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THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6614.

Memorandum Spec'n 20109

SPECIFICATION FOR LOCOMOTIVES 10 30 D 681

FOR Abilene & Southern Railway.

HNW.

Class as Photo. 6038.

Engine Drawing No. 92.

5-17-20.

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 11' 4" Driving 11' 4" Total 21' 7"
Total wheelbase, eng. and tend. {Actual 51' 2" / Limited to ---

Curves ---

Limits, Height --- Width ---
Weight (approximate) in working order, Total 126,000 pounds.
On F. tr'k 32,000 lbs., Drivers 94,000 lbs., B. tr'k ---- lbs.

Tractive power 22,000 lbs. Ratio of adhesion 4.27
Work'g St'm Pres. 190 lbs., Service Freight.
Fuel Soft coal. Loco. to operate in Texas.
Locomotive to meet all I. C. C. requirements.
Boiler Steel. Thick ⅝" & 11/16" Bill 8670
Front Tube Sheet ½" Thick
Boiler, Diam. 58" Plan Extended wagon top.
{Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.
{With Factor of Safety of 4.5 267 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips.
Auxiliary dome: None
Dome, diam. 33" Pos. Central.

Firebox Steel. Combustion chamb. None.
Firebox, length 76-3/16" Width 42⅜" Depth F. 59¼" B. 58¼"
Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"
Firedoor opening 16" diam. Fire door, Franklin Butter-fly type.
Water space, Front 4" Sides 3" Back 3"
Water space frame Single Riveted
Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O.S.
{Two rows B. L. W.
Radial stays 1" diam. Sling stays front {Expansion stays.
Button heads below crown on Eight central rows
Crown bars None. Placed --- above crown
Crown bolts ----

Flues No. 9 B. W. G. Steel.
Tubes No. 12 B.W.G. Charcoal iron or steel, (B.L.W. Option).
Tube ends Swaged for copper ferrules, fire box ends.
Number {21 / 131 Diam. {5⅜" / 2" Length 12' 6"
Superheater flues to be welded to fire box tube sheet.
Heating Surface {Flues 367 Combus. Chamb. --- Total 1327
{Tubes 852 Fire Box 108 Fire Brick Tubes ----
Grate area 22.3 Ratio to Heating Surface 1: 59.5
Superheater 312

Fire Brick Arch, on studs.

Grates Rocking bars and drop plates.
Ash Pan, Dampers Front and back.
Ash pan to be of the self cleaning type.
Throttle to have auxiliary drifting valve.
Throttle Balance. Pos. Dome.
Dry pipe Steel. Superheater as Locomotive Superheater
Co's Specn. No. 0-14721, dated 8-27-20, (Copy attached).
Superheater Schmidt type, to connect with top header in smoke box and to have outside steam pipe connection to valve chambers. Royalty payable by The B. L. W.
Smokebox extenstion With. {Cleaning hole and cap L. S. Only, with additional hand hole and cap in each side of smoke box for inspection of superheater.
Spark ~~ejector or~~ hopper With.
Netting and deflect. plates With.
Exhaust nozzles Single high.

Stack Cast iron, straight. Dia. 16"

Safety Valves Two Coale, 3" Open. (Spec)
Safety valves None with relief lever, Set to 190 pounds.
Whistle One B. L. W. Plain.

Steam Gauge One Iron 7". Maker: Ashcroft. (Not Spec)
Steam gauge stand Iron. **Clock** None

Water Gauge One B.L.W. Ironclad. **Cab Lamps** Electric.
Gauge Cocks Three back. Surface valve None.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve without separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One "Everlasting" Pos: Front.
Cleaning Plugs
Firebox, Corners diagonal, sides and back.
Crown, Two each side and two back.
Waist, One under front.
Front tube sheet. One. Fusible plug One.

Furnish to Railway Company the following data:-
Copy in triplicate specification card on I.C.C. form 151;
Copy in triplicate annual locomotive inspection and repair report form No. 3. Two blue prints of boiler and two blue-prints of locomotive erecting card.
All other data customarily furnished with a new locomotive.

Injectors Two Ohio, type "A" (Spec) No. 9
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check B. L. W. Pos. Right and left.

Steam Heat None.

Cab Steel.

Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 34"

Pilot Wood.
Front Bumper Oak. Bumper plate With.
Steps Hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"
Coupler M. C. B. Automatic.

Signal fixtures Iron on bumpers.
Headlight equipment to be Pyle National Electric, type K-2, with incandescent headlight and with dimmer attachment.
Headlight One round case, 18" Reflector.
Headlight, Nos. on sides With. H'd'l't step None.
Lamp shelf None. Nosing ----
For hereafter: Headlight step to be applied.
Bell 92 pounds. Viloco air bell ringer.
Sand Box One Diam. 31" Body Iron painted. Pipes Iron.
Sander (Spec) Viloco air, style AL-110, to sand front and back.
Dome casing Iron painted.

Boiler Jacket #22 soft steel pto. Bands Iron. Style 9
Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS Oct 1920.

W L Moore-

SPECIFICATION FOR LOCOMOTIVES 10 30 D 681.

FOR Abilene & Southern Railway.

HNW.

2

Frames Cast steel.

Cylinders, Diam. 18" Stroke 24"
St'm ports, Length 20⅜" Width 1⅞" Bridges ----
Exh. ports, length --- Width --- Valve lean ¼"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 13½" By-pass valve None.
S. F. Lubr. (Spec) Nathan five feed No. 31, Bull's Eye.
Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings ---- Covers ----
St'm chest valves 9½" diam. Piston type.
Met. pkg. (Not spec) (Piston rods / Valve stems) United States, King type.
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron with rings of cast iron sprung in.
Guides Alligator type, steel. Guide caps Needle.
Crossheads Cast steel, with bearings of cast iron, tinned.
Wrist Pins Steel. Rod caps Grease cups forged solid on rods.
Parallel rods to have solid ends.

Valve Motion Walschaerts.
(Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts except stayBolts, to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners None.
Drivers, O. S. Diam 57" Cen. diam. 50", centers cast iron.
Tires from Standard Steel Works.
Tires Steel. Held by Shrinkage and shoulder.
Tires, Flanged, Pos. Front and back. Size 3½" x 5½"
Tires, Plain, Pos. Middle. Size 3½" x 6½"
Lateral play between driving boxes and wheel hubs 3/16" total.
Driving Boxes Steeled cast iron, with Elvin Grease cellers.
Journals, Diam 8" Length 9".

Springs. Make Standard Steel Works.

Front Engine Truck Four Wheeled Swing bolster, center bearing.
To swing 2⅜" each side of cen., Cen. pin liners None.
Journals, Diam. 5" Length 8" Boxes Cast iron.
Wheel hub liners None.
Wheels, Diam 28" Tread 4¼" Kind Chilled cast iron plate.
Tires None. Cen. diam. ---, Size ---
Tires held by ---

Back Engine Truck None. Wheeled ---
To swing -- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels.
Operating Parts {Engine, sch. No. 6 ET. Westg. Combined auto. and straight air.
Foundation Parts {Drivers, sch. WM-1 American outside equalized. / Eng. Trk. sch. ---
Air pump One 9½" Pos. Left side.
Train connections Front and back.
Train signal, sch. ----
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1434.
Weight, with fuel and water, about 100,000 pounds.
Tender to be weighed: Yes.
Tank 5,000 Gallons Spec 4830
Tank "U" shape, straight top. Fuel capacity 10 tons.

Tool Boxes Hard wood, top.

Frame Steel, 8" and 10" channels, with bumpers of wood and steel plate.
Front Drawbar height 31⅜"
Pilot None.
Back drawhead, center above rail 33½"
Coupler M. C. B. Automatic.

Steps Hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, Standard steel works.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4¼" Kind Chilled cast iron plate.
Tires None. Cen. diam. --- Size ---
Tires held by ----
Safety chains Single.
Tender brake beams from American Steel Foundries.
Brake Position On all wheels.
Brake sch. No. 6 ET. Westg. Auto. and Straight air, with 12" x 12" tender cylinder.

List of tools, sch. 29. One pair wrecking frogs.
Photo sch. No. 2. Inspection B. L. W.
To be weighed No. Material specifns B. L. W.
Certificate of boiler test Three copies B. L. W. form 1036.
Junior laws to 9-1-20 Shipment On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

Painting, style → 291, Olive green and aluminum.

Lettering, etc., in white paint, i.e., aluminum.
Mark on cab panel: A. & S.
Mark on tank sides: Abilene and Southern.

Road Nos. Poe Road Nos. Name None.
F. No. plate. 18
Sand box.
Back of tank.

Actual Dimensions of Loco. → Width over front bumper, 9' 7"
Extreme height over all 14' 4"
Extreme Width: Cab boards 10' 3" ~~Cylinders or~~ valve motion 9' 5⅛"
Length outside face front bumper of engine to face of tender wedge 29' 8"
Length face of tender wedge to outside face back bumper of tender 26' 4½"
Total length outside face front bumper of engine to outside face back bumper of tender 56' 0½"

SPECIFICATION FOR LOCOMOTIVES: 10 30 0 681

FOR: ABILENE & SOUTHERN RAILWAY.

Specification for Type A Double Loop Superheater..... SPECIAL O-1472 DATED AUG. 27TH, 1920.

BOILER TUBES ...131...in number.....2.....o. d.....12.....ft.....6.....in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.

BOILER FLUES ...21...in number...5½"...o. d...#9 BWG...of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18.....Card 1469-G

BOILER FLUE SETTING ¼ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections.....Card 1136

TUBE SHEET LAYOUT .....Card 31-50685

UNITS ...21...units...12.....o. d.....#9 BWG.....Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.

UNIT PIPE SUPPORTS Of steel, fastened securely on superheater pipes so as not to slide.....Card 10773

UNIT PIPE JOINT Made in best possible manner to insure absolutely tight joints.....Card 1052

UNIT CLAMP BOLT In accordance with Locomotive Superheater Company Material Specification No. 12-A.....Card 10644

HEADER Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls.....Card 10392-E

HEADER SUPPORTS Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place.....Card 1323

STEAM PIPE JOINT RINGS Of cast-iron.

DEFLECTING PLATE To permit of easy inspection and removal of superheater units.....Card SEE ARRGT.

DAMPER CYLINDER Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing.....Card 1149-J

DAMPER SHAFT COUNTERWEIGHT Painted a light color to render it easily visible by the engineer.....Card 1067

PYROMETER Model No. ..... Pyrometer.....Card NONE

PYROMETER ARRANGEMENT Generally in accordance with.....Card

PYROMETER BRACKET Firmly fastened to boiler to prevent vibration.....Card

S. H. ARRANGEMENT In accordance with.....Card 4804-A

TEST (FINAL) The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30# more than the working pressure of the boiler.

DAMPER	Card 1082-A	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1585
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. PIPE BAND	Card
DAMPER CYL. SUPPORT FITTING	Card 11138	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1059	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1058	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O. S.)	Card 1138	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I. S.)	Card 10386	DEFLECTING PLATE HANDLE	Card 1457
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A

THE BALDWIN LOCOMOTIVE WORKS As Spec'n C-7033

Memorandum Spec'n 21009

SPECIFICATION FOR LOCOMOTIVES 6 28 D 333

FOR AMERICAN BRIDGE COMPANY

Gen. as PHOTO. 3097

Engine Drawing No. 48

P

3-11-21

Gauge of Road 4' 8½" Play 3/8"

Wheelbase, Rigid 9' 6" Driving 9' 6" Total 9' 6"

Total wheelbase, eng. and tend. (Actual --- Limited to ---)

Curves --- GRADES 1%

Limits, Height --- Width ---

Weight (approximate) in working order, Total 111,000 POUNDS

On F. tr'k --- lbs., Drivers 111,000 lbs., B. tr'k --- lbs.

Tractive power 21,400 lbs., Ratio of adhesion 5.05

Work'g St'm Pres. 160 lbs., Service SWITCHING

Fuel SOFT COAL

Boiler STEEL Thick 8/16" Bill 9373

Front Tube Sheet 12/16 Thick.

Boiler, Diam. 58" Plan STRAIGHT TOP

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 5.08 **Tested to** 300 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS, SEXTUPLE RIVETED.

Dome, diam. 29" Pos. CENTRAL

MAIN DOME, ONE-PIECE TYPE. AUXILIARY DOME, NONE

Firebox STEEL Combustion chamb. NONE

Firebox, length 67 5/8" Width 41 1/4" Depth F. 57 1/2" B. 56 1/2"

Firebox, Tube 12/16" Crown 3/8" Sides 3/8" Back 3/8"

Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame SINGLE Riveted

Water space stays 7/8" DIAM. WITH 3/16" HOLES 12/16" DEEP FROM C.S. {TWO ROWS B. L. W. EXPANSION STAYS}

Radial stays 1" DIAM. Sling stays front

Button heads below crown on EIGHT central rows

Crown bars NONE Placed --- above crown

Crown bolts ---

TUBES TO BE MANUFACTURED BY THE NATIONAL TUBE CO.

Tubes #12 B.W.G. COLD DRAWN OR HOT ROLLED SEAMLESS STEEL

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 200 Diam. 2" Length 10' 0"

Heating Surface Flues --- Combus. Chamb. --- Total 1136 sq. ft.

Tubes 1038 sq. ft. Fire Box 98 sq. ft. Fire Brick Tubes ---

Grate area 19.4 sq. ft. Ratio to Heating Surface 1: 58.5

Superheater ---

Fire Brick ARCH, ON STUDS

Grates ROCKING BARS AND DROP PLATES

Ash Pan, Dampers FRONT AND BACK

Throttle BALANCED Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L. S. ONLY

Spark ~~ejector or~~ hopper WITH

Netting and deflect. plates WITH

Exhaust nozzles DOUBLE, HIGH

Stack STRAIGHT Dia. 14"

Safety Valves TWO COALE 2½" OPEN See XO-9916-'29

Safety valves BOTH with relief lever. Set to 160 POUNDS

Whistle ONE B. L. W. PLAIN

Steam Gauge ONE IRON 6" MAKER: U. S. GAUGE CO.

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B. L. W. IRONCLAD **Cab Lamps** TO BURN OIL

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE B. L. W. Pos: FRONT

Cleaning Plugs

Firebox, CORNERS DIAGONAL

Crown, ONE EACH SIDE AND THREE BACK

Waist, ONE UNDER FRONT

Front tube sheet, ONE 2" fusible plug ONE

MATERIALS ENTERING INTO CONSTRUCTION OF THIS LOCO., AS FAR AS POSSIBLE, TO BE PURCHASED FROM THE UNITED STATES STEEL CORP.

BOILER TO BE BUILT FOR 200 POUNDS WORKING PRESSURE WITH SAFETY VALVES SET FOR 160 POUNDS WORKING PRESSURE.

MACHINERY TO BE BUILT FOR 180 POUNDS PRESSURE.

BOILER TEST PRESSURE PLATES ON BACK HEAD OF BOILER TO SHOW THAT BOILER HAS BEEN BUILT AND TESTED FOR 200 POUNDS WORKING PRESSURE.

Injectors TWO MONITOR (NOT SPEC) No. 7

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B.L.W., WITH STOP VALVE Pos. R. AND L.

Steam Heat NONE

Cab STEEL CAB WINDOW SASH AND DOORS OF STEEL.

CAB TO HAVE SLIDING WINDOWS AND DOORS ARRANGED TO SLIDE INSIDE.

WINDOW SCREENS FOR REAR WINDOWS.

Cab boards WOOD Nosing NONE

Running boards WOOD Nosing NONE

Hand rail IRON Located on TANK

Back Bumper OAK

Pilot NONE

Front Bumper OAK Bumper plate WITH

Steps ACROSS FRONT AND REAR WITH SUITABLE HAND RAILS.

STEPS, HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

F. & B. Drawhead, Center above rail 33½"

Coupler M. C. B. AUTO.

Signal fixtures NONE

Headlight TWO ROUND CASE 16" Reflector, To burn KEROSENE

Headlight, Nos. on sides WITH H'dl't step WITH

Lamp shelf NONE Nosing ---

Bell 35 POUNDS

Sand Box TWO Diam. 28" Body IRON PAINTED Pipes IRON

Sander HAND, IN EACH BOX, TO SAND FRONT AND BACK

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

J.N.V. McNeil May-1921

SPECIFICATION FOR LOCOMOTIVES 6 28 D 333

FOR AMERICAN BRIDGE COMPANY

P

5

5

Frames CAST STEEL

Cylinders, Diam. 17" Stroke 24"

St'm ports, Length 16" Width 1¼" Bridges 1"

Exh. ports, Length 16" Width 2½" Valve lead 1/10"

Valve travel 5½" Steam lap 1" Exhaust clearance ---

Eccentric ~~crank~~ throw 5½" By-pass valve NONE

S. F. Lubr. DETROIT THREE FEED NO. 22 BULL'S EYE (NOT SPEC)

Cyl'r heads CAST IRON LUBR. PIPES OF IRON UNDER JACKET

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED

St'm chest casings IRON PAINTED Covers STEEL PAINTED

St'm chest valves RICHARDSON BALANCED WITH VACUUM VALVES

Met. pkg (NOT SPEC) UNITED STATES, KING TYPE

PISTON RODS TO BE KEYED TO CROSSHEADS

Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN

Guides SOFT STEEL, CASE HARDENED Oil cups NEEDLE

Crossheads CAST STEEL, WITH BEARINGS OF BRASS.

Wrist Pins STEEL Rod cups PLUNGER, FORGED ON

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON

~~Links, sliding blocks, pins, lifting links and eccentric rod laws to be well case hardened or to have hardened bushings.~~

VALVE MOTION, LINKS, NUTS, PINS ETC. TO BE CASE HARDENED.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Tender NONE

Tank 1200 Gallons. Bill 5643

SADDLE TANK OVER TOP OF BOILER.

Fuel BOX ON REAR EXTENSION OF ENGINE FRAME, BACK OF CAB, CAPACITY 2500 POUNDS.

LOCOMOTIVE TO CONFORM TO THE SAFETY LAWS AND REQUIREMENTS OF THE CITY OF TRENTON AND STATE OF NEW JERSEY. LOCOMOTIVE TO CONFORM TO ALL I. C. C. REQUIREMENTS.

BOILER TO CONFORM TO A. S. M. E. CODE. (SEE SUP. 11 &6)

BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO. (SEE SUP. 11, 29).

PURCHASER TO BE ADVISED WHEN READY FOR INSPECTOR TO INSPECT CONSTRUCTION OF LOCOMOTIVE.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE

Drivers, O. S. Diam. 44" Cen. diam. 38" CENTERS CAST IRON

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND REAR Size 3" x 5 1/2"

Tires, Plain, Pos. MIDDLE Size 3" x 6½"

Driving Boxes STEELED CAST IRON

Journals, Diam. 8" Length 8½"

LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN PEDESTAL FITS: 7/32" TOTAL

Springs. Make B. L. W.

Front Engine Truck NONE Wheels ---

To swing --- each side of cen. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck NONE Wheels ---

To swing --- each side of cen. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL WHEELS (NO TENDER)

Operating Engine, sch. "S" AMERICAN STEAM

Parts Eng. Tr'k, sch. ---

Foundation Drivers, sch. WM-2 AMERICAN OUTSIDE EQUALIZED

Parts Eng. Tr'k, sch. ---

Air pump NONE Pos. ---

Train connections NONE

Train signal, sch. NONE

MAIN CYLINDER LUBR. TO HAVE ONE FEED PIPED TO STEAM BRAKE CYLR.

STEAM BRAKE EXHAUST TO BE PIPED TO SMOKE BOX AND TO DISCHARGE THROUGH THE SMOKE BOX.

List of tools, sch. 155

Photo sch. No. 2 Inspection B. L. W. (EXCEPT SEE SUP. 6 & 11 &6

To be weighed YES Material specs B.L.W., (EXCEPT SEE SUP 44 *)

Certificate of boiler test THREE COPIES B. L. W. FORM 1036

Junior laws to 3-31-21 Shipment ON OWN WHEELS

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents NONE

Property plates NONE

Painting, style 220, OLIVE GREEN AND ALUMINUM

Mark on TANK SIDES, AMERICAN BRIDGE COMPANY IN BLOCK LETTERS 3" LONG X 32" HIGH.

Road Nos. Fr. --- Road Nos. --- Name NONE

F. NO. PLATE 13

CAB SIDES

BACK OF FUEL BOX

Actual Dimensions of Loco. Extreme height over all 14' 0 3/8"

Extreme Width Over cab boards 9' 2" Over cylinders or valve motion 8' 9½"

Length outside face of front bumper to outside face of back bumper of engine 26' 6 3/8"

11 BOILER TO BE OPERATED IN THE STATE OF NEW JERSEY
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

12 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDERS WORKS.

13 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND-ONE-HALF (1½) TIMES THE WORKING PRESSURE.

14 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

15 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6059.
SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

16 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

17 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST 1/2" BEYOND THE INSIDE OF THE PLATES

18 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:-

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	3/8"	7/16"	1/2"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MAY BE APPLIED.

19 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

20 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN 1/2" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN 3/8", (I. E., USE FUSIBLE PLUG CARD 4414 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS.)

25 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

26 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6058.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

27 THERE SHALL BE NOT LESS THAN SIX BRASS WASH-OUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEGS ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

28 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT TO EXCEED 1/4" LESS THAN FULL SIZE FOR PLATES OVER 5/8" IN THICKNESS, AND 1/8" LESS THAN FULL SIZE FOR PLATES 5/8" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED 1/8" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

29 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN 7/16". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(MANUFACTURER'S SERIAL NUMBER)	NEW JERSEY (STATE IN WHICH BUILT) NO. 7 (NUMBER OF STATE BOILER) THE BALDWIN LOCOMOTIVE WORKS (NAME OF MANUFACTURER) (LEAVE BLANK) (STATE NUMBER) (LEAVE BLANK) (YEAR BUILT) 200 LBS. (MAXIMUM WORKING PRESSURE WHEN BUILT)

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6739.

Memorandum Spec'n 20126.

SPECIFICATION FOR LOCOMOTIVES 6 36 D 342.

FOR (H.W.M.) American Steel and Wire Company.

HNW.

8-17-20

Gen. as **Photo.** 6308.

Engine Drawing No. 40.

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"
Total wheelbase, eng. and tend. Actual 42' 0½" Limited to ---

Curves ---

Limits, Height --- Width ---
Weight (approximate) in working order Total 137,900 pounds.
On F. tr'k --- lbs. Drivers 137,900 lbs. B. tr'k ---- lbs.

Tractive power 35,000 lbs. Ratio of adhesion 3.92
Work'g St'm Pres. 180 lbs. Service Switching.
Fuel Soft coal.

Boiler Steel. Thick 11/16" Bill 9280
Front Tube Sheet ½" Thick
Boiler, Diam. 68" Plan Straight top.
Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.
With Factor of Safety of 5.1 300 lbs. water pres.
Longitud. seams Butt jointed, double covering strips.
Main dome, one-piece type. Auxiliary dome, None.
Dome, diam. 29" Pos. Central.
Firebox Steel. Combustion chamb. None.
Firebox, length 108⅛" Width 42" Depth F. 65½" B. 62½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening 16" diam.
Water space, Front 4" Sides 3" Back 3"
Water space frame Double Riveted
Water space stays ⅜" diam. with 3/16 holes 1¼" deep from O.S.
Radial stays 1" diam. Sling stays front Two rows B. L. W. Expansion stays.
Button heads below crown on Eight central rows
Crown bars None. Placed --- above crown
Crown bolts ---

Flues ---
Tubes No. 11 B.W.G. hot rolled seamless steel.
Tube ends Swaged for copper ferrules, fire box ends.
Number 322. Diam. 2" Length 10' 5".

Heating Surface: Flues --- Combus. Chamb. --- Total 1903
Tubes 1742 Fire Box 161 Fire Brick Tubes ---
Grate area 31.5 Ratio to Heating Surface 1: 60.5
Superheater ---

Fire Brick Arch, None.

Grates Rocking bars with drop plate.
Ash Pan, Dampers Front and back.

Throttle Balance. Pos. Dome.
Dry pipe Steel.

Superheater None.

Smokebox extenstion With. Cleaning hole and cap L. S. Only.
Spark ejector or hopper With.
Netting and deflect. plates With.

Exhaust nozzles Double, high.

Stack Cast iron, straight. Dia. 18"

Safety Valves Two Consolidated 2½" Open. (Not spec'd)
Safety valves Both with relief lever, Set to 180 pounds.
Whistle One B. L. W. Plain.

Steam Gauge One Iron 7" Maker: Ashcroft.
Steam gauge stand Iron. **Clock** None.

Water Gauge One B.L.W. Ironclad **Cab Lamps** To burn oil.
Gauge Cocks Three back. Surface valve None.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve without separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.
Cleaning Plugs One plug above fire door.
Firebox. Corners diagonal, sides and back.
Crown, three each side and two back.
Waist, One under front.
Front tube sheet One. Flue sheet One.

Pump None.

Injectors Two Monitor (Not spec'd) No. 9
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check B.L.W., with stop valve. Pos. Right and left.

Steam Heat None.

Cab Steel.

Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler and cab.

Back Bumper Bar steel. Back drawbar height 31½"

Pilot None.
Front Bumper Cast steel. Bumper plate None.
Steps Across front with hand holds.
Steps, hand holds, etc., to conform to I. C. C. requirements.
Front Drawhead, Center above rail 33½"
Coupler M. C. B. Auto.

Signal fixtures Iron on bumper.

Headlight Two round case 16" Reflector, To burn kerosene.
Headlight, Nos. on sides With. H'dl't step With.
Lamp shelf None. Nosing ---

Bell 92 pounds.
Sand Box Two Diam. 28" Body Iron painted. Pipes Iron.
Sander (Not spec'd) Leach air, trap A-1, in each box, to sand front and back.

Dome casing Iron painted, with pressed steel top and bottom rings.

Boiler Jacket #18 Soft steel pto. Bands Iron. Style 9
Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

J. Bretherick Jan-1921

SPECIFICATION FOR LOCOMOTIVES 6 36 D 342.

FOR American Steel and Wire Company.

HNW.

Frames Cast steel.

Cylinders, Diam 21" Stroke 26"
St'm ports, Length 19" Width 1⅞" Bridges 1¼"
Exh. ports, Length 19" Width 3¼" Valve lead ⅛"
Valve travel 5⅝" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 13-13/16" By-pass valve None.
(Not spec'd) S. F. Lubr. Nathan triple No. 9 Bull's Eye.
Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings Iron painted. Covers Steel painted.
St'm chest valves Richardson balanced, with vacuum valves.
(Not spec'd) Met. pkg. Metal to metal valve stems United States, King type.

Pistons Heads of cast iron with rings of cast iron sprung in.
Guides Steel. Guide cups Needle.
Crossheads Cast steel with bearings of cast iron tinned.
Wrist Pins Steel. Boil cups Plunger, forged on.
Parallel rods to have solid ends.

Valve Motion Walschaerts
Links, sliding blocks, pins, lifting links and eccentric rod bars N. Case hardened or with hardened bushings.

All threads on bolts (except stayBolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners Bronze, for main wheels only.
Drivers, O. S. Diam 50" Cen. diam. 44"
Wheel centers: Main, cast steel; others, cast iron.
Tires Steel. Held by Shrinkage and shoulder.
Tires, Flanged, Pos. All. Size 3" x 5½"
Tires, Plain, Pos. None. Size ---
Lateral play between driving boxes and wheel hubs 3/16" total.
Driving Boxes Steeled cast iron.
Journals, Diam 9" Length 12"

Springs. Make B. L. W.

Front Engine Truck None. Wheels: ---
To swing -- each side of cen., Cen. pin liners --
Journals, Diam. -- Length -- Boxes --
Wheel hub liners --
Wheels, Diam. -- Tread -- Kind --
Tires -- Cen. diam. -- Size --
Tires held by --

Back Engine Truck None. Wheels: ---
To swing -- each side of cen., Cen. pin liners --
Journals, Diam. -- Length -- Boxes --
Wheel hub liners --
Wheels, Diam. -- Tread -- Kind --
Tires -- Cen. diam. -- Size --
Tires held by ---

Brake, position On all driving and tender wheels.
Operating Engine, sch. No. 6 ET. Nestg. combined auto. and straight air.
Parts Eng. Trk. sch. ---
Foundation Drivers, sch. WM-2 American O. S. Equalized.
Parts Eng. Trk. sch. ---
Air pump One 9½" Pos. Left side.
Train connections Front and back.
Train signal, sch. None.
Air reservoir to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1636.
Weight, with fuel and water, about 84,000 pounds.
Tender to be weighed: Yes.
Tank 4,000 Gallons, Bl. 5558
Tank "U" shape, sloping back. Fuel capacity, 6 tons.

Top Boxes of hard wood, top.

Frame Steel, 8" and 10" channels, with bumpers of wood reingorced with steel plate.
Front Drawbar height 31½"
Pilot None.
Back drawbar, center above rail 33½"
Coupler M. C. B. Auto.

Steps, hand holds, etc., to conform to I. C. C. requirements
Slide across rear, with hand holds.

Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, B. L. W.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 30" Tread 1¼" Kind Chilled cast iron plate.
Tires None. Cen. diam. --- Size ---
Tires held by --- Wheel rims, 2½" thick.
Spring chains Single.

Brake Position On all wheels.
Brake gear No. 6 ET. Westinghouse automatic and straight air, with 10" x 12" tender cylinder.

List of tools sch. 29
Photo sch. None. Inspection (See sup. I. 20.23)
To be weighed No. Material specified B. L. W., except (See sup. 4.22)
Certificate of boiler test Three copies, B. L. W. form 1036.
Similar tanks to 11-1-20. Shipment On own wheels.

Brass shop finish No. 1.
Machine shop finish D-165.

B. L. W. Patents None.

Priority plates None.

Painting, style 231, Olive green and aluminum.

Marking Tank sides: American Steel & Wire Company

Road Nos. Pos. Road Nos. Name None.
F. No. Plate. 30
Cab sides.
Back of tank.

Actual Dimensions of Loco. Extreme height over all 14' 11"
Extreme Width: Cab boards 10' 1" Cylinders or valve motion 10' 2½"
Length outside face front bumper of engine to face of tender wedge 29' 3½"
Length face of tender wedge to outside face back bumper of tender 24' 8½"
Total length outside face front bumper of engine to outside face back bumper of tender 53' 11½"

MASSACHUSEETS STATE REQUIREMENTS FOR BOILERS.

SPECIFICATION FOR LOCOMOTIVES:- 6 36 D 342

FOR:- AMERICAN STEEL AND WIRE Co.

HNW.

1 BOILERS TO BE BUILT TO CONFORM TO THE REQUIREMENTS OF THE STATE OF MASSACHUSETTS, MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE, SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1¼ TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL,	MASS. CODE PAGE 41.
MATERIAL FOR ONE PIECE DOME,	MASS. CODE PAGES 41 AND 49.
BOILER RIVET STEEL,	MASS. CODE PAGE 41.
BOILER BRACE IRON,	MASS. CODE PAGE 78.
BOILER STAYBOLT IRON,	MASS. CODE PAGE 78.

5 ALL BOILER STEEL SHALL BE OF FIREBOX STEEL. ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B. L. W. MARKING CARD 6854. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B. L. W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE, (1918). LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B. L. W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS SHOULD NOT BE MORE THAN GIVEN IN THE TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4⅛"	4⅜"
7/8"	180	3 15/16"	4⅛"
7/8"	190	3 15/16"	4"
7/8"	200	3 11/16"	3 15/16
1"	225	3½"	4⅛"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 5,000 POUNDS PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, (SEE TRACING 34108).

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 6,500 POUNDS PER SQ. IN. IF GREATER, TENSILE NOT MORE THAN 62,000 POUNDS, YIELD NOT LESS THAN 1/2 TENSILE STRENGTH, ELONGATION (IN 8") NOT LESS THAN 28%.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET:	MINIMUM THICKNESS:
42" OR LESS.	3/8"
OVER 42" TO 54", INCLUSIVE.	7/16"
OVER 54" TO 72", INCLUSIVE.	1/2"
OVER 72"	9/16"

WHEN TUBE SHEET IS NOT CIRCULAR IN FORM (I.E., FIRE BOX TUBE SHEETS) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 POUNDS, PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 POUNDS, THE VERTICAL SEAMS MUST BE OF DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8" AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIAMETER, TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

13 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN FOLLOWING TABLE:

SIZE OF PIPE CONNECTION OF CORRESPONDING TAPER TAP.	1" AND 1¼"	1½" AND 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½"	11½"	8"
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NUMBER OF THREADS.	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

14 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼" PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

15 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 POUNDS, IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝" (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 POUNDS, AND FUSIBLE PLUG CARD 4219 FOR 175 POUNDS AND LESS.) TO PROJECT NOT LESS THAN 1".

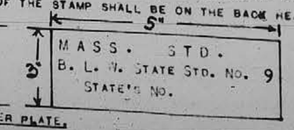
16 EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER, THE FEED WATER TO DISCHARGE BELOW THE LOWEST SAFE WATER LINE. FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS.

17 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE MASSACHUSETTS BOILER CODE, AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER, AS PER B.L.W. MARKING CARD 6958. THIS MARKING CARD SHOULD BE SPECIFIED ON THE STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

18 THERE SHALL NOT BE LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD, OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

19 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE, OR THEY MAY BE PUNCHED OUT, NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN POSITION. THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE, AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER. EDGES TO BE CHAMFERED TO A 1/16" RADIUS.

20 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE:



BRASS OR COPPER PLATE.

21. LOCOMOTIVE TO OPERATE AT WORCESTER, MASS.

22. BOILER TO MEET THE MASSACHUSETTS STATE LAW. (SUP IETC)

23. BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY. (SUP IETC)

24. BOILER TUBES TO BE PURCHASED FROM NATIONAL TUBE CO., COPY OF ORDER TO BE SENT MR. D. C. MACDONALD, DISTRICT PURCHASING AGENT, AMERICAN STEEL & WIRE CO., WORCESTER, MASSACHUSETTS.

25. THE FOLLOWING MATERIALS TO BE PURCHASED FROM CARNEGIE STEEL COMPANY:-
BOILER AND FIRE BOX STEEL.
TANK STEEL FOR ENGINE AND TENDER.
DRIVING AXLES.
TENDER AXLES.
PISTON RODS.
CONNECTING RODS.
WRIST PINS.
STUB STRAPS.
ALL OTHER MATERIAL WHERE POSSIBLE TO BE PURCHASED FROM CARNEGIE STEEL COMPANY.

26. SEND COPIES OF ALL REQUISITIONS ON CARNEGIE STEEL COMPANY TO MR. D. C. MACDONALD, DISTRICT PURCHASING AGENT OF THE AMERICAN STEEL & WIRE CO., 94 GROVE ST., WORCESTER, MASS.

27. MATERIAL TO BE INSPECTED BY THE BALDWIN LOCOMOTIVE WORKS. CONSTRUCTION OF THE LOCOMOTIVE TO BE INSPECTED BY MR. C. F. W. RYS, METALLURGICAL ENGINEER, CARNEGIE STEEL CO., PITTSBURGH, PENNSYLVANIA.
NOTIFY MR. RYS TWO (2) DAYS IN ADVANCE OF OUR BEGINNING WORK IN THE SHOPS ON THIS LOCOMOTIVE, SO THAT HE MAY ARRANGE FOR THE INSPECTION.

THE BALDWIN LOCOMOTIVE WORKS As Spec'n ~~C-6503~~ C-6635.

Memorandum Spec'n 20065

SPECIFICATION FOR LOCOMOTIVES 6-38-D 116 to 118

FOR ~~Stock~~ ALLEGHENY STEEL COMPANY, FOR 116.
THE OTIS STEEL COMPANY, FOR 117.
JONES & LAUGHLIN STEEL COMPANY, FOR 118.

HW.

Ry. Co's Class

Gen. as Photo. 6352

Engine Drawing No. 19

3-16-20 (Not Spec)

Gauge of Road 4'-8½" Play ¾"
Wheelbase, Rigid 11'-0" Driving 11'-0" Total 11'-0"
Total wheelbase, eng. and tend. {Actual 43'-4½" {Limited to ---

Curves ---

Limits, Height --- Width ---
Weight (approximate) in working order, Total 160,000 pounds
On F. trk --- lbs. Drivers 160,000 lbs., B. trk --- lbs.

Tractive power 37,750 lbs. Ratio of adhesion 4.24
Work'g St'm Pres. 150 lbs. Service SWITCHING
Fuel SOFT COAL

Boiler STEEL Thick 13/16" Bld 8876
Front Tube Sheet 9/16" Thick
Boiler, Diam. 72" Plan STRAIGHT TOP
{Allowable st'm pres. 190 lbs. {Tested to 200 lbs. steam pres.
{With Factor of Safety of 5.42 {Tested to 270 lbs. water pres.
Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

Dome, diam. 33" Pos FORWARD OF FIRE BOX.

Firebox STEEL Combustion chamb. NONE
Firebox, length 96-1/16" Width 39" Depth F. 71¼" B 69¼"
Firebox, Tube 9/16" Crown ½" Sides ⅜" Back ⅜"
Firedoor opening 16" DIAM.
Water space, Front 4" Sides 4" Back 4"
Water space frame DOUBLE Riveted
Water space stays ⅞" DIAM. WITH 3/16" HOLES, 1¼" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front {THREE ROWS B.L.W. EXPANSION STAYS
Button heads below crown on SIX central rows
Crown bars NONE Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 W.G. CHARCOAL IRON OR STEEL (B.L.W.OPTION)
Tube ends SPACED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 330 Diam. 2" Length 11'-0"

Heating Flues --- Combus. Chamb. --- Total 2046
Surface Tubes 1886 Fire Box 160 Fire Brick Tubes ---
Grate area 26 Ratio to Heating Surface 1: 78.7
Superheater ---

Fire Brick ARCH, NONE

Grates ROCKING BARS WITH DROP PLATE
Ash Pan, Dampers NONE

Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater NONE

Smokebox Extension WITH Cleaning hole and cap L.S.ONLY
Spark ~~arster or~~ hopper WITH
Netting and deflect. plates WITH

Exhaust nozzles DOUBLE, HIGH

Stack STRAIGHT Dia. 16"

Safety Valves TWO COALE 3" OPEN
Safety valves BOTH with relief lever, Set to 180 POUNDS
Whistle ONE B.L.W. PLAIN

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (Not Spec)
Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC FOR 116 & 117. TO BURN OIL FOR 118
Gauge Cocks THREE BACK Surface valve NONE
Lowest gauge cock 3" above highest part of crown
Lubricator steam valve WITHOUT separate dry pipe to dome
Blower Valve B.L.W. WITH BARCO SMOKE BOX FITTING.

Blow off Cock ONE B.L.W. Pos: FRONT
Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.
Firebox, CORNERS DIAGONAL AND SIDES
Crown, TWO EACH SIDE AND ONE AT ~~BACK~~
Waist, ONE UNDER FRONT
Front tube sheet, ONE Fusible plug ONE

Pump NONE
BOILER TO CONFORM TO THE A. S. M. E. CODE, FOR PENNA. FOR 116 & 118

BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

Injectors TWO MONITOR (Not Spec) No. 9
Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER
Pipes, Check IRON Feed IRON Overflow IRON
Check B.L.W. WITH STOP VALVE Pos. RIGHT AND LEFT

Steam Heat NONE

Cab STEEL

CAB BOARDS TO BE COVERED IN CAB, WITH WOOD 1" THICK.
Cab boards STEEL Nosing T-IRON
Running boards STEEL Nosing T-IRON
Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 32"

Pilot NONE Pushing shoes CAST IN BUMPER
Front Bumper CAST STEEL Bumper plate NONE
Steps ACROSS FRONT WITH A.C. RAILS.
STEPS, HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.
Front Drawhead, Center above rail 33½"
Coupler SHARON M.C.B. AUTOMATIC

Signal fixtures NONE
HEADLIGHT EQUIPMENT TO BE SCHROEDER WITH INCANDESCENT HEADLIGHTS, 18" CASES FOR 116 AND 117 ONLY.
Headlight TWO ROUND CASE 16" Reflector To burn KEROSENE
Headlight, Nos. on sides WITH Hdlt sides WITH
Lamp shelf NONE Nosing ---

Bell 92 POUNDS
Sand Box TWO Diam. 28" Body IRON PAINTED Pipes IRON
Sander LEACH AIR TRAP A-1, IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED

Boiler Jacket #18 SOFT STEEL Pto. Bands IRON Style 9
Boiler Lagging MAGNESIA SECTIONAL (Not Spec)

Loco. 6-38-D 117 FOR OPERATION IN OHIO: BOILER TO MEET THE A.S.M.E. CODE, EDITION OF 1914; SAFETY VALVES AND OTHER FITTINGS TO COMPLY WITH THE OHIO BOILER INSPECTION LAWS AND RULES, EDITION OF 1918.

THE BALDWIN LOCOMOTIVE WORKS

C.T. Powell Sept 1920

SPECIFICATION FOR LOCOMOTIVES 6-38-D 116 to 118

FOR ~~Stock~~ (See opposite page)

HW.

12
17

Frames CAST STEEL.
CYLINDERS TO BE BUSHED.
Cylinders, Diam. 22" Stroke 28"
St'm ports, Length 19" Width 1⅜" Bridges 1⅝"
Exh. ports, Length 19" Width 2¾" Valve bars 1"
Valve travel 5¼" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 12 2/32" (Not Spec) Cross valve NONE
S.P. Lubr. NATHAN TRIPLE BULL'S EYE, THREE PINTS CAP.
Cyl'r heads CAST IRON Lubr. PIPES OF IRON UNDER JACKET
Cyl'r casings IRON PTD. Hdlt rings STEEL PAINTED
St'm chest castings IRON PTD. Hdlt rings STEEL PAINTED
St'm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES (Not Spec)
Main pkg. rings UNITED STATES, KING TYPE.
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN.
Guides STEEL
Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.
Wrist Pins STEEL PLUNGER
PARALLEL RODS TO HAVE BOLT ENDS.
CROSSHEADS TO HAVE SIDE PLATES.
Valve Motion WALSCHAERT.

Wearing Bearings B.L.W.

Drivers, O.S. Diam. 51" Main 10½" CENTERS CAST STEEL

Tires STEEL Flanges, Front ~~Back~~ 2½" Size 32" x 5½"
Tires, Front, Pos. MIDDLE 32" x 5½"
Lateral play, Total 3" TOTAL
Driving Boxes CAST STEEL
Journals, Diam. 9" 10"

Springs, Make B.L.W.

Front Engine Truck NONE Wheels ---
To swing --- each side of center
Journals, Diam. --- Length --- Dia. ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Flange ---
Tires --- Size --- ---
Tires held by ---

Back Engine Truck NONE Wheels ---
To swing --- each side of center
Journals, Diam. --- Length --- Dia. ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Flange ---
Tires --- Size --- ---
Tires held by ---

Brake, ON ALL DRIVING AND TENDER WHEELS
Operating apparatus, No. 6-ET ESTD. COMBINED AUTO. AND STRAIGHT AIR,
Parts Eng. Trk. ---
Foundation, Driving sch. M-1, AMERICAN G.S. EQUALIZED
Parts Eng. Trk. ---
Air pump ONE 9½" Pos. LEFT SIDE
Train connections FRONT AND BACK
Train signal, sch. NONE
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.
TWO AIR DRUMS, ONE 20" x 60", AND ONE 20" x 84".

Tender EIGHT Wheels, Drawing No. 1553
Weight, with fuel and water, about 95,900 POUNDS
TENDER TO BE WEIGHED: No
Tank 4500 Gallons Built 5200
TANK "U" SHAPE, SLOPING BACK. FUEL CAPACITY 6 TONS.

Tool Boxes OF STEEL, TOP.

Frame STEEL, 6" AND 10" CHANNELS, WITH BUMPERS OF WOOD AND STEEL PLATE.
Front Drawbar height 33½"
Pilot NONE Pushing shoes WITH
Back drawbar, Center above rail 33½"
Coupler SHARON M.C.B. AUTO. WITH 6" x 6" SHANK.

Cabs, Extra room, Extra seats, Toilets, Retirements
Steps across ends of tender with handrails.
STEPS AND HAND RAIL ON SLOPING BACK OF TANK.
Trucks IRON BAR-TYPE, WITH CAST STEEL B LOLSTERS.

Springs ELLIPTIC, D. L. & W. MAKE
Journals, Diam. 5" Length 9" SYMINGTON JOURNAL BOXES.
Wheels, Diam. 33" Tread 4½" Kind CHILLED CAST IRON PLATE
Tires NONE Size ---
Tires held by ---
Safety appliances SINGLE

Brake Pos. ON ALL WHEELS PENNSYLVANIA BRAKE BEAMS.
Brakeshoes No. 9 ET ESTD. AUTO. AND STRAIGHT AIR, WITH 10" x 12" CYLINDERS.

List of Flues 29
Flues for NONE Injectors B.L.W. EXCEPT FOR BOILER
To be equipped NO Water scoops B.L.W. EXCEPT FOR BOILER
Certificate of Inspection THREE CARRIERS OF B.L.W. FOR 1936
Date Ready 5.10.20 Shipped ON OWN WHEELS
Boiler Shop No. 1
Machine Shop No. 2-1-3

B.L.W. Feed Pipe Strainer, Pat'd. Sept. 1, 1903 (cast on)
Patents
Property of Purchaser NONE

Painting, Style 291, OLIVE GREEN AND ALUMINUM
MARK ON TANK SIDES, ALLEGHENY STEEL COMPANY FOR 116.
MARK ON TANK SIDES, THE OTIS STEEL COMPANY RIVERSIDE WORKS FOR 117.
MARK ON TANK SIDES, JONES & LAUGHLIN STEEL CO. ALIQUIPPA WORKS FOR 118.
THE LOWER LINE IN MARK ON TANK TO BE IN SMALL LETTERS.
Name NONE
F. No. Plate 10 FOR 116
F. Sand Box 6 FOR 117
Cab Sides 16 FOR 118
Back of Tank

Actual Dimensions of Loco. Extreme height over all 14'-0"
Extreme Width Cab boards 10'-3¼" Cylinders ~~Steam chest~~ 10'-5½"
Length outside face front bumper of engine to face of tender sills 29'-10¾"
Length face of tender sills to outside face back bumper of tender 21'-5"
Total length outside face front bumper of engine to outside face back bumper of tender 54'-3½"

THE BALDWIN LOCOMOTIVE WORKS

SPECIFICATION FOR LOCOMOTIVES 6 38 D 116 TO 118 — 13

FOR STOCK — 13

RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF PENNSYLVANIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6059. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 3408.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOMES:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:-

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED. EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝". (I.E., USE FUSIBLE PLUG CARD 4104 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4019 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6059. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP, LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ¼" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS, AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S

PENNSYLVANIA (State in which boiler is owned) OHIO (Manufacturer's state number) FOR 117
27 TO 29 — 35
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (State's number) (LEAVE BLANK) (Year put in service)
(Manufacturer's Serial number)
180 POUNDS
(Maximum working pressure when built)

THE BALDWIN LOCOMOTIVE WORKS

Memorandum Spec'n 20135

SPECIFICATION FOR LOCOMOTIVES 6 38 D 131 TO 140

FOR STOCK

P

DUP. 6 38 D 118 WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Gen. as PHOTO. 6352

Engine Drawing No. 19

9-3-20

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 11' 0" Driving- 11' 0" Total 11' 0"
Total wheelbase, eng. and tend. {Actual 43' 4½" / Limited to ---

Curves ---

Limits, Height --- Width ---
Weight (approximate) in working order, Total 160,000 POUNDS
On F. tr'k --- lbs., Drivers 160,000 lbs., B. tr'k --- lbs.

Tractive power 37,750 lbs., Ratio of adhesion 4.24
Work'g St'm Pres. 180 lbs., Service SWITCHING
Fuel SOFT COAL

Boiler STEEL Thick 13/16" Diff 8376
Front Tube Sheet, 9/16" Thick
Boiler, Diam. 74" Plan STRAIGHT TOP
{Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.42} **Tested to** {200 / 270} lbs. steam pres / lbs. water pres
Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS

Dome, diam. 33" Pos. FORWARD OF FIRE BOX

Firebox STEEL Combustion chamb. NONE
Firebox, length 96-1/16" Width 39" Depth F. 71½" B. 69½"
Firebox, Tube 9/16" Crown ½" Sides ⅜" Back ⅜"
Firedoor opening 16" DIAM.
Water space, Front 4" Sides 4" Back 4"
Water space frame DOUBLE Riveted
Water space stays ⅝" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O. S.
Radial stays 1" DIAM. Sling stays front {THREE ROWS B. L. W. / EXPANSION STAYS}
Button heads below crown on SIX central rows
Crown bars NONE Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS
Number 330 Diam. 2" Length 11' 0"

Heating Surface Flues --- Combus. Chamb. --- Total 2046
Tubes 1886 Fire Box 160 Fire Brick Tubes ---
Grate area 26 Ratio to Heating Surface 1 : 78.7
Superheater ---

Fire Brick ARCH, NONE

Grates ROCKING BARS WITH DROP PLATE
Ash Pan, Dampers NONE

Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L.S. ONLY
Spark ~~ejector or~~ hopper WITH
Netting and deflect. plates WITH

Exhaust nozzles DOUBLE - HIGH

Stack STRAIGHT Dia. 16"

Safety Valves TWO COALE 3" OPEN
Safety valves BOTH with relief lever, Set to 180 POUNDS
Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (NOT SPEC)
Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** TO BURN OIL
Gauge Cocks THREE BACK Surface valve NONE
Lowest gauge cock ¾" above highest part of crown
Lubricator steam valve WITHOUT separate dry pipe to dome
Blower Valve B. L. W. WITH BARCO SMOKE BOX FITTING

Blow off Cock ONE B. L. W. Pos: FRONT
Cleaning Plugs ONE PLUG ABOVE FIRE DOOR
Firebox SEMICIRCULAR AND SIDES
Crown, TWO EACH SIDE AND ONE BACK
Waist ONE UNDER FRONT
Front tube sheet ONE Fusible plug ONE

Pump NONE
BOILER TO CONFORM TO THE A. S. M. E. CODE FOR PENNA. (Sup. Itc)

BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

Injectors TWO "MONITOR" (NOT SPEC) No. 9
Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER
Pipes, Check IRON Feed IRON Overflow IRON
Check B.L.W. WITH STOP VALVE Pos. RIGHT AND LEFT

Steam Heat NONE

Cab STEEL

CAB BOARDS TO BE COVERED IN CAB WITH WOOD 1" THICK.
Cab boards STEEL Nosing T-IRON
Running boards STEEL Nosing T-IRON
Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 32"

Pilot NONE Pushing shoes CAST IN BUMPER
Front Bumper CAST STEEL Bumper plate NONE
Steps ACROSS FRONT WITH HAND RAILS
STEPS, HAND HOLDS, ETC. TO CONFORM TO I. C. C. REQUIREMENTS
Front Drawhead, Center above rail 33½"
Coupler SHARON M. C. B. AUTOMATIC.

Signal fixtures NONE

Headlight TWO ROUND CASE 16" Reflector, To burn KEROSENE
Headlight, Nos. on sides WITH Hdlt. step WITH
Lamp shelf NONE Nosing ---

Bell 92 POUNDS
Sand Box TWO (NOT SPEC) Diam. 28" Body IRON PAINTED Pipes IRON
Sander LEACH AIR, TRAP A-1, IN EACH BOX, TO SAND FRONT AND BACK.
Dome casing IRON PAINTED

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON Style 9
Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

C. Powell Nov-1920

SPECIFICATION FOR LOCOMOTIVES 6 38 D 131 TO 140 15

FOR STOCK 15

P

Frames CAST STEEL
CYLINDERS TO BE BUSHED
Cylinders, Diam. 22" Stroke 26"
St'm ports, Length 19" Width 1⅞" Bridges 1⅛"
Exh. ports, Length 19" Width 2¾" Valve heads ¼"
Valve travel 5¼" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 12-7/32" By-pass valve NONE
S. P. Lubr. (NOT SPEC) NATHAN TRIPLE BULL'S EYE, THREE PINTS CAP.
Cyl'r heads CAST IRON Lubr. PIPES OF IRON UNDER JACKET.
Cyl'r casings IRON PAINTED Heads covers STEEL PAINTED
St'm chest castings IRON PAINTED Covers STEEL PAINTED
St'm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES
Met. pkg. (NOT SPEC) UNITED STATES, KING TYPE
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN.
Guides STEEL Outside clearance ---
Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED
Wrist Pins STEEL Rod caps PLUNGER
PARALLEL RODS TO HAVE SOLID ENDS
CROSSHEAD TO HAVE SIDE PLATES
Valve Motion WALSCHAERTS
(Links, sliding blocks, pins, lifting links and eccentric rod bays to be well case hardened or to have hardened bushings)

All threads on bolts (except stayboltes) to be United States Standard.
All finished renewable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners BRASS
Drivers, O. S. Diam. 51" Cen. diam. 44" CENTERS CAST STEEL

Tires STEEL Held by SHRINKAGE AND SHOULDER
Tires, Flanged, Pos. FRONT AND BACK Size 3½" x 5½"
Tires, Plain, Pos. MIDDLE Size 3½" x 6½"
Lateral play between driving boxes and wheel hubs 3/16" TOTAL
Driving Boxes CAST STEEL
Journals, Diam. 9" Length 12"

Springs. Make B. L. W.

Front Engine Truck NONE Wheels ---
To swing --- each side of cent. Cent. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck NONE Wheels ---
To swing --- each side of cent. Cent. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS
Operating { Engine, sch. No. 6-ET WESTG. COMBINED AUTO. AND STRAIGHT Air
Parts { Eng. Tr'k, sch. ---
Foundation { Drivers, sch. WM-3, AMERICAN O. S. EQUALIZED
Parts { Eng. Tr'k, sch. ---
Air pump ONE 9½" Pos. LEFT SIDE
Train connections FRONT AND BACK
Train signal, sch. NONE
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.
TWO AIR DRUMS, ONE 20½" x 60", AND ONE 20½" x 84".

Tender EIGHT Wheeled. Drawing No. 1953
Weight, with fuel and water, about 95,500 POUNDS
TENDER TO BE WEIGHED: No.
Tank 4500 Gallons, Bbl. 5200
TANK "U" SHAPE, SLOPING BACK. FUEL CAPACITY 6 TONS.

Tool boxes OF STEEL, TOP.

Frame STEEL, 8" AND 10" CHANNELS, WITH BUMPERS OF WOOD AND STEEL PLATE.
Front Drawbar height 33½"
Pilot NONE Pushing shoes WITH
Back drawbar height (NOT SPEC) 33½"
Coupler SHARON M. C. B. AUTO. WITH 6" x 6" SHORT SHANK.
Steps, hand holds, etc. TO CONFORM TO I. C. C. REQUIREMENTS.
Steps ACROSS REAR OF TENDER WITH HAND RAILS.
STEPS AND HANDRAIL ON SLOPING BACK OF TANK.
Trucks ARCH BAR TYPE, WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, B. L. W. MAKE
Journals, Diam. 5" Length 9" SYMINGTON JOURNAL BOXES
Wheels, Diam. 33" Tread 1¼" Kind CHILLED CAST IRON PLATE
Tires NONE Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE

Brake Position ON ALL WHEELS PENNSYLVANIA BRAKE BEAMS
Brake sch. No. 6-ET WESTINGHOUSE AUTO. AND STRAIGHT AIR, WITH 12" x 12" CYLINDERS.

List of tools, sch. 29
Photo sch. NONE Inspection B.L.W. EXCEPT FOR BOILER
To be weighed NO Material sheet B. L. W. EXCEPT FOR BOILER
Certificate of Engine test THREE COPIES B. L. W. FORM 1036
Junior loaded to 5-10-20 Shipment ON OWN WHEELS

Brass shop finish No. 1
Machine shop finish D-165

B. L. W.
Patents NONE

Property plates NONE

Painting, style 291, OLIVE GREEN AND ALUMINUM

Marking

Road Nos. Pos. Road Nos. Name

Actual Dimensions of Loco. Extreme height over all 14' 0"
Extreme Width: Cab boards 10' 3⅛" Extension ~~cab boards~~ 10' 5½"
Length outside face front bumper of engine to face of tender wedge 29' 10½"
Length face of tender wedge to outside face back bumper of tender 24' 5"
Total length outside face front bumper of engine to outside face back bumper of tender 54' 3½"

6 38 D 131, SOLD TO THE SPRINGFIELD TERMINAL R. R. Co.
CHANGES COVERED ON EXTRA ORDER No. 10640 DATED 9-29-22.
B. L. W. TO FURNISH I. C. C. BOILER FORMS.
PAINTING, STYLE --- BLACK, NO STRIPING.
LETTERING ETC. IN ALUMINUM LEAF.
MARK ON CAB SIDES, S. T. RY.
MARK ON TANK SIDES, SPRINGFIELD TERMINAL
ROAD NUMBER, 7: ON FRONT NO. PLATE, HEADLIGHT SIDES, DOME, AND ON SIDES OF CAB AND TANK. THE NUMBER ON CAB AND TANK TO BE DIRECTLY UNDER CENTER OF MARKING.

6 38 D 132 TO 134 SOLD TO CHICAGO GREAT WESTERN RY. Co., WITH CHANGES COVERED ON EXTRA ORDER No. 11594 DATED 10-28-22.
B. L. W. TO FURNISH I. C. C. BOILER FORMS.
ONE SET OF PRINTS TO BE FURNISHED.
COUPLER, FRONT OF ENGINE, M. C. B. AUTO., WITH 6" x 8" SHANK AND WITH DRAW CASTING AS B. L. W. PATTERN 185932.
COUPLING, REAR OF TENDER, M. C. B. AUTO., WITH WESTG.
FRICTION DRAFT GEAR, TYPE "D-4".
TRAIN AIR LINE ON ENGINE AND TENDER TO BE 1¼" TO MEET THE A. R. A. REQUIREMENTS.
HEADLIGHTS TO BE OMITTED. RY. CO. WILL FURNISH AND APPLY HEADLIGHTS AFTER DELIVERY OF LOCOS.
CAB LIGHTS FOR OIL, TO BE FURNISHED AND APPLIED BY THE B. L. W.
PAINTING, STYLE ---- BLACK, NO STRIPING.
LETTERING ETC. IN ALUMINUM, SAME AS FOR 12 48 ¼ E 1105 TO 1114 AND AS RY. CO'S. PRINTS J-316 AND Q-7 (HEREWITH).
CLASSIFICATION MARK ON CAB SIDES, B-7.
MARK ON TANK SIDES, CHICAGO GREAT WESTERN
MARK ON BACK OF TANK, 4500 GAL.
SAFETY MARKING, KEEP OFF, TO BE APPLIED ON FACE OF BUMPERS NEAR EACH END, AT FRONT OF ENGINE AND AT BACK OF TENDER.
ROAD NOS. 485 TO 487, ON F. NO. PLATE, F. SAND BOX, CAB SIDES AND ON BACK OF TANK COLLAR.
ROAD NUMBERS, PRECEDED BY LETTER "T" ON SIDES OF TENDER FRAME AND ON EACH END OF EACH TENDER TRUCK BOLSTER.

6 38 D 135, SOLD TO PITTSBURGH STEEL Co.
CHANGES COVERED ON EXTRA ORDER No. 12269 DATED 11-17-22.
MR. G. J. LAMBERT, SUPT. OF TRANSPORTATION OF THE M. S. R. R. AND MR. MOGAN, GEN'L. SUPT. OF THE PITTSBURGH STEEL Co., WILL COME TO PHILADELPHIA NOVEMBER 20 TO INSPECT LOCO.
B. L. W. TO FURNISH I. C. C. BOILER FORMS.
ONE COMPLETE SET OF BLUE PRINTS TO BE FURNISHED.
PHOTO. SCH. No. 2
PAINTING STYLE ---- BLACK, NO STRIPING
LETTERING ETC. TO BE IN WHITE PAINT.
MARK ON TANK SIDES, MONESSEN SOUTHWESTERN RAILWAY COMPANY, THE LEADING LETTERS TO BE 5" x 6" AND THE SMALL LETTERS TO BE 4" x 5".
ROAD NUMBER, 9, ON F. NO. PLATE, HEADLIGHTS, CAB PANELS AND ON BACK OF TANK UNDER HEADLIGHT.

6 38 D 136 AND 137, SOLD TO TOLEDO, ST. LOUIS & WESTERN R. R. Co., WITH CHANGES COVERED ON EXTRA ORDER No. 12271, DATED 11-17-22.
LOCOS. SUBJECT TO INSPECTION BY MR. RAPP. THE B. L. W. PITTSBURGH OFFICE TO BE ADVISED BY WIRE WHEN LOCOS. ARE READY FOR THIS INSPECTION.
LOCOS. HAVE BEEN ACCEPTED BY MR. RAPP AND ARE TO BE SHIPPED AS QUICKLY AS POSSIBLE.
B. L. W. TO FURNISH I. C. C. BOILER FORMS.
OMIT OIL HEADLIGHTS.
PROPERTY PLATES, B. L. W., FOR ENGINE AND TENDER.
PAINTING STYLE, --- BLACK, NO STRIPING
LETTERING ETC. IN ALUMINUM, AS SHOWN ON RY. CO'S. TWO BLUE PRINTS DATED 11-16-22 (HEREWITH)
CLASSIFICATION MARK ON CAB SIDES, B-9.
MARK ON TANK SIDES, T ST. L & W
MARK ON BACK OF TANK, CAP. 4500 GAL.
ROAD NUMBERS, 16 AND 17, ON FRONT NUMBER PLATE, FRONT SAND BOX, SIDES OF CAB AND ON SIDES OF BOTH HEADLIGHTS.

6 38 D 138 AND 139 SOLD TO DETROIT & TOLEDO SHORE LINE R. R., WITH CHANGES COVERED ON EXTRA ORDER No. 12272, DATED 11-17-22.
LOCOS. SUBJECT TO INSPECTION BY MR. RAPP. THE B. L. W. PITTSBURGH OFFICE TO BE ADVISED BY WIRE WHEN LOCOS. ARE READY FOR THIS INSPECTION.
THESE LOCOS. HAVE BEEN ACCEPTED BY MR. RAPP AND ARE TO BE SHIPPED AS SOON AS POSSIBLE.
B. L. W. TO FURNISH I. C. C. BOILER FORMS.
OMIT OIL HEADLIGHTS.
PROPERTY PLATES, B. L. W. FOR ENGINE AND TENDER.
PAINTING, STYLE ---- BLACK, NO STRIPING.
LETTERING ETC. IN ALUMINUM SAME AS FOR 10 40 E 170, EXCEPT OMIT BAND AROUND SIDES OF TANK.
MARK ON CAB SIDES { DETROIT & TOLEDO / SHORE LINE
MARK ON TANK COLLAR, DETROIT & TOLEDO SHORE LINE
MARK ON BACK OF TANK, 4500 U. S. GALL.
ROAD NOS. 115 AND 116, ON FRONT NO. PLATE, FRONT SAND BOX, SIDES AND BACK OF TANK AND ON SIDES OF BOTH HEADLIGHTS.

6 38 D 140 SOLD TO THE ALIQUIPPA & SOUTHERN R. R. Co., WITH CHANGES COVERED ON EXTRA ORDER No. 12862 DATED 12-7-22.
BOILER TO BE CAREFULLY TESTED AS RY. CO. REPORTS THAT THE BOILER OF 6 38 D 118 LEAKED BADLY WHEN DELIVERED.
B. L. W. TO FURNISH I. C. C. BOILER FORMS.
TANK FUNNEL SAME AS FOR EXTRA ORDER No. 25023 OF 1920, FOR 6 38 D 118.
PAINTING, STYLE 291, OLIVE GREEN AND ALUMINUM.
LETTERS AND FIGURES IN ALUMINUM, 8" HIGH.
MARK ON TANK SIDES, A. & S. R. R.
ROAD No. 112, ON FRONT NUMBER PLATE, F. SAND BOX, CAB SIDES AND BACK OF TANK.

SPECIFICATION FOR LOCOMOTIVES 6 38 D 131 TO 140 17
FOR Stock 17
RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF PENNSYLVANIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE, SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL	A.S.M.E. SPEC. PAGE 11
MATERIAL FOR ONE-PIECE DOME	
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMTER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜". (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼" THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

PENNSYLVANIA
(State in which boiler is to be used)
34 TO 36 & 38 TO 44
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK (State's number)) (LEAVE BLANK (Year put in service))
(Manufacturer's Serial number) 180 POUNDS.
(Maximum working pressure allowed)

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-7127

Memorandum Spec'n 21022

SPECIFICATION FOR LOCOMOTIVES 4 26 C 147

FOR AMERICAN SUGAR REFINING CO.

WKS

Gen. as PHOTO. 6020 {EXCEPT TO HAVE LAIRD TYPE GUIDES

Engine Drawing No. 20

6.14.21.

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 7' 0" Driving 7' 0" Total 7' 0"

Total wheelbase, eng. and tend, {Actual ——— {Limited to ———

Curves LAYOUT OF CO'S. TRACKS AS BLUE-PRINT (HEREWITH).

Limits, LIMITS: LENGTH OVER BUMPERS 27' 0".

Height 12' 6" OVERALL Width 9' 2" OVER CAB HANDLES

Weight (approximate) in working order, Total 93,000 POUNDS

On F. tr'k ——— lbs. Drivers 93,000 lbs. B. tr'k ——— lbs.

Tractive power 20,800 lbs. Ratio of adhesion 4.47

Work'g St'm Pres. 175 lbs. Service SWITCHING.

Fuel SOFT COAL

Boiler STEEL Thick ⅞" Rivet O-20

Front Tube Sheet ½" Thick

Boiler, Diam. 50" Plan STRAIGHT TOP

Allowable st'm pres. 175 lbs. **Tested to** 195 lbs. steam pres.

With Factor of Safety of 5.17 263 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

MAIN DOME: BUILT-UP TYPE AUXILIARY DOME: NONE

Dome, diam. 27½" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 72⅞" Width 42¼" Depth F. 49" B. 38"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET

Water space, Front 4" Sides 3" Back 3"

Water space frame SINGLE Riveted

Water space stays ⅜" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O. S.

Radial stays 1" DIAM. Sling stays front {TWO ROWS B.L.W. {EXPANSION STAYS

Button heads below crown on SIX central rows

Crown bars NONE Placed ——— above crown

Crown bolts ———

Flues ———

Tubes No. 12 B.W.G. CHARCOAL IRON

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 160 Diam. 2" Length 10' 9"

Heating Surface Flues ——— Combus. Chamb. --- Total 973 □'

Tubes 893 □' Fire Box 80 □' Fire Brick Tubes ---

Grate area 21.4 □' Ratio to Heating Surface 1: 45.5

Superheater ———

Fire Brick ARCH: NONE

Grates ROCKING BARS AND DROP PLATE

Ash Pan, Dampers FRONT AND BACK

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap NONE

Spark ~~ejector or~~ hopper WITH

Netting and deflect. plates WITH

Exhaust nozzles ~~SINGLE~~ DOUBLE HIGH

Stack CAST IRON, TAPERED Dia. 13"

Safety Valves TWO CONSOLIDATED 1½" OPEN

Safety valves BOTH with lifting lever. Set to 175 POUNDS

Whistle ONE B.L.W. PLAIN

Steam Gauge ONE IRON 6¾" MAKER: U. S. GAUGE CO. (Not Spec)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** TO BURN OIL

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE B. L. W. Pos. LEFT SIDE

Cleaning Plugs

Firebox, CORNERS AND SIDES

Crown, ONE EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT

Front tube sheet ONE 29 visible plug ONE

Pump NONE

Injectors TWO SELLERS, CLASS "N" (Not Spec) No. 6½

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B.L.W., WITH STOP VALVE Pos. R. AND L.

Steam Heat NONE

Cab WOOD

Cab boards WOOD Nosing NONE

Running boards WOOD Nosing NONE

Hand rail IRON Located on TANK

Back Bumper OAK

Pilot NONE

Front Bumper OAK Bumper plate NONE

Steps ACROSS FRONT AND REAR WITH HANDRAILS

STEPS, HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

F & B. Drawhead, Center above rail 33½"

Coupler M. C. B. AUTOMATIC

Signal fixtures NONE

HEADLIGHTS TO HAVE PROVISION FOR SIDE NUMBERS, BUT NUMBERS TO BE BLANK.

Headlight TWO ROUND CASE 16" Reflector, To burn KEROSENE

Headlight, Nos. on sides WITH H'd'l't step WITH

Lamp shelf NONE Nosing ———

Bell 85 POUNDS

Sand Box TWO Diam. 24" Body IRON PAINTED Pipes IRON

Sander HAND, IN EACH BOX, TO SAND FRONT AND REAR.

SAND BOXES TO HAVE HELAIT SHAPED LIDS.

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

L. G. Tandy July 1921

SPECIFICATION FOR LOCOMOTIVES 4 26 C 147

FOR AMERICAN SUGAR REFINING CO.

19

19

Frames CAST STEEL

Cylinders, Diam. 16" Stroke 24"

St'm ports, Length 16" Width 1¼" Bridges 1"

Exh. ports, Length 16" Width 2½" Valve lead 1/16"

Valve travel 5¼" Steam lap ¾" Exhaust clearance ———

Eccentric ~~crank~~ throw 5" By-pass valve NONE

S. F. Lubr. (Not Spec) DETROIT DOUBLE NO. 12 BULLS EYE

Cyl'r heads CAST IRON LUBR. PIPES OF IRON UNDER JACKET.

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED

St'm chest casings IRON PAINTED Covers STEEL PAINTED

St'm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES

Met. pkg. (Spec) PISTON RODS VALVE STEMS U. S. KING TYPE

Pistons HEADS OF CAST IRON, WITH RINGS OF CAST IRON SPRUNG IN.

Guides LAIRD TYPE, STEEL Oil cups N EEDLE

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL Rod cups NEEDLE

ALL RODS TO HAVE STRAP ENDS.

Valve Motion STEPHENSON

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case-hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE

Drivers, O. S. Diam. 44" Cen. diam. 38" CENTRES: CAST IRON

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. ALL Size 3" x 5½"

Tires, Plain, Pos. ——— Size ———

Lateral play between driving boxes and wheel hubs = (SEE SUP. 8)

Driving Boxes STEELED CAST IRON

Journals, Diam. 8" Length 8½"

Springs. Make B. L. W.

Front Engine Truck NONE Wheels ———

To swing ——— each side of cen. Cen. pin liners ———

Journals, Diam. ——— Length ——— Boxes ———

Wheel hub liners ———

Wheels, Diam. ——— Tread ——— Kind ———

Tires ——— Cen. diam. ——— Size ———

Tires held by ———

Back Engine Truck NONE Wheels ———

To swing ——— each side of cen. Cen. pin liners ———

Journals, Diam. ——— Length ——— Boxes ———

Wheel hub liners ———

Wheels, Diam. ——— Tread ——— Kind ———

Tires ——— Cen. diam. ——— Size ———

Tires held by ———

Brake, position ON ALL WHEELS (NO TENDER)

Operating { Engine, sch. U-2 B. L. W. STEAM

Parts { Eng. Tr'k. sch. ———

Foundation { Drivers, sch. U-2 B. L. W.

Parts { Eng. Tr'k. sch. ———

Air pump ——— Pos. ———

Train connections ———

Train signal, sch. ———

SEPARATE LUBRICATOR FOR STEAM BRAKE VALVE.

Tender NONE

Tank 1500 Gallons, Bill 5677

SADDLE TANK OVER TOP OF BOILER AND SMOKEBOX

TANK TO BE SET BACK SLIGHTLY FROM FRONT OF SMOKEBOX - ABOUT 6".

FUEL BOX ON REAR EXTENSION OF FRAME, BACK OF CAB, CAPACITY 2000 POUNDS.

FUEL BOXES TO HAVE TWO SLIDING GATES AND TO BE DESIGNED TO PROVIDE AMPLE ROOM FOR FIRING LOCOMOTIVE.

OPENING TO BE PROVIDED IN COAL BOX FOR CLEANING TUBES.

LOCOMOTIVE TO MEET ALL I. C. C. REQUIREMENTS, AND THE BOILER LAWS OF THE CITY OF PHILADELPHIA, AND STATE OF PENNSYLVANIA. (SEE A. S. M. E. BOILER CODE ATTACHED) (SEE SUP. 11 ETC.)

BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.

B.L.W. TRACING 45179 APPROVED, EXCEPT LENGTH OF CAB TO BE INCREASED TO HAVE FRONT WALL OF CAB 3" FROM BACK OF TANK.

RUNNING BOARDS TO BE HIGH IN ORDER THAT REPAIR TO SPRING RIGGING CAN BE EASILY MADE.

HAND RAILS ON SIDES OF CAB AND BACK OF COAL BOX TO BE MADE OF PIPE AND HAND RAIL COLUMNS.

TWO SUITABLE PIPE AND COLUMN HAND RAILS ON EACH SIDE OF CAB DOOR AND ACROSS FRONT AND REAR OF ENGINE.

LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS 7/32" TOTAL INCLUDING LATERAL PLAY IN DRIVING BOX PEDESTAL FITS.

List of tools, sch. 155

Photo sch. No. 2 Inspection B.L.W. (EXCEPT SEE SUP. 4, 11 to 29)

To be weighed YES Material specs B.L.W. (EXCEPT SEE SUP. 44)

Certificate of boiler test {THREE COPIES B.L.W. FORM 1036 {AND FIVE COPIES B.L.W. FORM 1915.

Junior laws to 6.18.21 Shipment ON OWN WHEELS

Brass shop finish, No. 1

Machine shop finish N-165

B. L. W.

Patents { NONE

Property plates NONE

LOCOMOTIVE TO BE VARNISHED ALL OVER.

Painting, style 222, BLACK AND GOLD

CYLINDERS, STEAM CHEST, DOME, SAND BOXES AND COAL BOX TO BE STRIPED IN GOLD SIMILAR TO PHOTO. 6020.

Mark on TANK SIDES AS CUT: (THE FRANKLIN SUGAR REFINING COMPANY)

LETTERING IN GOLD WITH GOLD BAND OUTSIDE.

FRONT NUMBER PLATE A STAR.

Road Nos. Pos. Road Nos. Name NONE

NONE

Actual Dimensions of Loco. Extreme height over all = 12' 3½"

Extreme Width { Over cab boards = 8' 9"

{ Over cylinders or valve motion = 8' 9"

Length outside face of front bumper to outside face of back bumper of engine = 26' 0"

SPECIFICATION FOR LOCOMOTIVES 4 26 C 147

FOR AMERICAN SUGAR REFINING Co.

P

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30

11 BOILER TO BE OPERATED IN THE STATE OF PENNSYLVANIA
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

12 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

13 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND-ONE-HALF (1½) TIMES THE WORKING PRESSURE.

14 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL) MATERIAL FOR ONE-PIECE DOME)	A.S.M.E. SPECS PAGE 14
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 32
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

15 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

16 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

17 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

18 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:-

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	⅞"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

19 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

20 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I. E., USE FUSIBLE PLUG CARD 1414 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).

25 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER,

26 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6858.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

27 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG. ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

28 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/8" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES ⅝" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

29 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(MANUFACTURER'S SERIAL NUMBER)	PENNSYLVANIA (STATE IN WHICH BOILER IS TO BE USED) NO. 45 (NUMBER GIVEN BY STATE AUTHORITIES) THE BALDWIN LOCOMOTIVE WORKS (NAME OF MANUFACTURER) (LEAVE BLANK) (STATE NUMBER) (LEAVE BLANK) (YEAR BUILT) 175 LBS. (MAXIMUM ALLOWABLE WORKING PRESSURE WHEN BUILT)

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-6684.

Memorandum Spec'n 20117

SPECIFICATION FOR LOCOMOTIVES 10 26 ¼ D 184

FOR Arkansas Short Leaf Lumber Co.

Gen. As.-Photo.5580 {Except to have electric head-light at rear of tender, instead of on top of cab.

Engine Drawing No. 43 21 21

P

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 9' 2" Driving 9' 2" Total 24' 8"

Total wheelbase, eng. and tend. {Actual 48' 2½" / Limited to ---

Curves 14 degrees

Limits, Height --- Width ---

Weight (approximate) in working order, Total 122,000 pounds

On F. tr'k 12,000 lbs., Drivers 91,000 lbs., B. tr'k 19,000 lbs.

Tractive power 22,200 lbs., Ratio of adhesion 4.1

Work'g St'm Pres. 200 lbs., Service Logging

Fuel Coal

26 **Boiler** Steel Thick ¾" Bill 9186

5 Front Tube Sheet ½" Thick

Boiler, Diam. 60" Plan Extended Wagon Top

3 Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

6 With Factor of Safety of 5.27 300 lbs. water pres.

6.18 Longitud. seams Butt jointed, double covering strips.

Main dome, one-piece type. Auxiliary Dome, None

5 **Dome,** diam. 29" Pos. Forward of fire box

5 **Firebox** Steel Combustion chamb. None

Firebox, length 67⅛" Width 33¼" Depth F. 74" B. 68"

10 Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

30 Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

7 Water space stays ⅝" diam. with 3/16" holes 1¼" deep from O.S.

7 Radial stays 1" diam. Sling stays front {Two rows B. L. W. / Expansion Stays

Button heads below crown on Eight central rows

Crown bars None Placed --- above crown

Crown bolts ---

4 Flues #9 B. W. G. Steel

Tubes No. 12 B. W. G. Charcoal Iron

18 Tube ends Swaged for copper ferrules fire box ends.

Number 21 Diam. 5⅜" Length 11' 4"

122 2"

Tubes to be electrically welded to back tube sheet.

Heating Surface {Flues 332 sq. ft. Combus. Chamb. --- Total 1170 sq. ft. / Tubes 719 sq. ft. Fire Box 119 sq. ft. Fire Brick Tubes ---

Grate area 15.5 sq. ft. Ratio to Heating Surface 1: 75.5

Superheater 282 sq. ft.

Fire Brick Arch, on studs

Grates Rocking Bars and drop plates

Ash Pan, Dampers Front and Rear

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater Schmidt type (See Sup. 31 etc.)

31 5 **Smokebox** extenstion With 32 Cleaning hole and cap L.S.only

Spark ~~ejector or~~ hopper With

Netting and deflect. plates With

Exhaust nozzles Single, High

Stack Straight Dia. 16"

16 6-28-20 (Not Spec.) **Safety Valves** Two Coale 2½" Open

Safety valves Both with relief lever, Set to 200 pounds

8 **Whistle** One B. L. W. Plain

8 9 **Steam Gauge** One Iron 7" Maker: Ashcroft

Steam gauge stand Iron **Clock** None

8 **Water Gauge** One B.L.W. Ironclad **Cab Lamps** Electric

8 **Gauge Cocks** Three - Back Surface valve None

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

8 **Blower Valve** B. L. W.

8 **Blow off Cock** One B. L. W. Pos: R. S.

17 **Cleaning Plugs** One filling plug in top of boiler

Firebox, Corners, back ones diagonal and left side.

Crown, Two each side and four back

Waist, One under front One plug above fire door.

Front tube sheet One 10 Fusible plug One

Pump None

Injectors Two Sellers. Class "N" (Spec.) No. 7½

Injectors, Pos. Right and Left Steam pipes Copper

33 16 Pipes, Check Iron Feed Iron Overflow Iron

8 Check B.L.W. with stop valve Pos. R. and L.

Steam Heat None

Cab Steel

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 32¾"

Pilot Wood

Front Bumper Cast Steel Bumper plate With

Steps Hand holds, etc. to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Automatic

Signal fixtures Iron on bumper

34 **Headlight** Two Round Case 18" Reflector,

Headlight, Nos. on sides With H'dl't step With

Lamp shelf None Nosing ---

Bell 85 pounds Gollmar Air Bell Ringer.

Sand Box, Two. Diam. 28" Body Iron painted Pipes Iron

Sander (Not Spec.) Leach Air, Trap A-1, in each box, to sand front and back

Dome casing Iron painted.

Boiler Jacket #16 Soft Steel ptd. Bands Iron Style 9

Boiler Lagging Magnesia sectional

THE BALDWIN LOCOMOTIVE WORKS

M.H. A=H

SPECIFICATION FOR LOCOMOTIVES 10 26 ¼ D 184 Sept 1926

FOR ARKANSAS SHORT LEAF LUMBER CO.

P

22

27

Frames CAST STEEL

Cylinders, Diam. 16" Stroke 24"
Stm ports, Length 16.13" Width 1⅛" Bridges ---
Exh. ports, Length --- Width --- Valve bad ⅛"
Valve travel 5" Steam lap 1" Exhaust clearance ---
Eccentric crank throw 12-1/32" By-pass valve NONE
S. F. Lubr. (NOT SPEC) NATHAN FIVE FEED No. 31 BULLS EYE
Cyl'r heads CAST IRON LUBR. PIPES IF IRON UNDER JACKET.
Cyl'r casings IRON PAINTED Head covers STEEL PAINTED
Stm chest casings IRON PAINTED Covers STEEL PAINTED
Stm chest valves 8" DIAM., PISTON TYPE
Met. pkg. (NOT SPEC) PISTON RODS VALVE STEMS U. S. KING TYPE
PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST STEEL (SEE SUP. 35)

Guides STEEL Oil cups NEEDLE

Crossheads CAST STEEL WITH BEARINGS OF CAST IRON, TINNED

Wrist Pins STEEL Rod cups PLUNGER, FORGED ON

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS

(Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners BRONZE

38 **Drivers,** O. S. Diam. 47" Cen. diam. 40" CENTERS CAST IRON

37 **Tires** STEEL Held by SHRINKAGE AND SHOULDER
Tires, Flanged, Pos. FRONT AND BACK Size 3½" x 5½"
Tires, Plain, Pos. MIDDLE Size 3½" x 6½"
Lateral play between driving boxes and wheel hubs 3/16" TOTAL

Driving Boxes CAST STEEL

Journals, Diam. 7" Length 8"

36 **Springs.** Make B. L. W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING
To swing 4" each side of cen., Cen. pin liners NONE
Journals, Diam. 5" Length 10" Boxes CAST STEEL
Wheel hub liners BRONZE, ON WHEELS
Wheels, Diam. 26" Tread --- Kind ROLLED STEEL
Tires NONE Cen. diam. -- Size --
Tires held by --- WHEEL RIMS 2½" x 5½"

Back Engine Truck TWO Wheeled SWING BOLSTER, SIDE BEARING
To swing 4½" each side of cen., Cen. pin liners NONE
Journals, Diam. 5" Length 10" Boxes CAST STEEL
Wheel hub liners BRONZE, ON WHEELS
Wheels, Diam. 26" Tread - - Kind ROLLED STEEL
Tires NONE Cen. diam. --- Size ---
Tires held by --- WHEEL RIMS 2½" x 5½"

Brake, position ON ALL DRIVING AND TENDER WHEELS
Operating Engine, sch. No. 6-ET WESTG. COMBINED AUTO. AND STRAIGHT AIR
Parts Eng. Trk, sch. ---
Foundation Drivers, sch. M-1 AMERICAN OUTSIDE EQUALIZED
Parts Eng. Trk, sch. ---
Air pump ONE 9½" Pos. LEFT SIDE
Train connections FRONT AND BACK
Train signal, sch. ---
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1599
Weight, with fuel and water, about 65,000 POUNDS
TENDER TO BE WEIGHED: YES
33 46 **Tank** 3,000 Gallons, Bill 5463
TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 6 TONS.
33 SYPHON CONNECTION TO TOP OF TANK ON LEFT SIDE.
Tool Boxes HARD WOOD, IN REAR OF TANK

48 **Frame** STEEL 6" AND 8" CHANNELS WITH BUMPERS OF WOOD AND STEEL PLATE.
Front Drawbar height 30¾"
Pilot NONE
Back drawhead, center above rail 33½"
Coupler M. C. B. AUTOMATIC

STEPS, HAND HOLDS ETC. TO CONFORM TO I. C. C. REQUIREMENTS.
Steps ACROSS REAR.

Trucks ARCH BAR TYPE, WITH BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B. L. W.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 30" Tread — Kind ROLLED STEEL
Tires NONE Cen. diam. --- Size ---
Tires held by --- WHEEL RIMS 2½" x 5½"
Safety chains SINGLE

Brake Position ON ALL WHEELS
Brake sch. No. 6-ET WESTG. AUTO. AND STRAIGHT AIR WITH 10" x 12" TENDER BRAKE CYLINDERS.

List of tools, sch. 26 ONE PAIR WRECKING FROGS.
Photo sch. No. 2 Inspection B. L. W. (EXCEPT SUP. 1 & 19, 29)
To be weighed YES Material specns B. L. W. (EXCEPT SEE SUP. 4)
2 Certificate of boiler test THREE COPIES B. L. W. FORM 1036
Junior laws to 11-15-20 Shipment ON OWN WHEELS

Brass shop finish, No. 1
Machine shop finish D-165

B. L. W.
Patents NONE

Property plates NONE

Painting, style 291, OLIVE GREEN AND ALUMINUM

Mark on CAB SIDES, A. S. L. L. CO.
MARK ON TANK SIDES: ARKANSAS SHORT LEAF LBR. CO.

Road Nos. Pos. Road Nos. Name NONE
F. NO. PLATE 5
F. SAND BOX
BACK OF TANK

Actual Dimensions of Loco. WIDTH OVER FRONT BUMPER 10' 0"
Extreme height over all 14' 3"
Extreme Width Cab boards 10' 0" Steam or valve chests 8' 11½"
Length outside face front bumper of engine to face of tender wedge 30' 3"
Length face of tender wedge to outside face back bumper of tender 24' 3½"
Total length outside face front bumper of engine to outside face back bumper of tender 54' 6¾"

NOT TO BE REPRODUCED OR TRANSMITTED WITHOUT PERMISSION

SPECIFICATION FOR LOCOMOTIVES 10 26 ½ D 184

FOR ARKANSAS SHORT LEAF LUMBER COMPANY

P

21
24

1 BOILER TO BE OPERATED IN THE STATE OF ARKANSAS & CALIFORNIA
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1913), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDERS WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
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BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1/5)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 3 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/32" DIAM., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATE.

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	½"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I. E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER, THE FEED WATER TO DISCHARGE BELOW THE LOWEST SAFE WATER LINE.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6859.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN EACH HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEGS ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE, OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER ⅝" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES ⅝" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ¼" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S

ARKANSAS CALIFORNIA
(State in which boiler is to be used)
No. 2 & No. 5
(Manufacturer's State Standard Number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of Manufacturer)
(LEAVE BLANK) (Manufacturer's Serial Number)
(State Number)
(LEAVE BLANK)
(Year put in service)
200 LBS.
(Maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVES 10 26 ½ D 184

FOR ARKANSAS SHORT LEAF LUMBER COMPANY

Specification for Type A Double Loop Superheater SPECN. NO. O-14595 DATED AUG. 10TH, 1920.

BOILER TUBES	122 in number 2 o. d 11 ft 4 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	21 in number 5½ o. d #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18	Card 11025-B
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections	Card 1136
TUBE SHEET LAYOUT		Card 3L-50667
UNITS	21 units 1½ o. d #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 104-L
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls	Card 11309
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	* 4L-11436-A
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card * 1067
PYROMETER	Model No. Pyrometer	Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 4L-40677
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 2L-11432-V	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card * 1065-A	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card * 11114	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card * 11115	S. H. PIPE END	Card 1321
DAMPER CYL. PIPING DIAGRAM	Card * 3L-11440	S. H. PIPE BAND	Card 988
DAMPER CYL. SUPPORT	Card * 11073-N	SPACING OF BANDS & SUPPORTS	Card 10799
DAMPER SHAFT	Card * 1068-E	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card * 1074-C	RETURN BENDS	Card 1022
DAMPER SHAFT BEARING (O. S.)	Card * 11363-B (R.S.)	LUBRICATOR CONNECTION	Card 1023
DAMPER SHAFT BEARING (I. S.)	Card * 11386-A (L.S.)	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINK	Card * 11177-H	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card * 3274	DEFLECTING PLATE CLAMP	Card 10809-A
DAMPER RIGGING	CARD * 2L-11473-D	DAMPER CYL. PIPE CONN.	* CARD 1L-11437

* LOCO. SUPERHEATER LETTER 12-29-20

SPECIFICATION FOR LOCOMOTIVES 10 26 ½ D 184

FOR ARKANSAS SHORT LEAF LUMBER CO.

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26 LOCOMOTIVE TO OPERATE IN THE STATE OF ARKANSAS, BUT IS TO BE BUILT ALSO TO MEET THE CALIFORNIA STATE LAWS.

27 BOILER TO CONFORM TO CALIFORNIA BOILER CODE.

28 BOILER TO CONFORM TO THE A. S. M. E. CODE. (SEE SUP. 1 &C)

29 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.

30 FIRE DOOR TO BE FRANKLIN AUTO. NO. 3 (BUTTERFLY TYPE)

31 SUPERHEATER AS LOCO. SUPERHEATER CO'S. SPECIFICATION NO. O-14595 DATED AUGST 10, 1920 (COPY ATTACHED). SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

32 HAND HOLE AND CAP ON RIGHT AND LEFT SIDES OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

33 SYPHON HANCOCK 4" No. 9, UNDER CAB BOARDS ON LEFT SIDE, WITH PIPE CONNECTION TO TANK, AND WITH 20 FEET OF SUCTION HOSE.

34 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHTS.

35 PISTONS TO BE FITTED WITH CAST IRON BULL RINGS, 4" FOLLOWER PLATES WITH FOLLOWER BOLTS 1⅛" DIAM., 12 THREADS.

36 SPRINGS TO BE TWO PLATES HEAVIER THAN USUAL.

37 FLANGE LUBRICATOR TO BE CHICAGO FOUR-FEED FLANGE OILER.

38 RAIL WASHERS TO BE APPLIED.

TENDER

46 TANK PLATES TO BE ⅜" THICK FOR TOP, BOTTOM AND COAL SPACE.

47 TANK TO HAVE DASH PLATES.

48 TENDER FRAME TO EXTEND 36" BEYOND TANK AT REAR.

THE BALDWIN LOCOMOTIVE WORKS {AS SPEC'N. C-6569. MINOR DETAILS AS FAR AS POSSIBLE TO BE SAME AS FOR 8 32 D 761.

Memorandum Spec'n 20104

SPECIFICATION FOR LOCOMOTIVES 8 34 D 551 GEN. AS PHOTO. 4057 {EXCEPT TO HAVE STEEL CAB, STEEL PILOT, ELECTRIC HEADLIGHTS, AND WALSCHAERTS VALVE GEAR.

FOR BEVIER AND SOUTHERN RAILROAD CO.

WKS 5.6.20. **Engine Drawing No.** 47

Gauge of Road 4' 8½" Play ¾"

★ **Wheelbase,** Rigid 14' 0" Driving 14' 0" Total 21' 11"

Total wheelbase, eng. and tend. {Actual 51' 10⅜" {Limited to ----

Curves 19 DEGREES GRADES: 2%

★ DRIVING WHEELBASE AS SPECIFIED NOT TO BE EXCEEDED.

Limits, Height ---- Width ----

Weight (approximate) in working order, Total 137,000 POUNDS

On F. tr'k 17,000 lbs., Drivers 120,000 lbs., B. tr'k ----- lbs.

TOTAL WEIGHT OF ENGINE LIMITED, NOT TO EXCEED 140,000 POUNDS.

Tractive power 29,500 lbs., Ratio of adhesion 4.07

Work'g St'm Pres. 170 lbs., Service {PASSENGER, FREIGHT AND SWITCHING

Fuel SOFT COAL

Boiler STEEL Thick 1 1/16" & ¾" Ball 9190

Front Tube Sheet ½" Thick

Boiler, Diam. 64" Plan EXTENDED WAGON TOP

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. Steam pres.

With Factor of Safety of 5.3 300 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

MAIN DOME, ONE-PIECE TYPE. AUXILIARY DOME, NONE.

Dome, diam. 33" Pos. FORWARD OF FIRE BOX

Firebox STEEL Combustion chamb. NONE

Firebox, length 96⅜" Width 41⅜" Depth F. 67¼" B. 64⅜"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedbor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame DOUBLE Riveted

Water space stays ⅝" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O. S.

Radial stays 1" DIAM. Sling stays front {TWO ROWS B.L.W. EXPANSION STAYS

Button heads below crown on EIGHT central rows

Crown bars NONE Placed ---- above crown

Crown bolts ----

Flues -----

Tubes No. 11 B. W. G. CHARCOAL IRON

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 254 Diam. 2" Length 12' 0"

Heating Surface {Flues ---- Combus. Chamb. --- Total 1735⁰

{Tubes 1585⁰ Fire Box 150⁰ Fire Brick Tubes ----

Grate area 28.1⁰ Ratio to Heating Surface 1: 61.8

Superheater ------

Fire Brick ARCH - NONE

Grates BURLINGTON STANDARD TO ROCK IN SECTIONS

Ash Pan, Dampers FRONT AND BACK

ASH PAN TO BE SELF DUMPING TYPE WITH LEVER AT SIDE.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extenstion WITH Cleaning hole and cap - L. S. ONLY

Spark ejector or hopper NONE

Netting and deflect. plates WITH

Exhaust nozzles DOUBLE, HIGH

Stack STRAIGHT Dia. 19"

Safety Valves TWO CROSBY 3" OPEN

Safety valves BOTH with raised lever Set to 170 POUNDS

Whistle ONE CHIME

Steam Gauge ONE IRON 7" MAKER:

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve WITHOUT Separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE EVERLASTING Pos. FRONT

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR

Firebox, CORNERS DIAGONAL AND SIDES

Crown, THREE EACH SIDE AND FOUR BACK

Waist, ONE UNDER FRONT

Front tube sheet, TWO Distributing plug NONE

Pump NONE

Injectors TWO OHIO No. 9

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B.L.W., WITH STOP VALVES Pos. R. AND L.

Steam Heat NONE

Cab STEEL WITH SMALL SIDE WINDOWS.

Cab boards STEEL Nosing T-IRON

Running boards STEEL Nosing T-IRON

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 34¼"

PILOT TO BE SHORT STUB TYPE WITH STEPS.

Pilot STEEL

Front Bumper OAK

Steps, HAND HOLDS, ETC. TO CONFORM TO I. C. C. REQUIREMENTS. Bumper plate WITH

Front Drawhead, Center above rail 33½"

Coupler AND POCKET AS C. B. & Q. BLUE PRINT 6444 AND COUPLER PLATE AS E-814-S.

Signal fixtures IRON ON BUMPER

Headlight TWO ROUND CASE 16" Reflector

Headlight, Nos. on sides NONE Hdlt. step WITH

Lamp shelf NONE Nosing ----

Bell 92 POUNDS

Sand Box ONE Diam. 28" GOLMAR AIR BELL RINGER

Sander LEACH AIR, TRAP A-10 AND HAND TO SAND FRONT OF FRONT AND BACK OF MAIN DRIVERS. SAND BOX SAME AS FOR 8 32 D 761. Body IRON PAINTED. Pipes IRON

Dome casing IRON PAINTED

Boiler Jacket #18 SOFT STEEL PTD. Jkts IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

C. Wagner Oct. 1920

SPECIFICATION FOR LOCOMOTIVES 8 34 D 551

FOR BEVIER AND SOUTHERN RAILROAD CO.

27

27

Frames CAST STEEL

Cylinders, Diam 20" Stroke 26"

Stm ports, Length 16" Width 1½" Bridge 1"

Exh. ports, Length 16" Width 2½" Valve diam 3⅜"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ----

Eccentric (Spec) 2-7/32" Bypass valve NONE

S. F. Lubr. NATHAN TRIPLE BULLS-EYE

Cyl'r heads CAST IRON LUBR. PIPES OF COPPER UNDER JACKET.

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED

Stm chest casings IRON PAINTED Covers STEEL PAINTED

Stm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES.

Met. pkg (Spec) UNITED STATES, KING TYPE

Pistons HEADS OF CAST IRON WITH DUNBAR STEAM PACKING

Guides ALLIGATOR TYPE, STEEL Bearings NEEDLE

Crossheads CAST STEEL WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL Bushings PLUNGER

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS

Links, sliding blocks, pins, lifting links and eccentric rod bushes to be case hardened or to have hardened bushings.

ALL WEARING PARTS OF VALVE MOTION TO BE BUSHED.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners BRONZE

Drivers, Main & S. Diam. 51" Com. diam. 44" CENTRES: CAST STEEL

DRIVING TIRES FROM STANDARD STEEL WORKS FOR 8 34 D 551 ONLY.

★ **Tires** ~~LIQUALE~~ STEEL Held by SHRINKAGE ONLY

Tires, Flanged, Pos. FRONT AND BACK Size 3½" x 5½"

Tires, Plain, Pos. MIDDLE Size 3½" x 6½"

Lateral play between driving boxes and wedges 3/16" TOTAL

Driving Boxes CAST STEEL WITH HARD GREASE CELLARS

Journals, Diam 8" Length 11"

Springs. Make RAILWAY STEEL SPRING CO.

Front Engine Truck TWO Wheels SWING BOLSTER, CENTER BEARING

To swing 3½" each side of cen. Cen. pin liners NONE

Journals, Diam. 5" Length 9" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 30" Tread ---- Kind CAST IRON SPOKE CENTER

★ Tires ~~LIQUALE~~ STEEL Cen. diam. 25" Size 2½" x 5½"

Tires held by SHRINKAGE ONLY

★ ENGINE TRUCK TIRES FROM STANDARD STEEL WORKS FOR 8 34 D 551 ONLY

Back Engine Truck NONE Wheels ---

To swing --- each side of cen. Cen. pin liners ---

Journals, Diam. --- Length ---- Boxes ----

Wheel hub liners ----

Wheels, Diam. ---- Tread ---- Kind -----

Tires ---- Cen. diam. ---- Size ----

Tires held by -----

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating { Engine, sch. A-1 - SWA WESTG. AUTO, AND STRAIGHT AIR

Parts { Eng. Trk. sch. ----

Foundation { Drivers, sch. WAL-2 AMERICAN OUTSIDE EQUALIZED

Parts { Eng. Trk. sch. ----

Air pump TWO 9½" Pos. LEFT SIDE

Train connections FRONT AND BACK

Train signal, sch. -----

Tender EIGHT Wheeled, Drawing No. 1610

Weight, with fuel and water, about 122,000 POUNDS

TENDER TO BE WEIGHED: YES

Tank 6000 Gallons, Bill 5487

TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 9 TONS.

TANK COPING TO STOP SLIGHTLY BEYOND END OF COAL SPACE TO REAR.

Tool Boxes HARD WOOD, TOP SYPHON VALVE IN TANK.

Frame STEEL, 12" CHANNELS, WITH BUMPERS OF WOOD REINFORCED WITH CHANNEL.

Front Drawbar height 31⅞"

Pilot STEEL (SEE SUP. 49)

Back drawhead, center above rail 33½"

Coupler M.C.B. AUTOMATIC WITH MINER FRICTION DRAFT RIGGING.

STEPS HAND HOLDS, ETC. TO CONFORM TO I. C. C. REQUIREMENTS

Steps AT FRONT AND REAR.

Trucks ARCH BAR TYPE, WITH BOLSTERS OF CAST STEEL.

Springs TRIPLE ELLIPTIC, RAILWAY STEEL SPRING CO'S.

Journals, Diam. 5" Length 9"

Wheels Diam. 33" Tread 44" Kind CHILLED CAST IRON PLATE

Tires NONE Cen. diam. --- Size ----

Tires held by -----

Safety chains SINGLE

Brake Position ON ALL WHEELS

Brake sch. FL-1212 AND SNB WESTG. AUTOMATIC AND STRAIGHT AIR.

List of tools, sch. 29

Photo sch. No. 2 Inspection B. L. W. (EXCEPT SEE SUP. 1, 19, 25)

To be weighed YES Material specifns B. L. W. (EXCEPT SEE SUP. 4)

Certificate of boiler test THREE COPIES B. L. W. FORM 1036

Junior laws to 9.25.20. Shipment ON OWN WHEELS

Brass shop finish No. 1

Machine shop finish D-165

Engine Truck Brasses (B. L. W.) Patents NONE

Driving Brasses (B. L. W.) Patents NONE

Tender Brasses (B. L. W.) Patents NONE

Property plates NONE

Painting, style 291, OLIVE GREEN AND ALUMINUM

Mark on CAB SIDES: BEVIER & SOUTHERN

MARK ON TANK COLLAR: BEVIER & SOUTHERN

Road No. Pos.	Road Nos.	Name
F. No. Plate	112	NONE
Sand Box		
Sides of Tank		

Actual Dimensions of Loco. Extreme height over all 14' 1"

Extreme Width: Cab boards 9'8" ; Cylinders or valve motion 9' 10"

Length outside face front bumper of engine to face of tender wedge = 31' 6½"

Length face of tender wedge to outside face back bumper of tender = 26' 2½"

Total length outside face front bumper of engine to outside face back bumper of tender = 57' 8⅝"

SPECIFICATION FOR LOCOMOTIVES 8 34 D 551

FOR BEVIER AND SOUTHERN RAILROAD CO.

P

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BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

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MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	½"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝", (I. E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER, THE FEED WATER TO DISCHARGE BELOW THE LOWEST SAFE WATER LINE.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6859.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH BOILER LEVERS.

17 THERE SHALL BE SUPPLIED TWO BRASS WASH-OUT PLUGS NOT SMALLER THAN 1½" PIPE SIZE LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEGS, ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 STAY BOLTS:- RIVETED STAYS, EXCEPT FOR ATTACHING STAY RODS AND T-IRONS TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THE TUBES DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTERS.

19 UPON COMPLETION, EACH BOILER SHALL BE TESTED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE MARK AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ½". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A FUSIBLE PLUG HOLE.

(S)	MISSOURI
(MANUFACTURER'S SERIAL NUMBER)	No. 3
	THE BALDWIN LOCOMOTIVE WORKS
	(LEAVE BLANK) (LEAVE BLANK)
	200 LBS.

SPECIFICATION FOR LOCOMOTIVES : 8 34 D 551

FOR : BEVIER AND SOUTHERN RAILROAD CO.

29

29

21 IN DESIGNING LOCOMOTIVE CONSIDER SIMPLIFIED CONSTRUCTION ACCOUNT OF RAILWAY CO. NOT HAVING ANY GREAT FACILITIES FOR REPAIRING.

22 LOCOMOTIVE TO OPERATE IN MACON COUNTY, MISSOURI.

23 LOCOMOTIVE TO MEEET ALL FEDERAL LAWS.

24 BOILER TO MEET THE A. S. M. E. CODE.

25 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.

26 DOME TO BE TAPPED FOR TEST GAUGE.

27 SPECIAL ATTENTION TO BE GIVEN TO ACCESSIBILITY TO STAYBOLTS.

28 TATE STAYS, ABOUT 400, LOCATED IN BREAKING ZONE.

29 SMOKEBOX TO HAVE SELF-CLEANING FRONT END ARRANGEMENT WITH PERFORATED PLATES, I. E. W. S. TYLER No. 393 DRAFTAG SPARK ARRESTOR.

30 FEED WATER STRAINER: TWO HAYES, AS USED ON C. B. & Q. LOCATED ON SUCTION LINE BETWEEN ENGINE AND TENDER. HAYES FEED WATER STRAINER TO BE PURCHASED FROM THE C. B. & Q. R. R. ROYALTY, IF ANY, PAYABLE BY B. L. W.

31 CAB TO BE WIRED FOR THREE INCANDESCENT LAMPS LOCATED FOR STEAM GAUGE, WATER GAUGE AND COAL PIT.

32 CHAFING IRON BETWEEN ENGINE AND TENDER WITH ADJUSTABLE TAKE-UP FOR LOST MOTION.

33 HEADLIGHTS TO BE HANDLAN BUCK MFG. CO'S. INCANDESCENT ELECTRIC, No. 1644R, FITTED WITH REFLECTORS OF COPPER METAL, SILVERED, AND TYPE "D" TURBO GENERATOR. GENERATOR TO BE LOCATED AHEAD OF CAB. HEADLIGHTS LOCATED ONE FRONT OF ENGINE AND ONE REAR OF TENDER. (SEE SUP. 47)

34 AIR PUMPS TO BE LOCATED AHEAD OF FIRE BOX TO CLEAR STAY-BOLTS.

35 AIR RESERVOIRS LOCATED UNDER FRONT RUNNING BOARDS.
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

41. FOR HEREAFTER : AIR PUMP TO BE PLACED 24" HIGHER.
FOR HEREAFTER : RAISE QUESTION ABOUT NECESSITY OF HAVING BOILER CONFORM TO THE A. S. M. E. CODE, - AND IF IT DOES, ARRANGE TO HAVE FUSIBLE PLUG APPLIED.
(R.S.McC. 3.5.21.)

TENDER

46 TANK MAN HOLE 18" x 24", HEIGHT 4" LOWER THAN ON RY. CO'S. PREVIOUS LOCOMOTIVE, B.L.W. CLASS 8 32 D 761.

47 HEADLIGHT ON TOP REAR END OF TENDER IN CENTER AND AS CLOSE TO EDGE OR END AS PRACTICABLE. (SEE SUP. 33)

48 CHAFING IRON BETWEEN ENGINE AND TENDER WITH ADJUSTABLE TAKE-UP FOR LOST MOTION.

49 PILOT TO BE SHORT STUB TYPE WITH STEPS.

50 TENDER TRUCK OF SIMPLE, DURABLE CONSTRUCTION, EASILY DEMOUNTED FOR CHANGING WHEELS.
ARCH BARS TO BE EXTRA STRONG, AND WITH BOTTOM OF COLUMN BOLTS HIGH AS POSSIBLE ABOVE RAIL.

51 BOTH TRUCKS TO HAVE SIDE BEARINGS.

THE BALDWIN LOCOMOTIVE WORKS — 16 Specn. 6-0465

Memorandum Spec. 250/0

SPECIFICATION FOR LOCOMOTIVES 10 24 ½ D 136

FOR H. G. BOHLSSEN MANUFACTURING COMPANY

PHOTO. 619

Engine Drawing No. 37

3-15-26 (NOT SPEC.)

Gauge of Road 4' 8½"
Wheelbase, Rigid 5' 2" Driving 14' 2"
Actual 25' 7"

Curves 35 DEGREES

Limits,
Weight

Safety Valves TWO SCALE 2" IRON
Whistle ONE B. L. W. PLAIN
Steam Gauge ONE IRON 7" IRON
Clock NONE
Water Gauge ONE B. L. W. IRONCLAD
Cab Lamps ELECTRIC
Gauge Cocks THREE
Blower Valve
Blow-off Cock
Cleaning-plug

Dome, Diam. 24" Pos. FORWARD OF FIRE BOX

Pump NONE

Firebox STEEL
Firebox length 96-3/16" Width 41" Depth 66-5/16"
Firebox, Tube 1/2" Wrapper 1/2" Crown 5/8"
Firebox, Crown 1/2" DIAM. STAYED WITH SLINGS AND STAYS TO THE SHEET.
Water space Front 4" Sides 3" Back 3"
Water space Sides SINGLE Back
Water space Front 3" Sides WITH 3/4" HOLES 1" DEEP FROM O.S.
TAPE FLEXIBLE STAYS, 20, IN BREAKING ZONE.
Button-head
Crown Bars NONE Pitch
Crown Bolts

PHOTO. 3" SYPHON UNDER CAB BOARD ON LEFT SIDE WITH PIPE CONNECTIONS TO TANK, AND WITH 70 FEET OF SUCTION HOSE.
Injectors TWO MONITOR (NOT SPEC.)
Feed Pipe RIGHT AND LEFT
Pipes, Outer IRON Inner COPPER
Check B. L. W. Elbow IRON
DBL. RIGHT AND LEFT

Steam Heat NONE

Cab STEEL

Tubes Iron Swaged for copper ferrules, Fire end Plain
Number 189 Diam. 2" Length 11'6"
2"

Heating Surface 282 sq. ft. Tubes 85
Surface 574 Firebox 86 Brick
Arch tubes 14.1 Total Heating Surface 759
Superheater 178

Fire Brick ARCH, ON STUDS
Fire door, Equipped with brick, for oil burning.
Grate shaker
Grates
Ash Pan, Dampers FRONT ONLY

Cab boards WOOD Roofing NONE
Runner boards WOOD Floor NONE
Handrail IRON Location BOILER

Back Bumper BAR STEEL Back Overhang 23½"
BACK FOOT PLATE OF CAST STEEL
Pilot WOOD
Front Bumper
Steps, HAND HOLES, ETC. TO CONFORM TO I.C.C. REQUIREMENTS

Front Drawhead, Couplers SAME AS FOR B. L. E. & C. AUTOMATIC WITH CUPPED KNUCKLE 33" CENTRE ABOVE RAIL, AND PLUG COUPLINGS FOR LOCATING CARS 25" CENTRE ABOVE RAIL.
Shelf IRON ON BUMPER
Headlight EQUIPMENT TO BE ELECTRIC WITH INCANDESCENT HEADLIGHT. REAR HEADLIGHT ON TOP OF CAB, ON SWIVEL BASE.
Headlight TWO ROUND CASE 15"
Headlight Nos. WITH
Lamp shelf NONE

Throttle TO HAVE AUXILIARY OPERATING VALVE
Throttle BALANCE Pos. DOME
Driver STEEL

Superheater SCHMIDT TYPE (SEE SUP. 4)

Smokebox DIAPHRAGM WITH 5/16" MESH
Spark plate or hopper NONE
SUPERHEATER UNITS Element plates WITH
Exhaust nozzle SINGLE, LOW
CLEANING PIPE WITH
Stack STRAIGHT Dia. 15"

Bell 85 POUNDS
Sand Box TWO Diam. 32" IRON PAINTED IRON
Sanding LEACH AIR (NORSANDER) TRAP A-1, TO SAND FRONT AND BACK.
Sand pipes IRON, PAINTED, WITH PRESSED STEEL TOP AND BOTTOM RING.

Boiler Jacket .022 SOFT STEEL BTO. IRON
Boiler Lagging PLASTIC MAGNESIA FROM B. L. W. STOCK.

W. CONKLIN June 1926

SPECIFICATION FOR LOCOMOTIVES 10 24 ½ D 136

FOR H. G. BOHLSSEN MANUFACTURING COMPANY

H#

31

Frames CAST STEEL

Cylinders 15" 24"
19½" ---
5" 13" E"
12½" NONE
(NOT SPEC.) DETROIT FIVE FEED No. 42 BULL'S EYE.
CAST IRON LUBR. PIPES OF IRON UNDER JACKET
IRON PAINTED STEEL PAINTED

9" DIAM., 4 TON TYPE
(NOT SPEC.) UNITED TABLE, KING TYPE

Pistons HEADS: F CAST IRON, WITH RINGS OF CAST IRON SPRUNG IN. Rods STEEL - TWO DIA. NEEDLE
Crossheads STEEL, WITH BEARING OF BRASS, ALLIGATOR TYPE
Valve Pins STEEL PLUNGER
Small E rods to have straps, keys and brasses

Valve Motion ALLOCHE TS

Tender EIGHT 15½
Weight 74,500 POUNDS
TENDER TO BE WEIGHED:- YES
Tank { OIL 1,500 5321
WATER 7,500 5005
TANK "U" SHAPE, STRAIGHT TOP.
Tank Bulge OF HARD WOOD TOP.
SYPHON CONNECTION TO TOP OF TANK ON LEFT SIDE.
Frame STEEL, 7" AND 6" CHANNELS, 7TH BUMPERS OF WOOD.
TENDER BUMPERS TO BE REINFORCED WITH STEEL
Front Deck 28½" NONE
Back NONE

Coupler SAME AS FOR B. L. E. & C. AUTOMATIC WITH KNUCKLE 33" CENTRE ABOVE RAIL AND PLUG COUPLINGS FOR LOCATING CARS 25" CENTRE ABOVE RAIL.
STEPS ACROSS REAR WITH HAND RAIL.
STEPS, HAND HOLES ETC. TO CONFORM TO I.C.C. REQUIREMENTS.
Trucks ARCH BAR TYPE, WITH CAST STEEL BOLSTERS.

Wearing Bearings B. L. W.
Driver BRASS
Driver 44" 38" CENTERS CAST IRON

Tires STANDARD STEEL SHRINKAGE AND SHOULDER
FRONT AND BACK 3" x ½"
MIDDLE 2" x ½"
3" TOTAL
Driving Boxes CAST STEEL
Journals, Diam. 6" Length 8"

ALL SPRINGS TO BE EXTRA HEAVY.
Springs, Make STANDARD STEEL WORKS

Front Engine Truck TWO WHEEL SWING BOLSTER, CENTER BEARING
Wheels 4" NONE
Journals Diam. 4½" Length 7½" Boxes CAST IRON
Wheel base 24" (SEE SUP. 7) Tires ½" {STANDARD STEEL WORKS ROLLED STEEL
Tires NONE Center Diam. --- Size ---
Truck springs --- WHEEL RIMS 2" THICK
BACK ENGINE TRUCK BOLSTERS OF CAST STEEL.

Back Engine Truck TWO WHEEL SWING BOLSTER, SIDE BEARING
Wheels 42" NONE
Journals Diam. 4½" Length 7½" Boxes CAST IRON
Wheel base 24" (SEE SUP. 8) Tires ½" {STANDARD STEEL WORKS ROLLED STEEL
Tires NONE Center Diam. --- Size ---
Truck springs --- WHEEL RIMS 2½" THICK

Brake, Type ON ALL DRIVING AND TENDER WHEELS
Operating Engineer No. 6 T WESTG. COMBINED AUTO. AND STRAIGHT AIR.
Foundation Drivers 44" 1 AMERICAN C. S. EQUALIZED
Parts Engine Type ---
Tender Type ---
Air pump ONE 9½" Pos. L. S.
Piping FRONT AND BACK
Train None
AIR RESERVOIR TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Brake ON ALL WHEELS
Engine No. 6 ET ELTG. AUTO. AND STRAIGHT AIR WITH 10"x12" TENDER CYLINDER
Driver 28 ONE PAIR OF FLANGING BLOCKS
Driver brake NONE Make B. L. W.
Driver springs YES Make B. L. W.
Lubrication THREE COPIES OF B. L. W. FORM 1036
Lubricators to 5.15.20 Supplied ON OWN WHEELS

Brass shoe finish No. 1
Machine shop finish D-165

B. L. W. FEED WATER STRAINER, PAT'D SEPT. 1, 1903 (CAST ON)
Patents
Property plates B. L. W., FOR ENGINE AND TENDER

Painting, style 291, OLIVE GREEN AND ALUMINUM
Marking TANK SIDES: H. G. BOHLSSEN MANUFACTURING CO.

Road Nos. Pilot Road Nos. Tender Name NONE
F. No. Plate 1
F. Sand Box
Cab Sides
Back of Tank

Actual Dimensions of Loco. HEIGHT OVER HEADLIGHT ON CAB 13'1 3/4"
Height 12'5"
Width Over All 9'0" Cylinders 8'10"
Length outside face of bumper to outside face of tender 29'1½"
Length from center of front truck to center of back truck 21'11"
Total length outside to outside 51'0"
engine to outside face back of tender

SPECIFICATION FOR LOCOMOTIVES 10 24 2 D 136

FOR H. G. BOHLSEN MANUFACTURING COMPANY

HW

1 LOCO. FOR OPERATION IN TEXAS.
BOILER TO CONFORM TO I. C.C. REQUIREMENTS.

2 FIRE BOX TO HAVE GRATE RESTS SO THAT LOCO. MAY READILY BE CHANGED TO BURN COAL FUEL.

3 OIL FUEL OF SAME GRADE AS FOR 10 26 2 D 152 I.E. GRAVITY 22, FLASH TEST UNKNOWN.

4 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPECN. NO. O-13825 DATED MAY 14, 1920, COPY ATTACHED.
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY PAYABLE BY THE B. L. E.

5 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

6 WATER GLASS TO BE [illegible] TYPE.

7 FRONT ENGINE TRUCK BOXES TO HAVE FACES BABBITTED, NEXT TO HUBS OF WHEELS. OMIT LINERS FROM WHEELS.

8 BACK BOGIE TRUCK BOXES TO HAVE FACES BABBITTED NEXT TO HUBS OF WHEELS. OMIT LINERS FROM WHEELS.

9 Bor Hereafter Back truck springs to carry 5300 pounds, instead of 6300 pounds. HR. 8/1/20

33

SPECIFICATION FOR LOCOMOTIVES 10 24 2 D 136

FOR H. G. BOHLSEN MANUFACTURING COMPANY

Specification for Type A Double Loop Superheater SPECN. NO. O-13825 DATED MAY 14TH, 1920.

BOILER TUBES	89 ... in number ... 2 ... o.d. ... 11 ... ft. ... 4 ... in over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A 214-18	
BOILER FLUES	14 ... in number ... 5½ ... x #9 BWG ... of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A 214-18 ... Card	11025-B
BOILER FLUE SETTING	¼ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, headed and grooved except for copper sheets. Front end to be rolled and headed. Rollers to have at least 8 rolls. Prosser to have at least 12 sections ... Card	1136
TUBE SHEET LAYOUT	... Card	30603
UNITS	14 units 1½ o.d. No. 9 BWG ... Pipes to be in accordance with the American Society for Testing Materials Specification A-214-18. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide ... Card	10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on ... Card	1052
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12 A ... Card	1004-E
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls ... Card	11249
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place ... Card	1323
STEAM PIPE JOINT RINGS	Should be of cast iron.	
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with ... Card	SEE ARRGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	11314
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer ... Card	1067
S. H. ARRANGEMENT	To be in accordance with ... Card	HL-40626
TEST FINAL	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 1140-H	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1065-A	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 1115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 1111	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 1127	S. H. PIPE BAND	Card 1340
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1066	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1074-3	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O.S.)	Card 1143-B	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 10300-A	DEFLECTING PLATE HANDLE	Card 1087
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10800
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A
DAMPER RIGGING	CARD 11306	PYROMETER	NONE

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-7288, dup. 6 32 D 1035
Except where otherwise specified.
Memorandum Spec'n 21044
SPECIFICATION FOR LOCOMOTIVES 6 32 D 1150
EW
FOR Brooklyn Eastern District Terminal.
J.McD.

Engine Drawing No. 112
12-1-21.
(Next spec)

Gauge of Road 4' 8½" Play 3"
Wheelbase, Rigid 8' 0" Driving 8' 0" Total 8' 0"
Total wheelbase, eng. and tend. {Actual ---, Limited to ---

Curves ---

Limits, Height --- Width ---
Weight (approximate) in working order, Total 125,000 pounds
On F. tr'k --- lbs. Drivers 125,000 lbs. B. tr'k --- lbs.

Tractive power 28,800 lbs. Ratio of adhesion 4.35
Work'g St'm Pres. 180 lbs. Service Switching
Fuel Hard Coal

Boiler Steel Thick 1 11/16" Bill 9528
Front Tube Sheet ½" Thick
Boiler, Diam. 58" Plan Straight top
{Allowable st'm pres. 180 lbs. / With Factor of Safety of 6.01} **Tested to** {200 lbs. steam pres. / 240 lbs. water pres.}
Longitud. seams Butt jointed, with double covering strips.
Main dome, one-piece type. Auxiliary dome, none.
Dome, diam. 29" Pos. Central

Firebox Steel Combustion chamb. None
Firebox, length 93-3/16" Width 33½" Depth F. 58" B. 57"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" diam. Crown and sides in one sheet.
Water space, Front 4" Sides 3" Back 3"
Water space frame Single Riveted
Water space stays ⅞" diam., with 3/16" holes 1¼" deep from O.S. {Two rows B.L.W.}
Radial stays 1" diam. Sling stays front {Expansion Stays}
Button heads below crown on Six central rows
Crown bars None Placed --- above crown
Crown bolts ---

Flues ---
Tubes No. 12 B.W.G. Charcoal Iron
Tube ends Swaged for copper ferrules, fire box ends.
Number 220 Diam. 1¾" Length 9' 4½"

Heating Surface {Flues ---, Tubes 936.5, Combus. Chamb. ---, Fire Box 129, Total 1065.5, Fire Brick Tubes ---, Grate area 21.6, Ratio to Heating Surface 1: 49.3, Superheater ---}

Fire Brick Arch, none.

Grates Rocking table grates, with drop plate.
Ash Pan, Dampers None
Ash pan, hopper style, with slide in middle of pan.

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

Smoke front and door of cast iron.
Smokebox extension With Cleaning hole and cap L. S. only.
Spark ~~ejector or~~ hopper With
Netting and deflect. plates With

Exhaust nozzles To be Shaw Noiseless.

Stack Straight Dia. 18"

Safety Valves Two Crosby 3" muffled
Safety valves One with relief lever. Set to 180 pounds.
Whistle None

Steam Gauge One iron 7" Maker: Ashcroft.
Steam gauge stand Iron **Clock** None

Water Gauge One Reflex **Cab Lamps** Electric
Gauge Cocks Three right side Surface valve None
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve Without separate dry pipe to same
Blower Valve B.L.W.

Blow off Cock One B.L.W. Pos:- Back.
Cleaning Plugs
Firebox, Corners and front
Crown, Two each side and two back
Waist, One under front
Front tube sheet, One Fusible plug One

Pump None

Injectors Two Monitor (Nos. spec) No. 8
Injectors, Pos. Right and left Steam pipes Copper
Pipes, Check Copper Feed Copper Overflow Iron
Check B.L.W. Pos. R. and L.

Steam Heat None

Cab Wood, (See Sup. 7 & etc.)

Cab boards Wood Nosing None
Running boards Wood Nosing None
Hand rail Iron Located on Tank

Back Bumper Cast steel

Pilot None
Front Bumper Cast steel Pushing shoes Front and back
Steps across front and rear, with hand holds. Bumper plate None

F. & B Drawhead, Center above rail 34"
Coupler Tower M.C.B. Automatic. Knuckles to have 16" face

Signal fixtures None

Headlight Two round case 14" Reflector
Headlight, Nos. on sides With Hdlt step With
Lamp shelf None Nosing ---

Bell 85 pounds
Sand Box (Sup. 7 & 16) Body Iron painted Pipes Iron
Sander Hand, in each box, to sand front and back.

Dome casing Steel painted, pressed steel top and bottom rings.

Boiler Jacket #22 Soft steel ptd. Bands Iron Style 9
Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS
E. H. Roberts March 19 22
SPECIFICATION FOR LOCOMOTIVES 6 32 D 1150.
FOR Brooklyn Eastern District Terminal.
HNW.

35

Furnish to Railway Company one complete set of erecting prints.

35

Frames Tennessee hammered iron.

Cylinders, Diam. 19" Stroke 24".
St'm ports, Length 16" Width 1¼" Bridges 1"
Exh. ports, Length 16" Width 2½" Valve lead 1/16"
Valve travel 5" Steam lap ¾" Exhaust clearance ---
Eccentric ~~crank~~ throw 5" By-Pass valve, None.
(Next spec)
S. P. Lubr. Nathan triple Bull's Eye.
Cyl'r heads Cast iron. Lubr. pipes copper under jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings Iron painted. Covers Steel painted.
St'm chest valves Richardson balanced, with vacuum valves.
(Next spec)
Met. pkg. United States, King type.
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron with rings of cast iron sprung in.
Guides Steel. Oil cups Needle.
Crossheads Cast steel, with bearings of cast iron tinned.
Wrist Pins Steel. Oil cups Plunger.

Valve Motion Stephenson. Eccentrics in halves.
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be
well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel nub liners of Bronze.
Drivers, O. S. Diam. 46" Cen. diam. 40" centers cast steel.

Tires Steel. Held by Shrinkage and shoulder.
Tires, Flanged, Pos. Front and back. Size 3" x 5½"
Tires, Plain, Pos. Middle. Size 3" x 6½"
Lateral play between driving boxes and wheel hubs = (See sup. 20)
Driving Boxes Steeled cast iron.
Journals, Diam. 8" Length 8½"

Springs. Make Standard Steel Works.

Front Engine Truck None. Wheels ----
Tr. wring -- each side of cen. Cen. pin liners --
Journals, Diam. -- Length -- Boxes --
Wheel nub liners --
Wheels, Diam. -- Tread -- Kind --
Tires --- Cen. diam. -- Size --
Tires Fastened by --

Back Engine Truck None. Wheels ---
Tr. wring -- each side of cen. Cen. pin liners --
Journals, Diam. -- Length -- Boxes --
Wheel nub liners --
Wheels, Diam. -- Tread -- Kind --
Tires -- Cen. diam. -- Size --
Tires fastened by --

Brake, position On all driving wheels. (No tender).
Operating {Engine — B. L. W. Steam.
Parts {Eng. Trk. sch. ---
Foundation {Drivers, sch. WM-2 American outside equalized.
Parts {Eng. Trk. sch. ---
Air pump None. Pos. ---
Train connections ---
Train signal, sch. ---

Tender None.

Tank 1450 Gallons, Bill 5744.
Saddle tank over top of boiler.
Tank with 3" circulating pipe of copper.

Provide 2" plug in each corner of tank at least 1½" above bottom of tank for washing out and tank cleaning plugs at bottom.

List of tools, sch. 158, except omit jack screws.
Photo sch. No. 2. Inspection B. L. W.
To be weighed No. Material specs. B. L. W.
Certificate of boiler test (See sup. 3)
Junior laws to 12-31-21 Shipment On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

B. L. W.
Patents None.

Property plates None.

Painting, style --- Black, no striping.

Mark on tank sides: B E D T

Road Nos. F. ---, Road Nos. ---, Name None.
F. No. Plate. 11
Cab sides.

Actual Dimensions of Loco. Extreme height over all = 12' 7¾"
Extreme Width {Over cab boards = 10' 1", Over cylinders ~~or valve motion~~ = 9' 3"
Length outside face of front bumper to outside face of back bumper of engine = 26' 2"

SPECIFICATION FOR LOCOMOTIVES: 6 32 D 1150

FOR: BROOKLYN EASTERN DISTRICT TERMINAL.

36 36

J.McD.

1 LOCOMOTIVE FOR I.C.C. SERVICE.

2 LOCOMOTIVE TO OPERATE IN THE STATE OF NEW YORK AND TO MEET THE NEW YORK STATE REQUIREMENTS COVERING ASH PANS AND SPARK ARRESTERS.

3 CERTIFICATE OF BOILER TESTS:- THREE COPIES B.L.W. FORM 1036 AND TWO COPIES B.L.W. FORM 491.

4 FIRE DOOR TO BE FRANKLIN RAILWAY SUPPLY CO'S. BUTTERFLY TYPE, NO. 8.

5 WATER SPACE AND RADIAL STAYS OF TENNESSEE CHARCOAL BLOOM IRON.

6 SHAW NOISELESS EXHAUST TO BE MADE BY THE B. L. W. ROYALTY, IF ANY, ON SHAW EXHAUST PAYABLE BY THE B.L.W.

7 BOILER FITTINGS TO BE LOCATED SAME AS FOR 6 32 D 145 BUILT IN 1900, CONSTRUCTION NO. 18145. THIS PLACES THROTTLE LEVER IN A MORE CONVENIENT POSITION THAN FOR CO'S. LOCO. NO. 10, B.L.W. CLASS 6 32 D 1035.
COMBINATION THROTTLE ROD STUFFING BOX AND STEAM GAUGE BRACKET IS MOVED FORWARD TO FRONT OF CAB. STEAM MANIFOLD ALSO MOVED FORWARD TO ABOUT MIDWAY OF CAB, FROM WHICH INJECTOR STEAM PIPES LEAD ALMOST DIRECT TO INJECTOR.
THIS WILL PERMIT OF SAND BOX BEING SET ON BOILER AT BACK OF CAB, INSIDE (SUP.16) AND CONVENIENT TO ENGINEER.
THROTTLE LEVER IS ALSO MORE CONVENIENT TO ENGINEER WHEN SWITCHING.

8 CAB FLOOR TO BE ON SAME LEVEL AS RUNNING BOARD.
CAB SHOWN ON PHOTO. 4381 TO BE REDUCED IN HEIGHT TO THAT EXTENT. GENERAL APPEARANCE AS SHOWN ON PHOTO ACCOMPANYING CO'S. SPEC'N.

9 CAB TO BE MADE OF WOOD. TWO SIDE PANELS TO BE LEFT OUT AND #10 STEEL PLATE FASTENED WITH CARRIAGE BOLTS, TO BE APPLIED. PLATE TO EXTEND FROM RUNNING BOARD TO TOP OF WINDOW SILL AND FROM OUTSIDE OF CORNER POST TO OUTSIDE OF CORNER POST, EACH END.
CAB TO BE FITTED WITH TWO STATIONARY WINDOWS EACH SIDE 11" WIDE OVER FRAMES AND TWO SLIDING WINDOWS EACH SIDE 12" WIDE OVER FRAMES, ONE TO SLIDE FORWARD AND THE OTHER ONE BACK.
CAB TO BE CLOSED AT REAR AND TO HAVE TWO DOORS BOTH FRONT AND BACK.

10 COAL BOX ON REAR EXTENSION OF ENGINE FRAME, BACK OF CAB. CAPACITY 1,300 POUNDS.

11 SADDLE TANK TO HAVE HAND RAIL RUNNING FULL LENGTH ON EACH SIDE AT A PROPER HEIGHT FROM RUNNING BOARDS.

12 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE E-2 INCANDESCENT, 32 VOLTS.
GENERATOR TO BE LOCATED ON TOP OF SADDLE TANK IN FRONT OF CAB, AS SHOWN ON CO'S. PHOTO. (HEREWITH).
REAR HEADLIGHT TO BE LOCATED AT BACK OF CAB, UNDER CAB EXTENSION.

16 THREE SAND BOXES: ONE BOX APPROXIMATELY 4' 0" LONG, 7" HIGH AT CENTER AND 14" DEEP AT ENDS, BY 10" WIDE, PLACED ON TOP OF BOILER INSIDE OF CAB, WITH SUITABLE HAND SANDERS AND WITH PIPES LEADING TO BACK DRIVERS.
TWO SAND BOXES, APPROXIMATE DIMENSIONS 25" HIGH, 18" LONG, 19½" x 18" ON TOP AND 9⅝" x 18" ON BOTTOM, LOCATED AT FRONT END, ONE EACH SIDE IN FRONT OF SADDLE TANK. THESE BOXES TO BE FITTED AND FASTENED TO FRONT END, AS SHOWN ON CO'S. PHOTO. (HEREWITH) WITH HAND SANDERS AND WITH PIPES TO FRONT WHEELS.

17 RELIEF COCKS UNDER EXHAUST CHAMBER TO CONNECT WITH CYLINDER COCK RODS.

18 CONNECTING AND PARALLEL RODS OF TENNESSEE HAMMERED IRON. PARALLEL RODS WITH STRAPS, KEYS AND BRASSES.

19 DRIVING TIRES FROM STANDARD STEEL WORKS AND TO BE ESPECIALLY HARD, FOR SWITCHING SERVICE.

20 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS - 7/32" TOTAL.

21 B.L.W. STEAM BRAKE CYLINDER TO BE APPLIED ON EACH SIDE AND TO BE CONTROLLED BY A B.L.W. BRAKE VALVE LOCATED IN CAB. STEAM BRAKE TO BE LUBRICATED FROM MAIN CYLINDER LUBRICATOR.

22 BRAKE SHOES TO BE ROSS-MEEHAN.

23 ROAD NUMBERS TO BE PAINTED ON SIDES OF CAB IN YELLOW AND HOUSE FLAG, AS CO'S. DESIGN TO BE PAINTED ON SIDES OF TANK, MAKING THE TWO OUTSIDE BARS AND CIRCLE RED AND THE CENTRAL BAR AND LETTERING WHITE. OUTLINE OF BLOCK IN THE CENTER TO BE CUT IN IN BLACK, SAME AS FOR LOCO. 6 32 D 1035.

THE BALDWIN LOCOMOTIVE WORKS {Dup. 6 38 D 46, with same extras, except where otherwise specified.

Memorandum Spec'n 21034

SPECIFICATION FOR LOCOMOTIVES 6 38 D 143

FOR Brownell Improvement Company

RTL

Gen. as Photo 4545

Engine Drawing No. 7

11-10-21

Gauge of Road 4' 8½" Play 4"
Wheelbase, Rigid 11' 6" Driving 11' 6" Total 11' 6"
Total wheelbase, eng. and tend. {Actual 43' 6½" / Limited to ---

Curves 28 degrees

Limits, Height 15' 0" Width ---
Weight (approximate) in working order, Total 152,100 pounds
On F. tr'k --- lbs. Drivers 152,100 lbs., B. tr'k -- lbs.

Tractive power 38,590 lbs. Ratio of adhesion 4
Work'g St'm Pres. 180 lbs. Service Switching
Fuel Soft Coal

Boiler Steel Thick ⅞" Bill 2214
Front Tube Sheet 9/16" Thick
Boiler, Diam. 78" Plan Straight Top
{Allowable st'm pres. 200 lbs. / With Factor of Safety of 5.02 **Tested to** 220 / 300 lbs. steam pres. / lbs. water pres.
Longitud. seams Butt-jointed, double covering strips
Main Dome: One-piece type Auxiliary Dome: None
Dome, diam. 33" Pos. Central

Firebox Steel Combustion chamb. None
Firebox, length 120⅛" Width 42" Depth F. 73⅜" B. 71⅜"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening 16" diam. Crown and sides in one sheet.
Water space, Front 4" Sides 3" Back 3"
Water space frame Double Riveted
Water space stays ⅜" diam. with 3⅛" holes 1¼" deep from O.S.
Radial stays 1" diam. Sling stays front {Three rows S.L.W. / Expansion Stays
Button heads below crown on Eight central rows
Crown bars None Placed --- above crown
Crown bolts ---

Flues ---
Tubes No. 11 B.W.G. ~~Charcoal Iron~~ Steel for 143 only (account of error)
Tube ends Swaged for copper ferrules, fire box ends
Number 374 Diam. 2" Length 10' 5"

Heating Surface {Flues ~~None~~ Combus. Chamb. ~~None~~ Total 2216⁰ / Tubes 2021⁶ Fire Box 195⁰ Fire Brick Tubes ---
Grate area 35.1⁰ Ratio to Heating Surface 1 : 63
Superheater ---

Fire Brick None
Three 2" combustion tubes in each side of fire box.

Grates Rocking bars and drop plate
Ash Pan, Dampers Front and back
Ash pan to conform to the I. C. C. Requirements.

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

Smoke box front and door to be of cast iron.
Smokebox extension With Cleaning hole and cab L. S. only
Spark ~~ejector or~~ hopper With
Netting and deflect. plates With

Exhaust nozzles Double, High

Stack Straight Dia. 18"

11-10-21

Safety Valves Two Coale 3", one muffled
Safety valves Both with solid clover. Set to {180 pounds muffled / 183 pounds open
Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Maker: Ashcroft (Spec)
Steam gauge stand Iron **Clock** None

Water Gauge One B.L.W., Ironclad **Cab Lamps** to burn oil
Gauge Cocks Three Back Surface valve None
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve Two B. L. W.

Blow off Cock One Crane 2" Pos.: Front
Cleaning Plugs One plug above fire door.
Firebox: Corners diagonal, sides and back
Crown, Three each side and two back
Waist, One under front
Front tube sheet, One 10 fine plug One

Pump None
Locomotive to operate in State of Illinois.
Boiler to conform to the A. S. M. E. Code. (See Sup 1 etc.)
Boiler to be inspected by The Hartford Steam Boiler Inspection and Insurance Company. (See Sup. 1 and 19)
Injectors Two Monitor (Spec) No. 10
Injectors, Pos. Right and Left Steam pipes Copper
Pipes, Check Iron Feed Iron Overflow Iron
Check B. L. W., with stop valve Pos. Right and Left

Steam Heat None

Cab Wood

Cab boards Wood Nosing None
Running boards Wood Nosing None
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 31¼"

Pilot None Pushing shoes At front
Front Bumper Oak Bumper plate None
Steps Across front with hand rail
Steps, hand holds, etc., to conform to I. C. C. Requirements.
Front Drawhead, Center above rail 33½"
Coupler M. C. B. Auto.

Signal fixtures None

Headlight Two Round Case 16" Reflector To burn Kerosene
Headlight, Nos. on sides With Headlight step With
Lamp shelf None Nosing ---

Bell 90 pounds
Sand Box Two Diam. 28" Body Iron Painted Pipes Iron
Sander (Spec) Leach Air, Trap A-1 in each box, to sand front and back.
Dome casing Iron painted, with pressed steel top ring.

Boiler Jacket #22 Soft Steel Ptd. Bands Iron Style 9
Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

L. G. Tandy March 1922

SPECIFICATION FOR LOCOMOTIVES 6 38 D 143

FOR Brownell Improvement Company

38 38

Frames Cast Steel
Cylinder cocks on inside as far off center as possible.
Cylinders, 22" ---
19" 15" 12⅝"
19" 3" 1/10"
" 8" ---
(Spec) 2" None
Lubrication, Triple Bull's Eye
Cast iron painted Steel pat. tbs
Steel pat. rods
Valve Motion, Allen Balanced, with vacuum valves.
(Spec) Cylinder heads to be lagged.
Pistons, to be keyed to crosshead.
Piston rod, cast iron with rings of cast iron spring in.
Crosshead, Steel
Guides, Steel
Eccentrics, cast steel, with bearings of cast iron timbed.
Wrist Pins, Steel Straps, Cups forged on rods.
Main rods, Forged Steel

Valve Motion ---

Main Bearings ---
Rods
Drivers, " 56" centers cast steel

Tires, Steel Shrinkage and Smooth
Front and back 3½" x 5/8"
Middle 3½" x 6½"

Driving Boxes Cast Steel with Elvin grease lubricators
Journals, 7" x 12"
Lateral play, leaded driving boxes and wheel hubs, including ---
Lateral play in pedestal fits - 7/32" total.
Springs, Bolster, B. L. W. Equal beams wrought steel.

Front Engine Truck None Wheels ---
Journals, ---

Back Engine Truck None Wheels ---

Brakes, On all driving and tender wheels
No. 6-ET Westg. Combined Auto. and Straight Air

K-3 American C. S. Equalized

Cylinder 11" Pos. Left Side
Front or back
None
Air reservoirs to have hydrostatic test of 210 pounds.
Brake rigging and other apparatus to be kept as high above rail as is consistent with good practice.

Tender Eight Wheels Diameter 36" 1694
Weight, 100,000 pounds
Tender to be weighed: Yes
Tank 5000 Capacity 5130
Tank "U" shape, sloping back. Fuel Cap. 8 tons
(Tank Bottom) Hard Wood, Top

Frame Steel 10" channels, with bumper of wood, re-inforced with steel plate. Body center castings of cast steel.
Front Pilot height 30⅜"
Rear None Platform at rear
Platform width 33½"
Coupler M. C. B. Auto.

Steps, hand holds, etc., to conform to I.C.C. Requirements.
Steps across rear with hand rails.
Steps and hand rail on sloping back of tank.
Trucks Arch bar type with bolsters of cast steel.

Elliptic B. L. W.
5" 3"
Width 30" 4" Material Drilled cast iron plate
Type None --- Size ---
Tank fastening ---
Spring rigging Single

Brakes On all wheels
No. 6-ET Westg. Autq. and straight air, with 12" x 12" tender cylinder.

Driving Boxes, Main ---
Main Journals, ---
Main Pins, ---
Side Rods, ---
Main Bearings, ---
Rods, ---
Drivers, " 56" centers cast steel

Tires, Steel
Front and back 3½" x 5/8"
Middle 3½" x 6½"

Driving Boxes Cast Steel with Elvin grease lubricators
Journals, 7" x 12"
Lateral play, leaded driving boxes and wheel hubs, including ---
Lateral play in pedestal fits - 7/32" total.
Springs, Bolster, B. L. W. Equal beams wrought steel.

Front Engine Truck None Wheels ---
Journals, ---

Back Engine Truck None Wheels ---

Boiler, B. L. W.
Pilot None

Paint, B. L. W. for engine and tender

Painting, 29 Olive Green and Aluminum

Name on sides of tank, above road number: Brownell Improvement Co.

Road No. None
F. No. Plate 8
Cab Panels
Tank Sides

Actual Dimensions of Loco. Extreme height over all 14' 5⅛"
Extreme Width Over Cylinders 10' 3" 9' 8¾"
Total wheelbase of engine 30' 9"
Total wheelbase of engine and tender 24' 3"

SPECIFICATION FOR LOCOMOTIVES 6 38 D 143

FOR BROWNELL IMPROVEMENT CO.

P

39

39

1 BOILER TO BE OPERATED IN THE STATE OF ILLINOIS
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND -ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6059. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1919)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:-

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	½"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝", (I. E., USE FUSIBLE PLUG CARD 4114 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6058.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG: ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER ⅝" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES ⅝" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(MANUFACTURER'S SERIAL NUMBER)	ILLINOIS (STATE OR COUNTY WHERE BOILER IS TO BE USED) No. 1 (NUMBER WITHIN STATE IF REQUIRED) THE BALDWIN LOCOMOTIVE WORKS (NAME OF MANUFACTURER) (LEAVE BLANK) (YEAR BUILT IF REQUIRED) (LEAVE BLANK) 200 LBS. (MAXIMUM WORKING PRESSURE WHEN BUILT)

THE BALDWIN LOCOMOTIVE WORKS As spec'n. C-6683

Memorandum Spec'n 20118

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 151

FOR Calcasieu Long Leaf Lumber Co.

Gen. as Photo. 7387 {except tender trucks to be arch bar type and with wood rack around top of tender

Engine Drawing No. 33

WHS 6.28.20

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 10' 3" Driving 10' 3" Total 26' 10"

Total wheelbase, eng. and tend. {Actual 50' 6" / Limited to ---

Curves 10 degrees

Limits, Height ---- Width ----

Weight (approximate) in working order, Total 130,000 pounds

On F. tr'k 13,000 lbs. Drivers 101,000 lbs. B. tr'k 16,000 lbs

Tractive power 25,087 lbs. Ratio of adhesion 4.02

Work'g St'm Pres. 200 lbs. Service Logging

Fuel Coal and Wood

Boiler Steel Thick ¾" Bill 9195

Front Tube Sheet ½" Thick

Boiler, Diam. 60" Plan Extended Wagon Top

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 5.35 300 lbs. water pres.

Longitud. seams Butt jointed, double covering strips

Auxiliary Dome : None

Dome, diam. 29" Pos. Forward of fire box

Firebox Steel Combustion chamb. None

Firebox, length 6' 1⅛" Width 42" Depth F. 63½" B. 60½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" diam. Crown and sides in one piece

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O. S.

Radial stays 1" diam. Sling stays front {Two rows B. L. W. Expansion Stays

Button heads below crown on Eight central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G. Steel

Tubes No. 12 B. W. G. Charcoal Iron

Tube ends Swaged for copper ferrules, fire box ends

Number {21 / 114 Diam {5/8" / 2" Length 13' 9"

Heating Surface Flues 404 Combus. Chamb. ---- Total 1438

Tubes 930 Fire Box 104 Fire Brick Tubes ---

Grate area 18.7 Ratio to Heating Surface 1: 76.9

Superheater 344

Fire Brick Arch – None

Grates Plain Bars with Drop Plate

Ash Pan, Dampers Back Only

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater Schmidt Type (See sup. 27 etc)

Smokebox extenstion With Cleaning hole and cap None

Spark ejector or hopper None

Netting and deflect. plates None

Exhaust nozzles Double, low

Petticoat pipe to be long

Stack Rushton Dia. 16"

Safety Valves Two Coale 2½" Open

Safety valves Both with relief lever Set to 200 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Maker : Ashcroft

Steam gauge stand Iron **Clock** None

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3¼" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos. Right Side

Cleaning Plugs One filling plug in top of boiler

Firebox, Corners diagonal, L. S., Front and Back

Crown, Two each side and three back

Waist, One under front

Front tube sheet, One Middle plug, One

Pump None

Injectors Two Monitor (Sampe) No. 7

Injectors, Pos. Right and Left Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B. L. W. with stop valve Pos. R. and L.

Steam Heat None

Cab Steel

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 36¾"

Pilot Wood

Front Bumper Cast Steel Bumper plate With

Steps Hand holds etc. to conform to I. C. C. requirements.

Front Drawhead, Center above rail

Coupler M. C. B. Automatic, 33½" centre above rail and with pocket draw casting 25" above rail, same as for 10 26¼ D 109.

Signal fixtures Iron on Bumper

Headlight Two round case 18" Reflector

Headlight, Nos. on sides With Shell steel With

Lamp shelf None Nosing ---

Bell 92 pounds Gollmar Air Bell Ringer

Sand Box Two Diam. 28" Bolts Iron Painted Pipes Iron

Sander (not Spec) Leach Air, Trap A-1, in each box, to sand front and back.

Dome casing Iron Painted

Boiler Jacket #22 Soft Steel Pto. Bands Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

E. H. Roberts. Sept 1920

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 151

FOR Calcasieu Long Leaf Lumber Co.

Frames Cast Steel

Cylinders, Diam. 17" Stroke 24"

St'm ports, Length 20.84" Width 1¼" Bridges ---

Exh. ports, Length --- Width ---- Valve lead ¼"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ----

Eccentric crank throw 10-19/32 By-pass valve None

S. F. Lubr. Nathan Five-Feed No. 31-Bulls Eye

Cyl'r heads Cast Iron Lubr. pipes of iron under jacket

Cyl'r casings Iron Painted Head covers Steel Painted

St'm chest casings Iron Painted Covers Steel Painted

St'm chest valves 9½" diam. Piston Type

Met. pkg. U. S. King Type

Piston rods to be keyed to crossheads

Pistons heads of cast steel (see sup. 41)

Guides Alligator Type, Steel Oil cups Needle

Crossheads Cast Steel with bearings of cast iron, tinned

Wrist Pins Steel Rod cups Plunger

Parallel rods to have solid ends.

Valve Motion Walschaerts

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboltsj to be United States Standard.

All finished movable nuts of steel or of iron case hardened

Wearing Bearings B. L. W.

Driving wheel hub liners Bronze

Drivers, O. S. Diam. 47" Cen. diam. 40" Centres; Cast Iron

Tires Steel Held by Shrinkage and Shoulder

Tires, Flanged, Pos. Front and Back Size 3½" x 5½"

Tires, Plain, Pos. Middle Size 3½" x 6½"

Lateral play between driving boxes and wheel hubs 3/16" total

Driving Boxes Cast Steel

Journals, Diam. 8" Length 9"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing Bolster

To swing 4" each side of cen. Cen. pin liners None

Journals, Diam. 5" Length 10" Boxes Cast Steel

Wheel hub liners Bronze

Wheels, Diam. 28" Tread --- Kind Rolled Steel

Tires None Cen. diam. --- Size ---

Tires held by --- Wheel Rims: 2½" x 5½"

Back Engine Truck Two Wheeled Swing Bolster, side bearing

To swing 4" each side of cen., Cen. pin liners None

Journals, Diam. 5" Length 10" Boxes Cast Steel

Wheel hub liners Bronze

Wheels, Diam. 28" Tread --- Kind Rolled Steel

Tires None Cen. diam. --- Size ----

Tires held by --- Wheel Rims: 2½" x 5½"

Brake, position On all driving and tender wheels

Operating Engine, sch. No. 6-ET Westg. Combined Automatic and Straight Air.

Parts Eng. Tr'k, sch. ----

Foundation Drivers, sch. WM-2 American Outside Equalized

Parts Eng. Tr'k, sch. ---

Air pump One 9½" Pos. Left Side

Train connections Front and Back

Train signal, sch. None

Air reservoirs to have hydrostatic test of 210 pounds

Tender Eight Wheeled, Drawing No. 1593 {Tender to be weighed: Yes

Weight, with fuel and water, about 90,000 pounds

Weight of tender, empty, about 50,000 pounds

Tank 4500 U. S. Gallons Bill 5458

Tank "U" shaped, straight top. Fuel capacity: 6 tons

Tool Boxes Hard Wood, placed in rear of tank

Frame 8" and 10" steel channels with bumpers of wood and steel plate.

Front Drawbar height 34¼"

Pilot None

Back drawhead, Center above rail

Coupler M.C.B. Automatic, 33½" centre above rail, and with pocket draw casting, 25" above rail, same as for 10 26¼ D 109

Steps hand holds etc to conform to I. C. C. requirements.

Steps across rear with hand rails.

Trucks Arch Bar type, with bolsters of cast steel

Springs Elliptic, B. L. W.

Journals, Diam. 4¼" Length 8"

Wheels, Diam. 33" Tread --- Kind Rolled Steel

Tires None Cen. diam. --- Size ---

Tires held by --- Wheel Rims: 2½" x 5½"

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET Westg. Automatic and Straight Air with 10" x 12" tender brake cylinder.

List of tools, sch. 29 One pair wrecking frogs

Photo sch. No. 2 Inspection B. L. W. (except see sup. 1 & 19,24)

To be weighed Yes Material specified B. L. W. (except see sup. 4)

Certificate of boiler test Three copies B. L. W. form 1036

Junior laws to 9.30.20 Shipment On own wheels

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents None

Property plates None

Painting, style 291, Olive Green and Aluminum

Lettering, etc. to be similar to 10 26 ¼ D 130.

Mark on cab sides : C.L.L.L.Co.

Mark on tank sides : Calcasieu Long Leaf Lumber Company

Road Nos. Pos. Road Nos. Name None

F. No. Plate 68

F. Sand Box

Back of Tank

Actual Dimensions of Loco. Extreme height over all 14' 8"

Extreme Width Cab boards 9' 11" Cylinders or valve motion 9' 1½"

Length outside face front bumper of engine to face of tender wedge 31' 11"

Length face of tender wedge to outside face back bumper of tender 24' 11½"

Total length outside face front bumper of engine to outside face back bumper of tender 56' 10½"

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 151

FOR CALCASIEU LONG LEAF LUMBER COMPANY

P

1 BOILER TO BE OPERATED IN THE STATE OF CALIFORNIA
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1913), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL / MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 39
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

10% ALLOWABLE VARIATION EITHER WAY IN THICKNESS OF TUBES.

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1913)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/32" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	½"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I. E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS OF SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR COCK BETWEEN THE CHECK VALVE AND THE BOILER, THE FEED WATER TO DISCHARGE BELOW THE LOWEST SAFE WATER LINE.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6859.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX (6) STAYS OR STAY BOLTS NOT SMALLER THAN 1" PIPE TAP LOCATED AS FOLLOWS:
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEGS ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 STAY FUNCTIONS- STAY BOLTS, EXCEPT FOR ATTACHING STAY RODS TO HEADS, SHALL BE DRILLED FULL SIZE THRU PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE. OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ⅛" LESS THAN FULL SIZE FOR PLATES OVER ⅝" IN THICKNESS, AND ¼" LESS THAN FULL SIZE FOR PLATES ⅝" AND UNDER, AND THEN DRILLED OUT REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THE BOILER, REAMED OR FINISHED FULL SIZE WITH ROTATING REAMER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ⅜". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

CALIFORNIA
No. 3
THE BALDWIN LOCOMOTIVE WORKS
(LEAVE BLANK) (LEAVE BLANK)
200 LBS.
(manufacturer's serial number) (state number) (maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVES 10 28 ½ D 151

FOR CALCASIEU LONG LEAF LUMBER COMPANY

Specification for Type A Double Loop Superheater, As Sprsh. O-14539, dated Aut. 17th, 1920.

BOILER TUBES	114 in number 2 o.d. 13 ft. 9 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	21 in number 5½ o.d. #9 B.W.G. of cold drawn seamless steel Flues to be in accordance with the American Society for Testing Materials Specification A-28-18	Card 11025-E
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections	Card 1136 Card 3L-50651
TUBE SHEET LAYOUT UNITS	21 units 15 o.d. #9 B.W.G. Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	Card 10773
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 1052
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on	Card 1094-L
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A	Card 11309-F
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages so as to insure soundness of all partition walls.	
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.	
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with	Card SEE ARRGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing.	Card 11313
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer	Card 1067
S H ARRANGEMENT	To be in accordance with	Card 4L-40673
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 2L-11432-P	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1311
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. PIPE BAND	Card 1309
~~DAMPER CYL. SUPPORT RIGGING~~	Card 11384	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1068	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O.S.)	Card 1148	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 1215-J - Buffalo	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A
PYROMETER	NONE		

SPECIFICATION FOR LOCOMOTIVE : 10 28 ½ D 151

FOR : CALCASIEU LONG LEAF LUMBER CO.

21 LOCO. TO OPERATE IN STATE OF LOUISIANA, BUT IS ALSO TO BE BUILT TO MEET THE CALIFORNIA STATE LAWS.

22 BOILER TO CONFORM TO CALIFORNIA BOILER CODE.

23 BOILER TO CONFORM TO THE A. S. M. E. CODE. (SEE SUP. 1 &G)

24 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

25 FIRE DOOR TO BE FRANKLIN AUTOMATIC NO. 8, BUTTERFLY TYPE.

26 TUBES TO BE ELECTRICALLY WELDED TO FIRE BOX TUBE SHEET.

27 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S. SPECIFICATION NO. O-14539 DATED AUG. 17, 1920, COPY ATTACHED. SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTION TO VALVE CHAMBER. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

28 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

29 SPARK ARRESTERS AND ASH PAN MUST MEET THE REQUIREMENTS OF THE LAWS OF THE STATE OF LOUISIANA.

30 ONE HANCOCK 4" No. 9 SYPHON LOCATED UNDER CAB BOARD ON LEFT SIDE, WITH PIPE CONNECTION TO TANK, AND WITH 20 FT. OF SUCTION HOSE.

31 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC INCANDESCENT, TYPE K-2.

41 PISTON TO BE FITTED WITH CAST IRON BULL RINGS, ¾" FOLLOWER PLATES: FOLLOWER BOLTS 1⅛" WITH 12 THREADS.

42 GUIDE YOKE OF CAST STEEL.

43 MAIN ROD TO CONNECT TO THE BACK DRIVERS.

44 DETROIT FLANGE LUBRICATORS TO FEED TO FRONT AND BACK DRIVERS.

45 ENGINE SPRINGS TO BE TWO PLATES HEAVIER THAN USUAL.

46 RAIL WASHERS TO BE APPLIED.

—TENDER—

51 HEIGHT OF TOP OF TANK TO CORRESPOND WITH ENGINEER'S SEAT IN CAB, SAME AS FOR 10 26 ½ D 109.

52 TOP, BOTTOM AND COAL SPACE OF TANK TO BE ¾" PLATES.

53 TANK TO HAVE DASH PLATES.

54 FUEL RACK AROUND TOP OF TANK.

55 REAR OF TENDER FRAME TO EXTEND 36" BEYOND BACK OF TANK.

THE BALDWIN LOCOMOTIVE WORKS As Spec. C-6683

Memorandum Spec'n 20119

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 152

FOR LONGVILLE LUMBER CO

Gen. as Photo. 7387 {Except tender trucks to be Arch Bar type, and with wood rack around top of tender.

Engine Drawing No. 33

Gauge of Road 4' 8½" Play 2¾"
Wheelbase, Rigid 10' 3" Driving 10' 3" Total 26' 10"
Total wheelbase, eng. and tend. {Actual 50' 6" {Limited to ---

Curves 15 degrees

Limits, Height --- Width ---
Weight (approximate) in working order, Total 130000 pounds
On F. tr'k 13000 lbs., Drivers 101000 lbs., B. tr'k. 16000 lbs.

Tractive power 25087 lbs. Ratio of adhesion 4.02
Work'g St'm Pres. 200 lbs., Service Logging
Fuel Coal and Wood

1 21 **Boiler** Steel Thick 3/4" Bill 9195
5 Front Tube Sheet ½" Thick
Boiler, Diam. 60" Plan Extended wagon top
3 Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.
6 3 With Factor of Safety of 5.35 300 lbs. water pres.
6 18 Longitud. seams Butt jointed with double covering strips
Auxiliary dome, None
5 **Dome,** diam. 29" Pos. Forward of firebox

5 **Firebox** Steel Combustion chamb. None
Firebox, length 64⅝" Width 42" Depth F. 63½" B 60½"
10 Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
24 Firedoor opening 16" diam. Crown and sides in one sheet
Water space, Front 4" Sides 3" Back 3"
Water space frame Single Riveted
7 15 Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O. S.
7 15 Radial stays 1" diam. Sling stays front {Two rows B. L. W. {Expansion Stays
Button heads below crown on Eight central rows
Crown bars None Placed --- above crown
Crown bolts ---

4 Flues No. 9 B W G Steel
18 **Tubes** No. 12 B W G Charcoal Iron
Tube ends Swaged for copper ferrules firebox ends
Number 21 114 Diam 5½" Length 15' 9"
Tubes to be electrically welded to fire-box tube sheet.

Heating Surface Flues 404⁶ Combus. Chamb. --- Total 1438⁶
Tubes 930⁶ Fire Box 104⁶ Fire Brick Tubes ---
Grate area 18.7 Ratio to Heating Surface 1:76.9
Superheater 344⁶

Fire Brick Arch, None

25 **Grates** Plain bars with drop plate.
Ash Pan, Dampers Back only

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater Schmidt type (See Sup. 26)

5 **Smokebox** extension With 27 Cleaning hole and cap None
28 Spark ejector or hopper None
Netting and deflect. plates None

Exhaust nozzles Double, low
Cleaning pipe - With
Stack Rushton Dia. 16"

6-28-20
8 18 (Not Spec) **Safety Valves** Two Coale 2½" Open
Safety valves both with relief lever, Set to 200 pounds
8 **Whistle** One B. L. W. plain
8 9 **Steam Gauge** One Iron 7" MAKER: Ashcroft
Steam gauge stand Iron **Clock** None
8 **Water Gauge** One B. L. W. Ironclad **Cab Lamps** Electric
8 **Gauge Cocks** Three back Surface valve None
Lowest gauge cock 3¼" above highest part of crown
Lubricator steam valve without separate dry pipe to dome
8 **Blower Valve** B. L. W.

8 **Blow off Cock** One B. L. W. POS: R. S.
17 **Cleaning Plugs** One filling plug in top of boiler.
Firebox Corners diagonal: L. S. front and back
Crown, Two each side and three back
Waist, One under front
Front tube sheet One Fusible plug One

Pump None

Injectors Two Monitor (Spec) No. 7
Injectors, Pos. Right and Left Steam pipes Copper
8 Pipes, Check Iron Feed Iron Overflow Iron
8 15 Check B. L. W. with stop valve Pos. R and L

Steam Heat None

29 **Cab** Steel

Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 36¾"

Pilot Wood
Front Bumper Cast Steel Bumper plate With
Steps, Hand holes, etc. to conform to I. C. C. requirements

Front Drawhead, Center above rail (See Sup. 30)
Coupler (See Sup. 30)

Signal fixtures Iron on bumper

31 **Headlight** Two Round Case 18" Reflector
Headlight, Nos. on sides With Hdl't step With
Lamp shelf None Nosing

Bell 92 pounds' Gollmar Air bell ringer
Sand Box Two (Not Spec) Diam. 28" Body Iron, PTD. Pipes Iron
Sander Leach Air Trap A-1 in each box to sand front and back

Dome casing Iron painted.

Boiler Jacket #22 soft steel, PTD. Bands Iron Style 9
Boiler Lagging Magnesia sectional

THE BALDWIN LOCOMOTIVE WORKS

E. H. Roberts Sep-1920

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 152

FOR LONGVILLE LUMBER CO.

Frames Cast Steel

Cylinders, Diam. 17" Stroke 24"
St'm ports, Length 20.84 Width 1¼" Bridge ---
Exh ports, Length --- Width --- Valve bars 1"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 10-19/32 By-pass valve None
(Not Spec) S. P. Lubr. Nathan Five Feed No. 31 Bulls Eye
Cyl'r heads Cast Iron. Lubr. pipes of iron under jacket
Cyl'r casings Iron painted Head covers Steel painted
St'm chest casings --- Covers ---
St'm chest valves 9½" diam. Piston type
(Not Spec) Met. pkg. {Piston rods {Valve stems U. S. King type
Piston rods to be keyed to crossheads
Pistons Heads of cast iron cored with snaprings and no follower
32 **Guides** Alligator type, Steel Oil cups Needle
Crossheads Cast Steel with bearings of cast iron, tinned.
Wrist Pins Steel Rod cups Plunger
33 Parallel rods to have solid ends

Valve Motion Walschaerts
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners Bronze
34 8 **Drivers,** O. S. Diam. 47" Cen. diam. 40" Centers Cast Iron

Tires Steel Held by Shrinkage and Shoulder
34 5 Tires, Flanged, Pos. Front and Back Size 3½" x 5½"
Tires, Plain, Pos. Middle Size 3½" x 6½"
Lateral play between driving boxes and wheel hubs 3/16" total
Driving Boxes Cast Steel
Journals, Diam. 8" Length 9"

Springs. Mak. B. L. W., two plates heavier than usual

Front Engine Truck Two Wheeled Swing bolster, centerbearing
To swing 4' 2" each side of cen., Cen. pin liners None
Journals, Diam. 5" Length 10" Boxes Cast Steel
Wheel hub liners Bronze
Wheels, Diam. 28" Tread --- Kind Rolled Steel
Tires --- Cen. diam. --- Size ---
Tires held by --- Rims of wheels 2½" x 5½"

Back Engine Truck Two Wheeled Swing bolster side bearing
To swing 4" each side of cen., Cen. pin liners None
Journals, Diam. 5" Length 10" Boxes Cast Steel
Wheel hub liners Bronze
Wheels, Diam. 28" Tread --- Kind Rolled Steel
Tires --- Cen. diam. --- Size ---
Tires held by --- Rims of wheels 2½" x 5½"

Brake, position On all driving and tender wheels.
Operating Parts {Engine, sch. 6-ET Westg. combined auto and straight air {Eng. Trk. sch. ---
Foundation Parts {Drivers, sch. WM-2 American O. S. equalized {Eng. Trk. sch. ---
Air pump One 9½" Pos. Left side
Train connections Front and back
Train signal, sch. None
Air reservoirs to have hydrostatic test of 210 pounds.

51 **Tender** Eight Wheeled, Drawing No. 1593 {Tender to be weighed - Yes
Weight, with fuel and water, about 90,000 pounds {Weight of tender empty about 50,000 pounds.
51 **Tank** 4500 Gallons, Bill 5458
Tank "U" shaped with straight top. Fuel capacity 6 tons
Tool Boxes Hard wood, placed in rear of tank

55 **Frame** Steel 8" and 10" channels - with bumpers of wood and steel plate
Front Drawbar height 34¼"
Pilot None
Back drawhead, center above rail (See Sup. 56)
Coupler (Sup. 56)

Steps, handholds, etc. to conform to I. C. C. requirements.
Steps to be applied at rear of tender instead of pilot.

Trucks Arch Bar Type with bolsters of cast steel

Springs Elliptic, B. L. W. make
Journals, Diam 4¼" Length 8"
Wheels, Diam. 33" Tread --- Kind Rolled Steel
Tires --- Cen. diam. --- Size ---
Tires held by --- Rims of wheels 2½" x 5½"
Safety chains Single

Brake Position On all wheels
Brake sch. No. 6 ET Westg. Automatic and straight air, with 10" x 12" tender cylinder.

List of tools, sch. 29 One pair wrecking frogs
Photo sch. No. 2 Inspection B. L. W. (See Sup. 1 and 23)
To be weighed No Material specs B. L. W. (See Sup. 1 & 22)
Certificate of boiler test Three copies B. L. W. form 1036
Junior laws to 9-30-20 Shipment On own wheels

Brass shop finish, No. 1
Machine shop finish D-165

Property plates None

Painting, style 291 Olive Green and Aluminum

Mark on Cab sides L. L. Co.
Mark on Tank sides Longville Lumber Company

Road Nos. (Not Spec) Boiler Nos. None
F. No. plate 93
F. Sand box
Back of tank

Actual Dimensions of Loco. Extreme height over {Cylinders or valve caution 14' 8"
Extreme Width over Cab boards 9' 11" {Cylinders or valve caution 9' 4"
Length outside face front bumper of engine to face of {Tender wedge 31' 11"
Length face of tender wedge to outside face back bumper {Tender 34' 11½"
Total length outside face front bumper of {Engine 56' 10½"
engine to outside face back bumper of {Tender

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 152

FOR LONGVILLE LUMBER COMPANY
RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF CALIFORNIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL	A.S.M.E. SPEC. PAGE 11
MATERIAL FOR ONE-PIECE DOME	
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 36

10 % allowable variation either way in thickness of tubes

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6159. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918).
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE -

GAGE DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
1"	160	4 1/8"	4 3/8"
1 0"	180	3 15/16"	4 1/8"
1 1/8"	190	3 13/16"	4"
1 1/4"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAD. 3408.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

13 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	⅜"	7/16"	½"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THIS PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝". (I.E., USE FUSIBLE PLUG CARD 4114 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP-COCK BETWEEN THE CHECK VALVE AND THE BOILER.

14 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6202. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEETS. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

15 THERE SHALL BE NOT LESS THAN SIX BRASS BASHOT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG, ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

16 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ¼" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

17 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS, AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

CALIFORNIA
(State in which boiler is to be used)
4
(Manufacturer's plate (serial) number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (Builder's number) (LEAVE BLANK) (Year put in service)
200 POUNDS
(Maximum working pressure allowed per sq. in.)

48

SPECIFICATION FOR LOCOMOTIVES 10 28 ½ D 152

FOR LONGVILLE LUMBER CO.

Specification for Type A Double Loop Superheater. AS SPECN. O-14539, DATED AUT. 17TH, 1920.

BOILER TUBES	114 ...in number... 2, ...o. d ...13 ...ft ...3 ...in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	21 ...in number... 5½ ...o. d #9 B.W.G. ...of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 ... Card 11025-E
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. ... Card 1136 Prosser to have at least 12 sections ... Card 3L-50661
TUBE SHEET LAYOUT	
UNITS	21 ...units ...1½ ...o. d #9 B.W.G. ...Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each nult to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide ... Card 10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on ... Card 1052
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A ... Card 1064-L
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. ... Card 11309-F
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. ... Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with ... Card SEE ARRGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 50 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 11313
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer ... Card 1067
S. H. ARRANGEMENT	To be in accordance with ... Card 4L-40673
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 2L-11432-P	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. PIPE BAND	Card 1988
DAMPER ~~CYL. SUPPORT~~ RIGGING	Card 11384	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1068	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O.S.)	Card 1148	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 1275-J - R.&L.	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A
PYROMETER	NONE		

SPECIFICATION FOR LOCOMOTIVE:- 10 28 ½ D 152.

FOR:- LONGVILLE LUMBER CO.

NNB.

49 49

21 LOCOMOTIVE TO BE OPERATED IN THE STATE OF LOUISIANA, BUT IS ALSO TO BE BUILT TO MEET THE CALIFORNIA STATE LAWS.

22 BOILER TO CONFORM TO THE A. S. M. E. CODE. (1918)

23 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

24 FIREDOOR TO BE FRANKLIN AUTOMATIC, NO. 8, BUTTERFLY TYPE.

25 ASH PAN MUST MEET THE REQUIREMENTS OF THE LAWS OF THE STATE OF LOUISIANA.

26 SUPERHEATER AS THE SUPERHEATER CO'S SPECIFICATION NO. O-14539, DATED 8-17-20, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

27 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATED.

28 SPARK ARRESTERS MUST MEET THE REQUIREMENTS OF THE LAWS OF THE STATE OF LOUISIANA.

29 ONE HANCOCK 4" SYPHON NO. 9, LOCATED UNDER CAB BOARD ON LEFT SIDE, WITH PIPE CONNECTION TO TANK AND WITH 20 FEET OF SUCTION HOSE.

30 COUPLERS M. C. B. AUTOMATIC, 33½" CENTER ABOVE TOP OF RAIL, WITH ~~CRAB~~ DRAW POCKET CASTING LOCATED 25" ABOVE RAIL, SAME AS FOR 10 26 ½ D 109.

31 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHTS.

32 GUIDE YOKE OF CAST STEEL.

33 MAIN RODS TO CONNECT TO BACK DRIVERS.

34 DETROIT FLANGE LUBRICATORS TO FEED TO FRONT AND BACK DRIVERS.

35 RAIL WASHERS TO BE APPLIED.

TENDER

51 TOP OF TANK AT A HEIGHT CORRESPONDING TO ENGINEER'S SEAT IN CAB, AS FOR 10 26 ½ D 109.

52 TANK PLATES ⅜" THICK TO BE USED FOR TOP, BOTTOM AND COAL SPACE OF TANK.
TANK TO HAVE DASH PLATES.

53 FUEL RACK AROUND TOP OF TANK.

54 SYPHON CONNECTION TO LEFT SIDE OF TANK (SUP 29)

55 REAR OF TENDER FRAME TO EXTEND 36" BEYOND BACK OF TANK.

56 COUPLER, M. C. B. AUTOMATIC, 33½" CENTER ABOVE TOP OF RAIL, WITH ~~CRAB~~ DRAW POCKET CASTING LOCATED 25" ABOVE RAIL, SAME AS FOR 10 26 ½ D 109.

THE BALDWIN LOCOMOTIVE WORKS Ab Spec'n C-6326

Memorandum Spec'n 20052

SPECIFICATION FOR LOCOMOTIVES 10 30 ½ D 47

ER/ **FOR** California Western Railroad and Navigation Company

Gen. as B.L.W. Tracing #41176

Engine Drawing No. 17

HW

2-20-20 (Spec)

Gauge of Road 4'8½" Play ¾" except ⅞" for F.& B. drivers

Wheelbase, Rigid 11'0" Driving 11'0" Total 25'7"

Total wheelbase, eng. and tend. (Limited to ---) Actual 49' 11½"

Curves 24 degrees on main line, 35 degrees on sidings.

Limits, Height --- Width ---

Weight (approximate) In working order, Total 140,000 pounds

On F. tr'k 17000 lbs. Drivers 111000 lbs. B. tr'k 12000

Tractive power 27,040 lbs. Ratio of adhesion 4.1

Work'g St'm Pres. 180 lbs. Service Passenger and freight

Fuel Oil

Boiler Steel Thick ⅜" Built 8952

Front Tube Sheet ½" Thick

Boiler, Diam. 68" Plate Extended wagon top

Allowable st'm pres. 200 lbs. Tested to 220

With Factor of Safety of 4.7 247

Longitud. seams Butt jointed, double covering strips.

Dome One piece type; Auxiliary Dome None

Dome, diam 33" Pos. Forward of firebox.

Firebox Steel Combustion chamber None

Firebox, length 89-11/16" Width 42" Depth F. 69¾" B. 67½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays 1" diam. with 3/16" holes 1½" deep from O.S.

Radial stays 1⅛" diam. Sling stays front {Three rows B.L.W. Expansion Stays.

Button heads below crown on Ten central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues #9 W. G. Steel

Tubes #12 W. G. Charcoal Iron

Tube ends Swaged for copper ferrule, fire box ends.

Number 26 / 156 Diam 5½" / 2" Length 11'1½"

Heating Flues 404 Combus. Chamb. --- Total 1456

Surface Tubes 902 Fire Box 150 Firebrick Tubes ---

Grate area 26.2 Ratio Heating Surface 55.5

Superheater 332

Fire Brick Arch None

Fire box lined with fire brick, for oil burning.

Fire brick pavement in pan.

Grates None

Ash Pan, Dampers Back only

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater Schmidt type (See sup. 9)

Sprocket wheels 10

Siphon injector or booster pipes None

Netting and deflector plates with

Exhaust nozzles Single Low

Cleaning pipe - with

Stack Cast Iron, Straight D. 17"

Safety Valves Two Consolidated 3" Open

Safety valves None with roller levers set to 180 pounds

Whistle Large chime

Steam Gauge One Lunk 7" Maker: Ashcroft (not Spec)

Steam gauge shows Lbs. in. **Clock** None

Water Gauge One Klinger Reflex **Cab Lamps** Electric

Gauge Cocks Three Syphon valve None

Lowest gauge cock 3¼" above highest part of crown

Lubricator steam valve Without separate connection to dome

Blower Valve B. L. W.

Blow off Cock One Everlasting 1" Pos: Front

Cleaning Plugs One plug above fire door.

Firebox Corners diagonal

Crown, Two each side and four back (See sup. 12)

Waist, Two under (See sup. 12)

Front tube sheet One Foundation plug One

Pump None

Injectors Two Monitor (Spec) No. 8

Injectors, Pos. R. and L. Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B. L. W. Pos. R. and L.

Steam Heat None

Cab Steel, lined with wood.

Ventilator in cab roof.

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Material of Boiler

Back Bumper Bar Steel Back buffer height 35¾"

Pilot Wood Pushing shoes Cast in bumper

Front Bumper Cast Steel Bumper plate With

Steps Hand holds, etc. to conform to I.C.C. requirements.

Front Drawhead, Diam. of eye 3¾"

Coupler M.C.B. auto. with solid knuckle

Engine flexible Iron on bumper.

Headlight Pyle Round case 16" Reflector

Headlight No. With Headlight shelf None

Lamp shelf None Wiring ---

Bell 92 pounds Bell Ringer (See sup. 21)

Sand Box (Spec)

Sanders Leach air, trap #---, to sand front and back of front drivers.

Dome casing Iron painted.

Boiler Jacket No. 18 Soft Steel Pto. Smooth Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

L.L. Neebe. May-1920

SPECIFICATION FOR LOCOMOTIVES 10 30 ½ D 47

FOR California Western Railroad and Navigation Company

MW

51

51

Frames Cast Steel

Cylinders, Diam. 16" Stroke 24"

Steam ports, Length 15.6" Width 12" Height ---

Exhaust ports, Length --- Width --- Height ---

Valve travel ¾" Steam lap ¾" Exhaust clearance ---

Exhaust opening 10 1/8" Release NONE

(Spec) Bathtub type feed bull's eye.

Cast Iron Lubr. pipes of iron under jacket.

Iron Pipe Steel plated

--- ---

(Spec) Piston 8" diam. piston type

U.S. King type

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron, with rings of cast iron sprung in.

Guides Laid type, Steel Bearing Needle

Crossheads Cast Steel with bearings of cast iron babbitted.

Wrist Pins Steel Hollow Grease, forged on.

Parallel rods to have solid ends.

Valve Motion Walschaert's

All threads of bolts, except studs, shall conform to United States Standard.

All finished hexagonal nuts or shall be of semi-case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Bronze

Drivers, O. S. Diam. 44" Diam. Diam. 32" centers, cast steel.

Tires Steel Height Shrinkage and shoulder

Tires, Flanged, Pos. All Size 3" x 5"

Tires, Plain, Pos. None Size ---

Lateral play between driving boxes and wheel tires 3/8" total

Driving Boxes Cast Steel

Journals, Diam. 5" Length 10"

Springs, Make B. L. W.

Front Engine Truck Two Wheels Swing bolster, centre bearing

To swing 5" each side of cent. Lat. movement None

Journals, Diam. 5" Length 8" Brass Cast Steel

Wheel hub liners Bronze

Wheels, Diam. 28" Tread ½" Kind Chilled cast iron plate.

Tires None Flange diam. --- Size ---

Tires held by ---

Back Engine Truck Two Wheels Swing bolster, side bearings

To swing 5" Lateral motion, total play None

Journals, Diam. 7" Length 8" Brass Cast Steel

Wheel hub liners Bronze

Wheels, Diam. 28" Tread ½" Kind Chilled cast iron plate.

Tires None Flange diam. --- Size ---

Tires held by ---

Brake, position On all driving and trailing wheels

Operating Engineers No. 6 E Quick clearance auto. and

Parts Eng. Tk. Sup. --- straight air.

Foundation Drivers and M-2 American B. S. Equalizer

Parts Eng. Tk. Sup. ---

Air pump Two 9½ Pos. Both L.S.

Train connections Front and back

Train signal, sys. "L"

Tender Eight wheeled Driving 1528 {Tender to be weighed: Yes

Weight, on drivers 110,000 pounds

Tank {Oil 2,000 4898

{Water 5,000 4809

Tank Responsible Cylindrical No. 2725.

Tank of steel, top.

Frame Steel, 10" channels with bumpers of wood and plate.

Height 3"

Push beam None Pedestals None

Back deadwood 33"

Coupler M.C.B. auto. with solid knuckle.

Trucks with Vulcan, steel frames and cast steel bolsters.

Cast steel

Springs Elliptic, B. L. W.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread ½" Kind Chilled cast iron plate.

Tires None Flange diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake gear No. 6 ET Westo. auto. and straight air with

12"x12" cylinder.

Last or tools, sets 31

Photo sch. No. 2 Inspection B. L. W.

To be weighed Yes. Material specs by B. L. W.

Certificate of boiler test Three, copies of B.L.W. form 1036

Ready date to 5.1.20 Shipment On own wheels. (See sup. 28)

Brass shop number, No 1

Machine shop number D-165

Feed Water Strainer, Patd. Sept. 1, 1903 (Cast on)

Patents

Property marks B. L. W., for engine and tender.

Painting, style --- Black, no striping

Lettering and numbers in yellow paint

Mark on cab sides, C. W. R.

Classification mark on cab sides, per 18/24 W-11 generally

same as for Southern Pacific 1000s.

Mark on sides and back of tank, C. W. R.

Road No. Name None

F. No. Plate 21

On sides and back of tank above mark.

Actual Dimensions of Loco. Extreme height over all 13' 11½"

Extreme Width over all 9' 11" Cylinders 7' 4½"

Length over buffers 31' 7"

Length of frame, weight to outside face back bumper 23' 11½"

Height, outside face front bumper 55' 6½"

SPECIFICATION FOR LOCOMOTIVES 10 30 4 D 47

FOR CALIFORNIA WESTERN RAILROAD AND NAVIGATION COMPANY

HW

1 THIS LOCO. MUST CONFORM TO I. C. C. REQUIREMENTS.

2 LOCOMOTIVE MUST PASS THROUGH A TUNNEL 14 FEET WIDE, 14 FT. HIGH FROM TOP OF RAIL TO SPRING LINE OF ARCH, THREE SEGMENT ARCH, EQUAL LENGTH SEGMENT. TUNNEL AS PRINT HEREWITH.

3 SPACE BETWEEN RIVET HOLE AND CALKING EDGE OF SHEET TO BE AS SHORT AS PRACTICABLE.

4 ALL RIVETS IN FIRE BOX EXPOSED TO FLAME TO BE COUNTERSUNK.

5 FIRE DOOR TO BE HOOD TYPE.

6 HOLLOW STAYS 1" DIAMETER.
FLEXIBLE STAYBOLTS, TATE, ABOUT 350 IN BREAKING ZONE.

7 FUEL OIL SAME AS FOR WEED LUMBER CO'S LOCOS, 10 20 D 145 & 149.
OIL BURNING ARRANGEMENT TO BE SOUTHERN PACIFIC STYLE, WITH VON BODEN INGLES BURNER IN FRONT OF FIRE BOX SIMILAR TO CO'S LOCO. NO. 36, AS SHOWING ON TWO BLUE PRINTS.
OIL AND STEAM CONNECTIONS BETWEEN ENGINE AND TENDER TO HAVE McLAUGHLIN FLEXIBLE CONDUITS.
ROYALTY PAYABLE BY THE B. L. W.

8 OMIT OIL HEATER ON ENGINE.

9 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPECIFICATION No. 0-1340 DATED APRIL 23, 1920. (COPY ATTACHED)
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX, AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY, PAYABLE BY THE B. L. W.

10 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

11 CAB LIGHTS TO CONFORM TO I.C.C. REQUIREMENTS.

12 WASHOUT PLUGS ON EACH SIDE OF BOILER, ABOUT 18" BACK AND 6" HIGHER THAN BOILER CHECKS.
TWO LUGS ON EACH SIDE, ABOUT 2" ABOVE CROWN SHEET AND FOUR BACK.
ONE PLUG ABOUT 12" FROM TUBE SHEET AND ONE ABOUT 36" FROM FIRE BOX IN BELLY OF BOILER.

13 SQUIRT HOSE TO BE APPLIED IN CAB, SO ARRANGED THAT IF THE HOSE SHOULD PULL OFF THE PIPE, THE HOT WATER WILL NOT INJURE ANY ONE WHO MAY BE IN THE CAB.

14 CAB MAY BE MADE SOMEWHAT HIGHER THAN SHOWN ON PHOTO. 394.

15 FRANKLIN RADIAL SUPPLY CO'S RADIAL BUFFER BETWEEN ENGINE AND TENDER.

16 CLASSIFICATION LAMPS ON ENGINE TO BE HARRIMAN STANDARD FROM ADAMS AND WESTLAKE COMPANY.
CLASSIFICATION LAMPS TO HAVE LIGHT-BUTTON SWITCH AT LAMP.

17 HEADLIGHT EQUIPMENT TO BE ELECTRIC WITH INCANDESCENT HEADLIGHT, AND GENERAL ELECTRIC CO'S TURBO GENERATOR.
HEADLIGHT TO BE APPLIED ON TOP OF SMOKE BOX.
HEADLIGHT GENERATOR TO BE PLACED ON TOP OF BOILER, IMMEDIATELY IN FRONT OF CAB.

18 TWO ADLAKE, SMALL (FIVE SPACE) ELECTRIC TRAIN INDICATORS GENERALLY AS UNION OR SOUTHERN PACIFIC STANDARD.

21 BELL RINGER TO BE GOLLMAR WITH TWO OPERATING VALVES ONE FOR ENGINEER AND ONE FOR FIREMAN.

22 PEDESTAL WEDGES TO BE FRANKLIN ADJUSTABLE, OF CAST IRON.

23 AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.

24 TWO MAIN AIR RESERVOIRS, LOCATED UNDER RAISED SECTION OF RUNNING BOARDS AT FRONT OF ENGINE.
AIR RESERVOIR TO HAVE HYDROSTATIC TEST OF 215 POUNDS.

25 WHEELS TO BE PAINTED SOLID BLACK WITH TIRES STEEL GRAY.

28 SPARE PARTS COVERED BY EXTRA ORDER NO. 17495 DATED 4-29-20 AND NO. 17358 DATED 3-30-20 TO BE SHIPPED WITH LOCOMOTIVE.

TENDER

A1 TANK TO BE VANDERBILT TYPE, SIMILAR TO TANK FOR 8 32 D 779. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

A2 MEASURING CHART ON FRONT OF OIL TANK.
MEASURING ROD FOR OIL TANK.

A3 WATER DRAINS AND SUPPLY VALVES ON OIL TANK TO BE SOUTHERN PACIFIC STANDARD.

A4 FRANKLIN RAILWAY SUPPLY CO'S RADIAL BUFFER BETWEEN ENGINE AND TENDER.

SPECIFICATION FOR LOCOMOTIVES: 10 30 4 D 47

FOR: CALIFORNIA WESTERN RAILROAD AND NAVIGATION CO.

Specification for Type A Double Loop Superheater SPECN. NO. 0-1340, DATED 4-23-20

BOILER TUBES	150 in number 2 o.d. 11 ft. 12 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-214-15	Card 11308-M
BOILER FLUES	26 in number 5½ o.d. 9 BWG of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-214-15	
BOILER FLUE SETTING	⅛ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrules, rolled, headed and prossered except for copper sheets. Front end rolled and headed. Rollers to have at least 8 rolls. Prosser to have at least 12 sections	Card 1136 Card 50534
TUBE SHEET LAYOUT		
UNITS	26 units 12 o.d. No. 9 BWG Pipes in accordance with the American Society for Testing Materials Specification A-28-15. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 800 lb. per sq. in.	Card 10773
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 1052
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 1064-L
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to one pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a position as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls	Card 10236
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	Card SEE ARRGT.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	Card 11313 Card 1067
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card
PYROMETER	Model No. Pyrometer	Card
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card 40610
S. H. ARRANGEMENT	In accordance with	
TEST FINAL	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card	11392-V	S. H. UNIT BOLT WASHER	Card	1071
DAMPER CYL. ARM	Card	1074	S. H. UNIT CLAMP	Card	1073
DAMPER CYL. PIPE FITTING	Card	11115	S. H. UNIT CLAMP WASHER	Card	10305
DAMPER CYL. PIPE UNION	Card	11114	S. H. PIPE END	Card	1311
DAMPER CYL. PIPING DIAGRAM	Card	3258	S. H. PIPE BAND	Card	1288
DAMPER CYL. SUPPORT	Card		SPACING OF BANDS & SUPPORTS	Card	10759
DAMPER SHAFT	Card	1068-M	TYPE OF RETURN BENDS		FORGED
DAMPER SHAFT ARM	Card	1065	RETURN BENDS	Card	11022
DAMPER SHAFT BEARING O. S.	Card	1114-B	LUBRICATOR CONNECTION	Card	3023
DAMPER SHAFT BEARING I.S.	Card	10326	DEFLECTING PLATE HANDLE	Card	1487
DAMPER SHAFT LINK	Card	1070	DEFLECTING PLATE STUDS	Card	10809
PATENT PLATE	Card	3272	DEFLECTING PLATE CLAMP	Card	10309-A
DAMPER RIGGING	CARD	11374-B	PYROMETER		NONE

THE BALDWIN LOCOMOTIVE WORKS {Dup. 10 30 ¼ D 47 WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 21019

SPECIFICATION FOR LOCOMOTIVES 10 30 ¼ D 49

NW **FOR** CALIFORNIA WESTERN RAILROAD AND NAVIGATION COMPANY

HW.

Gen. as B. L. W. TRADING 41178

Engine Drawing No. 17

5-1-21

Gauge of Road 4'8½" Play ⅜" EXCEPT ⅞" FOR F. & B. DRIVERS

Wheelbase, Rigid 11'0" Driving 11'0" Total 26'7"

Total wheelbase, eng. and tend. {Actual 49'11½" (Limited to ---

Curves 24 DEGREES ON MAIN LINE, 35 DEGREES ON SIDINGS.

3 **Limits,** Height --- Width ---

Weight (approximate) in working order, Total 140,000 POUNDS

On F. tr'k 17000 lbs., Drivers 111000 lbs., B. tr'k 12000 lbs

Tractive power 26500 lbs., Ratio of adhesion 4.19

10 **Work'g St'm Pres.** 180 lbs., Service PASSENGER AND FREIGHT

Fuel OIL.

1 5 **Boiler** STEEL Thick 13/16" Bill 9400

Front Tube Sheet ½" Thick

Boiler, Diam. 68" Plan EXTENDED WAGON TOP

{Allowable st'm pres. 200 lbs. **Tested to** {220 lbs. steam pres.

{With Factor of Safety of 5.1 {267 lbs. water pres.

4 Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

DOME ONE PIECE TYPE; AUXILIARY DOME-NONE

Dome, diam. 33" Pos. FORWARD OF FIRE BOX.

12 16 **Firebox** STEEL Combustion chamb. NONE

Firebox, length 89-11⅝" Width 40" Depth F. 38⅞" B. 67½"

9 Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

7 Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame SINGLE Riveted

8 Water space stays 1" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O. S.

8 Radial stays 1" DIAM. Sling stays front {THREE ROWS B.L.W. EXPANSION STAYS, central rows

Button heads below crown on SUP. Placed --- above crown

Crown bars NONE

Crown bolts ---

9 Flues #9 W. G. STEEL

Tubes #12 W. G. CHARCOAL IRON

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

{Number {26 Diam. 5½" Length 11'1½"
{156 2"

Heating {Flues 404.0 sq. ft. Combus. Chamb. --- Total 1458.0

Surface {Tubes 902.0 Fire Box 150.0 Fire Brick Tubes ---

Grate area 26.2 sq. ft. Ratio to Heating Surface 1: 55.5

Superheater 332.0

12½ **Fire Brick** ARCH NONE

FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

10 **Grates** NONE

Ash Pan, Dampers BACK ONLY

THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater SCHMIDT TYPE (SEE SUP. 13 ETC)

Smokebox extension WITH 15 cleaning hole and cap NONE

Spark ejector or hopper NONE

DIAPHRAGM Deflect. plates WITH

Exhaust nozzles SINGLE LOW

CLEANING PIPE - WITH

Stack CAST IRON, STRAIGHT Dia. 17"

Safety Valves (SPRING) TWO CONSOLIDATED 3" OPEN

Safety valves NONE with relief valves Set to 180 POUNDS

Whistle LARGE CHIME

1 **Steam Gauge** ONE IRON 7" MAKER: ASHCROFT (NOT SPRING)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE KLINGER REFLEX 12 **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 5" above highest part of crown

Lubricator steam valve WITHOUT Accumulator dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE EVERLASTING 1½" POS. FRONT

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS DIAGONAL

Crown, TWO EACH SIDE AND FOR'D AND B'K'D (SEE SUP. 17)

Waist, TWO UNDER (SEE SUP. 17)

Front tube sheet, ONE Flexible plug ONE

Pump NONE

Injectors TWO MONITOR (SPAC) No. 8

Injectors, Pos. R. AND L. Steam pipes COPPER

2½ Pipes, Check IRON Feed IRON Overflow IRON

5 Check B. L. W. Pos. R. AND L.

Steam Heat CONSOLIDATED SYSTEM.

24 **Cab** STEEL NOT LINED.

VENTILATOR IN CAB ROOF.

Cab boards STEEL Nosing T-IRON

Running boards STEEL Nosing T-IRON

Hand rail IRON Located on BOILER

27½ **Back Bumper** BAR STEEL Back drawbar height 34¾"

24½ **Pilot** WOOD - Pushing shoes CAST IN BUMPER

Front Bumper CAST STEEL Bumper plate WITH

1 **Steps** HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

1 **Coupler** W. C. B. AUTO. WITH SOLID KNUCKLE.

25-27 Signal fixtures IRON ON BUMPER

25 **Headlight** TWO ROUND CASE 16" Reflector,

Headlight, Nos. on sides WITH H'd'l't step NONE

Lamp shelf NONE Nosing ---

Bell 92 POUNDS BELL RINGER (SEE SUP. 28)

Sand Box ONE Diam. 35½" Body IRON PAINTED Pipes IRON

Sander LEACH AIR, TRAP A-10, TO SAND FRONT AND BACK OF FRONT DRIVERS.

Dome casing IRON PAINTED.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON - Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

C. Wagner July-1921

SPECIFICATION FOR LOCOMOTIVES 10 30 ¼ D 49

FOR CALIFORNIA WESTERN RAILROAD AND NAVIGATION COMPANY

HW.

55 55

Frames CAST STEEL

Cylinders, Diam. 18" Stroke 24"

St'm ports, Length 19.6" Width 1½" Bridges ---

Exh. ports, Length --- Width --- Valve liner 3/16"

Valve travel 1½" Steam lap ¾" Exhaust clearance ---

Eccentric crank throw 5"-1/16" By-pass valve NONE

S. F. Lubr. (SPEC) NATHAN FIVE FEED BULL'S EYE.

Cyl'r heads CAST IRON LUBR. PIPES OF IRON UNDER JACKET.

Cyl'r casings IRON PTD. Head covers STEEL PAINTED

St'm chest casings --- Covers ---

St'm chest valves 8" DIAM. PISTON TYPE

Met. pkg. (PISTON RODS WITH 2 RINGS) U. S. KING TYPE

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST IRON, WITH RINGS OF CAST IRON SPRUNG IN.

Guides LAIRD TYPE, STEEL Oil cups NEEDLE

Crossheads CAST STEEL WITH BEARINGS OF CAST IRON BABBITTED.

Wrist Pins STEEL Plug cups GREASE, FORGED ON.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS

(Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners BRONZE

30 **Drivers,** O. S. Diam. 45" Cen. diam. 38" CENTERS, CAST STEEL

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. ALL Size 3½" x 5½"

Tires, Plain, Pos. NONE Size ---

Lateral play between driving boxes and wheel hubs (SEE SUP. 31 ETC)

28 **Driving Boxes** CAST STEEL

Journals, Diam. 8" Length 10"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled SWING BOLSTER, CENTRE BEARING

33 To swing 5" each side of cen. Cen. pin liners NONE

Journals, Diam. 5" Length 8" Boxes CAST STEEL

Wheel hub liners BRONZE

Wheels, Diam. 28" Tread 4½" KING CHILLED CAST IRON PLATE.

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck Two Wheeled SWING BOLSTER, SIDE BEARING

33 To swing 5" each side of cen. Cen. pin liners NONE

Journals, Diam. 5" Length 8" Boxes CAST STEEL

Wheel hub liners BRONZE

Wheels, Diam. 26" Tread 4½" KING CHILLED CAST IRON PLATE.

Tires NONE Cen. diam. --- Size ---

Tires held by ---

34 **Brake,** position ON ALL DRIVING AND TENDER WHEELS.

Operating Engine, sch. No. 6 ET WESTG. COMBINED AUTO. AND STRAIGHT AIR.

Parts Eng. Tr'k, sch. --

Foundation Drivers, sch. 1-2 AMERICAN O.S. EQUALIZED

Parts Eng. Tr'k, sch. ---

34 **Air pump** Two 9½" Pos. Both L. S.

Train connections FRONT AND BACK

Train sprigh, sch. "L"

40 **Tender** EIGHT Wheeled, Drawing No. 1523 {TENDER TO BE WEIGHED: YES

Weight, with fuel and water, about 108,700 POUNDS

10 **Tanks** OIL 1800 Gallons, Bill 5665

WATER 9000 5668

TANK, VANDERBILT CYLINDRICAL No. 2816

Fuel Boxes OF STEEL, TOP

Frame STEEL 10" CHANNELS, WITH BUMPERS OF WOOD AND PLATE

H3 Front Drawbar height 34"

Pilot NONE Pushing shoes NONE

Back drawhead, center above rail 33½"

1 **Coupler** W. C. B. AUTOMATIC WITH SOLID KNUCKLE

Steps HAND HOLDS ETC. TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks WITH VULCAN CAST STEEL SIDE FRAMES AND CAST STEEL BOLSTERS.

Springs ELLIPTIC, B. L. W.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4" KING CHILLED CAST IRON PLATE.

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake Position ON ALL WHEELS

Brake shoes GET WESTG. AUTO. AND STRAIGHT AIR, WITH 10" x 12" TENDER BRAKE CYLINDER.

List of tools, sch. 160

Photo sch. No. 2 Inspection B. L. W.

To be weighed YES Material specifns B. L. W.

Certificate of boiler test (SEE SUP. 2)

Junior leaves by 5-15-21 Shipment ON OWN WHEELS

Brass shop finish, No. 1

Machine shop finish, D-155

Wheels to be painted SOLID BLACK WITH TIRES STEEL GRAY.

Painting, style --- BLACK, NO STRIPING.

LETTERING ETC. IN YELLOW PAINT, SAME AS FOR 10 30 ¼ D 47

MARK ON CAB SIDES: C. W. R.

CLASSIFICATION MARK ON CAB SIDES, PR 18/24 45-111 GENERALLY SAME AS FOR SOUTHERN PACIFIC LOCOS.

MARK ON SIDES AND BACK OF TANK: C. W. R.

Road Nos. 70s. Road Nos. Tanks NONE

F. No. PLATE 22

{ON SIDES AND BACK OF TANK ABOVE MARK

Actual Dimensions of Loco. Extreme height over all 14'0½"

Extreme Width: Cab boards 9'11" Cylinders or valve motion 9'4½"

Length outside face front bumper of engine to face of tender wedge 31'7"

Length face of tender wedge to outside face back bumper of tender 23'11½"

Total length outside face front bumper of engine to outside face back bumper of tender 55'6½"

SPECIFICATION FOR LOCOMOTIVES 10 30 & D 49

FOR CALIFORNIA WESTERN RAILROAD AND NAVIGATION COMPANY

H9

1 THIS LOCO. MUST CONFORM TO I. C. C. REQUIREMENTS.

2 CERTIFICATE OF BOILER TEST - THREE COPIES OF B. L. H. FORM 1036 AND TWO COPIES OF B. L. H. FORM 491.

3 LOCOMOTIVE MUST PASS THROUGH A TUNNEL 14 FEET WIDE, 14 FT. HIGH FROM TOP OF RAIL TO SPRING LINE OF ARCH, THREE SEGMENT ARCH, EQUAL LENGTH SEGMENT. TUNNEL AS PRINT ~~HEREWITH~~. RECEIVED FOR 10 30 & D 47.

4 SPACE BETWEEN RIVET HOLE AND CALKING EDGE OF SHEET TO BE AS SHORT AS PRACTICABLE.

5 BOILER STEEL TO BE REINFORCED WHERE THE INJECTOR CHECKS SCREW INTO BOILER SHEET.

6 ALL RIVETS IN FIRE BOX EXPOSED TO FLAME, TO BE COUNTERSUNK.

7 FIRE DOOR TO BE HOOD TYPE.

8 HOLLOW STAYS 1" DIAMETER TO BE APPLIED ONLY BEHIND THE FIRE BRICK.
FLEXIBLE STAYBOLTS, TATE, ABOUT 350 IN BREAKING ZONE.
CROWN RADIAL STAYS NOT TO BE BUTTON HEAD.

9 TUBES AND FLUES TO BE WELDED IN FIRE BOX END USING THE USUAL METHOD OF ROLLING AND BEADING WITH FERRULES AND FLUING FROM THE BEAD TO SHEET.

10 FUEL OIL SAME AS FOR LOCOS. 10 20 & D 145 & 149 AND 10 30 & D 47.
OIL BURNING ARRANGEMENT TO BE SOUTHERN PACIFIC STYLE, WITH VON BOREN INGLES BURNER IN FRONT OF FIRE BOX SIMILAR TO SO'S LOCO. NO. 3, AS SHOWING ON TWO BLUE PRINTS.
OIL FEED COCK TO BE LOCATED IN FRONT OF FIRE BOX ABOUT 6" FROM THE BURNER.
OIL AND STEAM CONNECTIONS BETWEEN ENGINE AND TENDER TO HAVE McLAUGHLIN FLEXIBLE CONDUITS.
ROYALTY PAYABLE BY THE B. L. H.

11 OMIT OIL HEATER ON ENGINE.

12 FIRE BRICK IN BACK WALL OF FIRE BOX, TO BE PUT IN LENGTHWISE OF FIRE BOX (INSTEAD OF CROSSWISE)

13 SUPERHEATER AS THE SUPERHEATER CO'S SPECIFICATION NO. O-16212, DATED MAY 13TH, 1921 (COPY ATTACHED)
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX, AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY, PAYABLE BY THE B. L. H.

14 PATENT PLATE (HEREWITH) FROM THE SUPERHEATER COMPANY, COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

15 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

16 GAS LIGHTS TO CONFORM TO I. C. C. REQUIREMENTS.

17 WASH-OUT PLUGS ON EACH SIDE OF BOILER, ABOUT 18" BACK AND 6" HIGHER THAN BOILER CHECKS.
CROWN PLUGS ON SIDES, ABOUT 2" ABOVE CROWN SHEET.
ONE PLUG ABOUT 12" FROM TUBE SHEET AND ONE ABOUT 36" FROM FIRE BOX IN BELLY OF BOILER.

21 SQUIRT HOSE TO BE APPLIED IN CAB, SO ARRANGED THAT IF THE HOSE SHOULD PULL OFF THE PIPE, THE HOT WATER WILL NOT INJURE ANY ONE WHO MAY BE IN THE CAB.

22 BACK FOOT PLATE TO BE MADE HEAVIER OF CAST STEEL.

23 FRANKLIN RAILWAY SUPPLY CO'S RADIAL BUFFER BETWEEN ENGINE AND TENDER.

24 FRONT FOOT PLATE OF CAST IRON.

25 CLASSIFICATION LAMPS ON ENGINE TO BE HARRIMAN STANDARD FROM ADAMS AND WESTLAKE COMPANY.
CLASSIFICATION LAMPS TO HAVE LIGHT-BUTTON SWITCH AT LAMP.

26 HEADLIGHT EQUIPMENT TO BE ELECTRIC WITH INCANDESCENT HEADLIGHT, AND GENERAL ELECTRIC CO'S TURBO GENERATOR.
HEADLIGHT TO BE APPLIED ON TOP OF SMOKE BOX.
HEADLIGHT GENERATOR TO BE PLACED ON TOP OF BOILER, IMMEDIATELY IN FRONT OF CAB.

27 TWO ADLAKE, SMALL (FIVE SPACE) ELECTRIC TRAIN INDICATORS GENERALLY AS UNION OR SOUTHERN PACIFIC STANDARD.

28 BELL RINGER TO BE HOLLMAR WITH TWO OPERATING VALVES ONE FOR ENGINEER AND ONE FOR FIREMAN.

29 FRANKLIN ADJUSTABLE WEDGES TO BE OMITTED.

30 DRIVING WHEEL CENTRES TO BE MADE HEAVIER TO INCREASE WEIGHT, I. E., MAKE CAST STEEL FROM SAME PATTERNS AS FOR CAST IRON CENTRES.

31 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS 1/32" TOTAL, INCLUDING LATERAL PLAY IN PEDESTAL FITS.

32 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS 5/16" TOTAL, INCLUDING LATERAL PLAY IN PEDESTAL FITS.

33 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS 5/16" TOTAL, INCLUDING LATERAL PLAY IN PEDESTAL FITS.

34 AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.

35 TWO MAIN AIR RESERVOIRS, LOCATED UNDER RAISED SECTION OF RUNNING BOARDS AT FRONT OF ENGINE.
AIR RESERVOIR TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

TENDER

40 TANK TO BE VANDERBILT TYPE, SIMILAR TO TANK FOR 8 32 D 739. ROYALTY, IF ANY, PAYABLE BY THE B. L. H.

41 MEASURING CHART ON FRONT OF OIL TANK.
MEASURING ROD FOR OIL TANK.

42 WATER DRAINS AND SUPPLY VALVES ON OIL TANK TO BE SOUTHERN PACIFIC STANDARD.

43 FRANKLIN RAILWAY SUPPLY CO'S RADIAL BUFFER BETWEEN ENGINE AND TENDER.

57 59

SPECIFICATION FOR LOCOMOTIVES 10 30 & D 49

FOR: CALIFORNIA WESTERN R.R. AND NAVIGATION COMPANY

Specification for Type A Double Loop Superheater Specn. O-16212 dated May 13th, 1921.

BOILER TUBES	156 in number 2 o.d. 11 No 13 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	26 in number 5½ o.d. 2½ B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card	11308-M
BOILER FLUE SETTING	¼ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, headed and prossetted except for copper sheets. Front end rolled and headed. Boilers to have at least 8 rows. Flues to have at least 12 sections. Card	1136
TUBE SHEET LAYOUT	Card	5054
UNITS	26 units 1 o.d. 2½ B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card	10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card	1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A. Card	1069-L
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 2410 lb. Test pressure to be applied separately to the superheated and to the superheated steam passages, so as to insure soundness of all partition walls. Card	ANV 4x7-2 10236
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card	1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units. Card	SEE ARROT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	4-P 11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card	1067
PYROMETER	Model No. Pyrometer Card	NONE
PYROMETER ARRANGEMENT	Generally in accordance with Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration Card	
S. H. ARRANGEMENT	In accordance with Card	40610
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card	11332-V	S. H. UNIT BOLT WASHER	Card	1071
DAMPER CYL. ARM	Card	10?4	S. H. UNIT CLAMP	Card	1073
DAMPER CYL. PIPE FITTING	Card	11115	S. H. UNIT CLAMP WASHER	Card	10305
DAMPER CYL. PIPE UNION	Card	11114	S. H. PIPE END	Card	1344
DAMPER CYL. PIPE CONNECTION	Card	1L-11437	S. H. PIPE BAND	Card	1988
DAMPER CYL. PIPING DIAGRAM	Card	2L-11435	SPACING OF BANDS & SUPPORTS	Card	10759
DAMPER CYL. SUPPORT	Card		TYPE OF RETURN BENDS		FORGED
DAMPER SHAFT	Card	1066-M	RETURN BENDS	Card	11022
DAMPER SHAFT ARM	Card	1065	LUBRICATOR CONNECTION	Card	3043
DAMPER SHAFT BEARING (O. S.)	Card	1144-S	DEFLECTING PLATE HANDLE	Card	1487
DAMPER SHAFT BEARING (I. S.)	Card	10386	DEFLECTING PLATE STUDS	Card	10909
DAMPER SHAFT LINK	Card	1070	DEFLECTING PLATE CLAMP	Card	10309-A
PATTENT PLATE	Card	3367			
DAMPER RIGGING	CARD	11341-S			

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-8222, Dup. 10 30 ½ D 49.

Memorandum Spec'n 23076. EXCEPT WHERE OTHERWISE SPECIFIED.

SPECIFICATION FOR LOCOMOTIVES 10 30 ½ D 56.

NEW

FOR California Western Railroad and Navigation Company.

HEX.

Ry. Co's Class Pr 18/24 45-109.

Gen. as Photo. 8014.

Engine Drawing No. 24.

8-1-23. (SPEC)

Gauge of Road 4' 8½" Play ¾" except 7/8" for F.&B. Drivers.

Wheelbase, Rigid 11' 0" Driving 11' 0" Total 26' 7"

Total wheelbase, eng. and tend. {Actual 49' 11½" / Limited to ---

Curves 24 degrees on main line, 35 degrees on sidings.

Limits, Height (See sup. 2) Width (See sup. 2)

Weight (approximate) in working order, Total 139,300 pounds.

On F. trk 17,100 lbs., Drivers 109,500 lbs., B. trk 12,700 lbs.

Tractive power 25,500 lbs. Ratio of adhesion 4.13

Work'g St'm Pres. 180 lbs. Service Passenger and Freight.

12. **Fuel** Oil, with gravity of 18 degrees Baume.

1. 4. **Boiler** Steel. Thick 13/16" Bill 9408.

Front Tube Sheet ½" Thick

Boiler, Diam. 68" Plan Extended wagon top.

{Allowable st'm pres. 200 lbs. / With Factor of Safety of 5.1} **Tested to** {220 lbs. steam pres. / 267 lbs. water pres.

Longitud. seams Butt jointed, double covering strips.

Dome one-piece type; Auxiliary dome, None.

Dome, diam. 33" Pos. Forward of fire box.

5. **Firebox** Steel. Combustion chamb. None.

Firebox, length 83-11/16" Width 42" Depth F. 68⅞" B. 67½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

7. Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays 1" diam. (See sup. 8)

9. Radial stays 1⅛" diam. Sling stays front {Three rows B.L.W. / Expansion Stays.}

Button heads below crown on Eight central rows, to suit oil fuel.

Crown bars None. Placed --- above crown

Crown bolts ---

Flues No. 9 B.W.G. Steel.

Tubes No. 12 B.W.G. Charcoal Iron.

10. Tube ends Swaged for copper ferrules, fire box ends.

Number {26 / 156} Diam {5⅛" / 2"} Length 11' 1½"

Heating Surface	Flues 4044	Combus. Chamb. ---	Total	1458
	Tubes 902	Fire Box 150	Fire Brick Tubes ---	

Grate area 26.2 Ratio to Heating Surface 1: 55.5

Superheater 332

11. **Fire Brick** Arch, None.

12. Fire box lined with fire brick, for oil burning.

Fire brick pavement in pan.

Grates None.

Ash Pan, Dampers Back Only.

Throttle lever rod to have brass sleeve through stuffing box.

Throttle Balance. Pos. Dome.

Dry pipe Steel.

Superheater Schmidt type. (See sup. 14)

15. **Smokebox** extension With. Cleaning hole and cap None.

Spark ejector or hopper None.

Nosing and deflect. plates With.

Exhaust nozzles Double, Low.

Cleaning Pipe: With.

Stack Cast Iron, Straight. Dia. 17"

Safety Valves Two Consolidated 3" Open, Form "R".

Safety valves None. with relief lever. Set to 180 pounds.

Whistle One large Chime.

Steam Gauge One Iron 7". Maker: Ashcroft (Not spec)

Steam gauge stand Iron. **Clock** None.

Water gauge to be Edna No. 4 Type "M".

Water Gauge Two. 16. **Cab Lamps** Electric.

Gauge Cocks Three Back. (Sup JT) Surface valve None.

Lowest gauge cock 5" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One Everlasting 1½". Pos: Front.

18. **Cleaning Plugs** One plug above fire door.

Firebox Corners diagonal.

Crown, Two each side and four back. (See sup. 18)

Waist, Two under. (See sup. 18)

Front tube sheet, One. Fusible plug One.

Pump None.

Injectors Two Monitor. (Spec) No. 8.

19. Injectors, Pos. R. and L. Steam pipes Copper.

Pipes, Check Iron. Feed Iron. Overflow Iron.

14. Check Nathan Goose-Neck Type. Pos. R. and L.

Check for use with 2" iron pipe.

Steam Heat Consolidated System.

19. **Cab** Steel, not lined.

Ventilator in cab roof.

Cab boards to be covered with wood.

Cab boards Steel. Nosing T-Iron.

Running boards Steel. Nosing T-Iron.

Hand rail Iron. Located on Boiler.

22. **Back Bumper** Bar Steel. Back drawbar height 36¼"

Back foot plate to be made of cast steel.

Pilot Wood. Pushing shoes Cast in Bumper.

26. **Front Bumper** Cast Steel. Bumper plate With.

Steps Hand holds, etc., to conform to I. C. C. Requirements.

Front Drawhead, Center above rail 33½"

Coupler Tower M.C.B. Auto. with extended floor pocket and solid knuckle.

27. 29. Signal fixtures Iron on Bumper.

28. **Headlight** Two Round Case 18". Reflector.

Headlight, Nos. on sides With. H'dl't step None.

Lamp shelf None. Nosing ---

Bell 92 pounds. Bell Ringer. (See sup. 30)

Sand Box One. Diam. 35" Body Iron Painted. Pipes Iron.

Sander (Spec) Leach Air Trap A-10 double, to sand front and back of front drivers.

Dome casing Steel Painted; pressed steel top and bottom ring.

31. **Boiler Jacket** #18 Soft Steel Ptd. Bands Steel. Style 9

Boiler Lagging Magnesia Sectional.

THE BALDWIN LOCOMOTIVE WORKS

E. Steele. Jan. 1924.

SPECIFICATION FOR LOCOMOTIVES 10 30 ½ D 56.

59

FOR California Western Railroad and Navigation Co.

HEX.

Frames Cast Steel.

Cylinders, Diam. 18" Stroke 24"

St'm ports, Length 19.6" Width 1½" Bridges ---

Exh. ports, Length --- Width --- Valve lead 3/16"

Valve travel 4½" Steam lap ¾" Exhaust clearance ---

Eccentric crank throw 12⅝" By-pass valve None.

32. (Spec) Cyl. Lubr. Nathan Five-Feed No. 31 Bull's Eye, 1918 Type.

Cyl'r heads Cast Iron. Lubr. pipes of iron under jacket.

Cyl'r casings Steel Painted. Head covers Steel Painted.

St'm chest casings --- Covers ---

St'm chest valves 8" diam., Piston Type.

Main pkg. (Spec) U. S. King Type.

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron, with rings of cast iron sprung in. With solid knuckle.

35. **Guides** Steel. (See sup. 33) Oil cups (See sup. 34)

Crossheads Cast Steel with bearings of cast iron, babbitted. Steps Hand holds etc., to conform to I. C. C. Requirements.

Wrist Pins Steel. Rod cups Grease, forged on.

36. Parallel rods to have solid ends.

Valve Motion Walschaerts.

Links, sliding blocks, pins, lifting links and eccentric rod laws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings Make, B. L. W. (Except See Sup. 36)

Driving wheel hub liners Bronze.

37. **Drivers,** O. S. Diam. 45" Cen. diam. 38" Centers Cast Steel.

Tires Steel. Held by Shrinkage and Shoulder.

Tires, Flanged, Pos. All. Size 3½" x 5½"

Tires, Plain, Pos. None. Size ---

Lateral play between driving boxes and wheel hubs = (See sup. 39)

38. **Driving Boxes** Cast Steel.

Journals, Diam. 8" Length 10"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing.

40. To swing 5" each side of cen., Cen. pin liners None.

Journals, Diam. 5" Length 8" Boxes Cast Steel.

Wheel hub liners Bronze.

Wheels, Diam. 26" Tread 4¼" Kind Chilled Cast Iron Plate.

Tires None. Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck Two Wheeled Swing bolster, side bearing.

41. To swing 5" each side of cen., Cen. pin liners None.

Journals, Diam. 5" Length 8" Boxes Cast Steel.

Wheel hub liners Bronze.

Wheels, Diam. 26" Tread 4¼" Kind Chilled Cast Iron Plate.

Tires None. Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels.

43. Operating {Engine, sch. No. 6 ET Westg. Combined Auto. and / Eng. Trk, sch. ---} Straight Air.

Parts

Foundation {Drivers, sch. WM-2-BC American O. S. Equalized. / Eng. Trk, sch. ---}

Parts

42. Air pump Two 9½" Pos. Both L.S.

Train connections Front and Back.

Train signal, sch. "L".

Air pumps to have United States Metallic Rod Packing.

Air pump exhaust to be piped into cylinder saddle.

Tender Eight Wheeled, Drawing No. 1528 {Tender to be Vet shed: No.

Weight, with fuel and water, about 108,700 pounds.

51. **Tank** {Oil, 1800 5665 / Water, 5000 Gallons. Bill 5668}

Tank: Vanderbilt, Cylindrical Type.

Tool Boxes of Steel, Top.

Frame Steel 10" channels, with bumpers of wood and plate.

51. Front Drawbar height 34"

Pilot None. Pushing shoes None.

Back drawhead, center above rail 33½"

Coupler Tower M.C.B. Automatic with extended floor pocket and solid knuckle.

55. **Trucks** Vulcan, Cast Steel, side frame type with cast steel bolsters. Bolster center plate to be of cast steel.

Springs Elliptic, B. L. W.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind Chilled Cast Iron Plate.

Tires None. Cen. diam. --- Size ---

Tires held by ---

Safety chains Single.

55. **Brake** Position On all wheels.

Brake sch. No. 6 ET. Westg. Auto. and Straight air with 12" x 12" tender brake cylinder.

* Spare parts covered by Extra Order 12239 - 1923 to be shipped with locomotive.

List of tools, sch. 160

Photo sch. None. Inspection B. L. W.

To be weighed No. Material specs B. L. W.

Certificate of boiler test (See sup. 3)

Junior laws to 10-10-23 Shipment On own wheels. (See * above).

Brass shop finish, No. 1.

Machine shop finish D-165.

Property plates B. L. W. for engine and tender.

Wheels to be painted solid black with tires steel gray.

31. **Painting,** style --- Black, no striping.

Lettering etc., in yellow paint, same as for 10 30 ½ D 49.

Mark on cab sides: C. N. R.

Mark on sides of cab, generally; same as for Southern Pacific Locos. } Pr 13/24 45 - 109

Mark on sides and back of tank: C. N. R.

Road Nos. Pos. Road Nos. Name None.

F. No. Plate. 23

On sides and back of tank above mark.

Actual Dimensions of Loco. Extreme height over all 14' 1"

Extreme Width: Cab boards 9'11" Cylinders ~~or valve motion~~ 9' 5"

Length outside face front bumper of engine to face of tender wedge 31' 7"

Length face of tender wedge to outside face back bumper of tender 23' 11½"

Total length outside face front bumper of engine to outside face back bumper of tender 55' 6½"

SPECIFICATION FOR LOCOMOTIVE 10 30 ½ D 56.

FOR CALIFORNIA WESTERN RAILROAD AND NAVIGATION COMPANY.

JFK.

1 LOCOMOTIVE TO CONFORM TO I. C. C. REQUIREMENTS.

2 LOCOMOTIVE MUST PASS THROUGH A TUNNEL 14 FEET WIDE, 14 FT. HIGH FROM TOP OF RAIL TO SPRING LINE OF ARCH, THREE SEGMENT ARCH, EQUAL LENGTH SEGMENT. TUNNEL AS PRINT RECEIVED FOR 10 30 ½ D 47.

3 BOILER TEST CERTIFICATE: THREE COPIES OF B.L.W. FORM 1036 AND TWO COPIES OF B. L. W. FORM 491.

4 BOILER TO HAVE REINFORCING PLATE WHERE THE INJECTOR CHECKS SCREW INTO BOILER SHELL.

5 FIRE BOX EXPANSION PAD TO HAVE LONGER BEARING, FULL WIDTH OF FRAME. (SEE SUP. 33)

6 ALL RIVETS IN FIRE BOX EXPOSED TO FLAME, TO BE COUNTERSUNK.

7 FIRE DOOR TO BE HOOD TYPE.

8 ALL RIGID STAYBOLTS TO BE HOLLOW, 1" DIAMETER.
FLEXIBLE STAYBOLTS, TATE, 350 IN BREAKING ZONE.

9 CROWN RADIAL STAYS NOT TO BE BUTTON HEAD.

10 TUBES AND FLUES TO BE WELDED IN FIRE BOX END USING THE USUAL METHOD OF ROLLING AND BEADING WITH FERRULES AND WELDING FROM THE BEAD TO SHEET.

11 FIRE BRICK IN BACK WALL OF FIRE BOX, TO BE PUT IN LENGTH WISE OF FIRE BOX.

12 OIL BURNING ARRANGEMENT TO BE SOUTHERN PACIFIC STYLE, WITH VON BODEN INGLES BURNER IN FRONT OF FIRE BOX SIMILAR TO Co's. Loco. No. 22, 10 30 ½ D 49.
OIL FEED COCK LOCATED IN FRONT OF FIRE BOX 6" FROM BURNER.
CONNECTIONS BETWEEN ENGINE AND TENDER FOR OIL AND FOR STEAM TO OIL HEATER TO HAVE BARCO FLEXIBLE CONDUITS.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

13 OMIT OIL HEATER ON ENGINE.

14 SUPERHEATER AS THE SUPERHEATER Co's. SPECN. No. C-22807, DATED AUGUST 8, 1923, COPY ATTACHED.
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX, AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY, PAYABLE BY THE B. L. W.

15 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

16 CAB LIGHTS TO CONFORM TO I. C. C. REQUIREMENTS.

17 GAUGE COCKS TO BE NATHAN, TYPE 272-A-1001.

18 WASHOUT PLUGS ON EACH SIDE OF BOILER, ABOUT 18" BACK AND 6" HIGHER THAN BOILER CHECKS.
CROWN PLUGS ON SIDES, ABOUT 2" ABOVE CROWN SHEET.
ONE PLUG ABOUT 12" FROM TUBE SHEET AND ONE ABOUT 36" FROM FIRE BOX IN BELLY OF BOILER.

19 SQUIRT HOSE TO BE APPLIED IN CAB, SO ARRANGED THAT IF THE HOSE SHOULD PULL OFF THE PIPE, THE HOT WATER WILL NOT INJURE ANY ONE WHO MAY BE IN THE CAB.

20 STEAM TURRET TO BE SET 8" AHEAD OF POSITION ON 10 30 ½ D 49.

21 CAB HANDLES TO EXTEND LOWER AND TO BE LOOPED.
CAB GRAB IRONS TO BE MADE LONGER.

22 FRANKLIN RAILWAY SUPPLY Co's. RADIAL BUFFER, WEDGE TYPE, BETWEEN ENGINE AND TENDER.

26 FRONT FOOT PLATE OF CAST IRON.

27 CLASSIFICATION LAMPS ON ENGINE TO BE HARRIMAN STANDARD FROM ADAMS AND WESTLAKE COMPANY.
CLASSIFICATION LAMPS TO HAVE LIGHT BUTTON SWITCH AT LAMP.

28 HEADLIGHTS TO BE SUNBEAM AIR-TIGHT, WITH SUNBEAM 32 VOLT INCANDESCENT ELECTRIC EQUIPMENT, INCLUDING TURBO TYPE RE-3 GENERATOR. HEADLIGHT ON TOP OF SMOKE BOX.
HEADLIGHT GENERATOR TO BE PLACED ON TOP OF BOILER, IMMEDIATELY IN FRONT OF CAB.

29 TWO ADLAKE, SMALL (FINE SPACE) ELECTRIC TRAIN INDICATORS GENERALLY AS UNION PACIFIC OR SOUTHERN PACIFIC STANDARD.

30 BELL RINGER TO BE GOLLMAR WITH TWO OPERATING VALVES ONE FOR ENGINEER AND ONE FOR FIREMAN.

31 BOILER JACKET TO BE PAINTED WITH JACKET ENAMEL.

32 LUBRICATOR TO BE PIPED TO STEAM CHESTS, CYLINDERS AND AIR PUMP.

33 BOILER WAIST SHEET TO HAVE SIX INSTEAD OF THREE BOLTS TO GUIDE YOKE. (SEE SUP. 5)

34 GUIDE OIL CUPS TO BE HANCOCK MALLEABLE NO. 45-A.

35 CROSSHEAD TO BE ALLIGATOR TYPE FIG. 1022, LOCO. DICTIONARY, 1919.

36 ROD BEARINGS TO BE TIGER BRONZE FROM MORE-JONES.

37 DRIVING WHEEL CENTERS TO BE MADE HEAVY TO OBTAIN WEIGHT, I.E. MAKE CAST STEEL FROM SAME PATTERNS AS FOR CAST IRON CENTERS.

38 DRIVING BOXES TO HAVE 2⅜" THICKNESS OVER CROWN AND WIDTH INCREASED TO 19".

39 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS 7/32" TOTAL INCLUDING LATERAL PLAY IN PEDESTAL FITS.

40 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS 5/16" TOTAL, INCLUDING LATERAL PLAY IN PEDESTAL FITS.

41 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS 5/16" TOTAL, INCLUDING LATERAL PLAY IN PEDESTAL FITS.

42 TWO MAIN AIR RESERVOIRS, LOCATED UNDER RAISED SECTION OF RUNNING BOARDS AT FRONT OF ENGINE.
AIR RESERVOIR TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

43 BRAKE FEED VALVE AND REDUCING VALVE TO BE ON ENGINEERS SIDE OF CAB, AHEAD OF SEAT INSTEAD OF ON BACK HEAD NEXT TO FIRE DOOR.

TENDER

51 MEASURING CHART ON FRONT OF OIL TANK.
MEASURING ROD FOR OIL TANK.

52 WATER DRAINS AND SUPPLY VALVES ON OIL TANK TO BE SOUTHERN PACIFIC STANDARD.

53 TENDER GRAB IRONS AT CAB TO BE MADE LONGER.

54 FRANKLIN RAILWAY SUPPLY Co's. RADIAL BUFFER, WEDGE TYPE, BETWEEN ENGINE AND TENDER.

55 TENDER BRAKE BEAMS TO BE HUNTOON NO. 3 WITH COMBINATION HEADS.

61

SPECIFICATION FOR LOCOMOTIVES 10 30 ½ D 56.

FOR CALIFORNIA WESTERN RAILROAD AND NAVIGATION COMPANY.

Specification for Type A Double Loop Superheater SPECN. NO. C-22807, DATED AUGUST 8, 1923.

BOILER TUBES	156 in number 2" o.d. 11 ft. 12 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification ~~A-31-18~~.	
BOILER FLUES	26 in number 5½" o.d. #9 B.W.G. AV of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification ~~A-31-18~~	Card 11308-M
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections	Card 1136
TUBE SHEET LAYOUT		Card 50584
UNITS	26 units 13" o.d. #9 B.W.G. AV Pipes in accordance with the American Society for Testing Materials Specification ~~A-31-18~~. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 2-11754
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 2-11752
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 2-1081-L
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls	A. H. M. 4 x 7 - 2 Card 10236
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to dampen cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	Card 1L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card 1067
PYROMETER	Model No. Pyrometer	Card NONE.
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 40610-C
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 11392-V	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 2-1074	S. H. UNIT CLAMP	Card 2-1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 2-10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPE CONNECTION	Card 1L-11437	S. H. PIPE BAND	Card 2-1988
DAMPER CYL. PIPING DIAGRAM	Card 2-11442	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED.
DAMPER SHAFT	Card 2-1068-M	RETURN BENDS	Card 2-11523
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O. S.)	Card 2-1575-A	DEFLECTING PLATE HANDLE	Card 1L-1487
DAMPER SHAFT BEARING (I.S.)	Card 10386	DEFLECTING PLATE STUDS	Card 2-10309
DAMPER SHAFT LINK	Card 2-1070	DEFLECTING PLATE CLAMP	Card 2-10309-A
PATENT PLATE	Card 3-3367	UNIT CLAMP BOLT NUT,	CARD 1P-1107-A
DAMPER RIGGING	CARD 3-11626-H		

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7245.

Memorandum Spec'n 21035.

SPECIFICATION FOR LOCOMOTIVES 10 34 E 2113.

ER/ **FOR** The Campbell's Creek Coal Co.

HNW.

Gen. as PHOTO. 4674, {Except injectors to be placed inside cab and injector checks in sides of boiler.

Engine Drawing No. 179

11-14-21.

Gauge of Road 4' 8½" Play ⅜"

Wheelbase, Rigid 14' 0" Driving 14' 0" Total 22' 1"

Total wheelbase, eng. and tend., {Actual 54' 0½" / Limited to ----

Curves 18 degrees.

Limits, Height (See sup. 3 Width (See sup. 3

Weight (approximate) in working order. Total 154,000 pounds.

On F. tr'k 17,000 lbs., Drivers 137,000 lbs., B. tr'k ---- lbs.

Tractive power 32,600 lbs., Ratio of adhesion 4.2

Work'g St'm Pres. 200 lbs., Service Freight (sup. 4)

Fuel Soft coal.

Boiler Steel. Thick ⅜" Bill 9512

Front Tube Sheet ½" Thick

Boiler, Diam. 68" Plan Extended wagon top.

{Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

{With Factor of Safety of 4.56 **Tested to** 267 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips.

6 **Dome,** diam. 33" Pos. Forward of fire box.

Firebox Steel. Combustion chamb. None.

Firebox, length 103-3/16" Width 42" Depth F. 68¾" B. 66¾"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

Firedoor opening 16" diam.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays ⅞" diam. with 3/16" holes 1½" deep from O.S.

Radial stays 1" diam. Sling stays front {Three rows B. L. W. Expansion stays.

Button heads below crown on Eight central rows

Crown bars None. Placed ---- above crown

Crown bolts ----

Flues ----

Tubes No. 12 B.W.G. Charcoal iron. (11 To use stock for 2113.)

Tube ends Swaged for copper ferrules, fire box ends.

Number 262 Diam 2¼" Length 13' 3¾"

Heating Surface Flues ---, Combus. Chamb. ----, Total 2204 sq. ft.; Tubes 2042 sq. ft., Fire Box 162 sq. ft., Fire Brick Tubes ----

Grate area 30 sq. ft. Ratio to Heating Surface 1: 73.4

Superheater ----

Fire Brick Arch, None.

Grates Rocking bars, with drop plate in front.

Ash Pan, Dampers Front and back.

Throttle Balance. Pos. Dome.

Dry pipe Steel.

Superheater None.

Smokebox extenstion With. Cleaning hole and cap None.

Spark ejector or hopper None.

7 Netting and deflect. plates With.

7 Exhaust nozzles Single high.

Stack Straight. Dia. 15"

Safety Valves (Not Spec.) Two Consolidated 2½" Open.

Safety valves None with relief lever, Set to 200 pounds.

Whistle Chime.

14 **Steam Gauge** One Iron 6¾" Maker: U. S. Gauge Co.

Steam gauge stand Iron. **Clock** None.

Water Gauge One B.L.W. Ironclad. **Cab Lamps** Electric.

Gauge Cocks Three right side. Surface valve None.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve To have separate dry pipe to dome.

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.

Cleaning Plugs One plug above fire door.

Firebox, Corners, back ones diagonal, sides and back.

Crown, Two each side and four back.

Waist, One under front.

Front tube sheet, One. Fusible plug One.

Pump None.

Injectors Two Monitor. (Spec.) No. 10.

Injectors, Pos. Right and left. Steam pipes Copper.

Pipes, Check Iron. Feed Iron. Overflow Iron.

Check B. L. W., with stop valve. Pos. Right and left.

Steam Heat None.

8 **Cab** Steel.

9 Cab boards Steel. Nosing Flanged.

10 Running boards Steel. Nosing Flanged.

Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 30¼"

Pilot Steel.

Front Bumper Cast steel. Bumper plate With.

14 **Steps** Hand holds, etc., to conform to I. C. C. requirements.M

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Automatic.

11 Signal fixtures Iron on bumper.

17 **Headlight** Two round case 18" Reflector,

Headlight, Nos. on sides With. H'dl't step With.

Lamp shelf None. Nosing ----

Bell 92 pounds.

Sand Box One Diam. 31" Body Iron painted. Pipes Iron.

Sander (Not Spec.) Leach air, trap A-10. to sand front and back.

Dome casing Iron painted.

See X 9118 for Lagging for Back Head of Jacket

Boiler Jacket #18 Soft steel ptd. Bands Iron. Style 9.

Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

H. K. Horwick Jan. 1922

SPECIFICATION FOR LOCOMOTIVES 10 34 E 2113.

63 63

FOR The Campbell's Creek Coal Co.

HNW.

Frames Cast steel.

Cylinders, Diam. 20" Stroke 24"

St'm ports, Length 23.17" Width 1⅞" Bridges ----

Exh. ports, Length ---- Width ---- Valve lead 3/16"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ----

Eccentric crank throw 13-15/16" By-pass valve None.

(Not Spec.) S. P. Lubr. Detroit triple No. 22 Bull's Eye.

Cyl'r heads (Sup. 13) Lubr. pipes of iron under jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

St'm chest casings ---- Covers ----

St'm chest valves 10" diam., Piston type.

(Not Spec.) Met. pkg United States, King type.

14 **Pistons** heads of cast iron, rings of cast iron, sprung in.

Guides Laird type, steel. Oil cups Needle.

Crossheads Cast steel, with bearings of brass.

15 **Wrist Pins** Steel. 15 Rod cups Grease.

Valve Motion Walschaerts.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Bronze.

Drivers, O. S. Diam. 50" Cen. diam. 44"

Wheel centers: Main, cast steel; others, cast iron.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. Front and back. Size 3" x 5½"

Tires, Plain, Pos. Intermediate. Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = (See sup. 16)

Driving Boxes Cast steel.

Journals, Diam. 9" Length 10"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing.

17 To swing 2½" each side of cen., Cen. pin liners None.

Journals, Diam. 5" Length 8" Boxes Cast iron.

Wheel hub liners None.

Wheels, Diam. 30" Tread ---- Kind Cast iron spoke center.

Tires Steel. Cen. diam. 25" Size 2½" x 5½"

Tires held by Shrinkage and shoulder.

Back Engine Truck None Wheeled ----

To swing ---- each side of cen., Cen. pin liners ----

Journals, Diam. ---- Length ---- Boxes ----

Wheel hub liners ----

Wheels, Diam. ---- Tread ---- Kind ----

Tires ---- Cen. diam. ---- Size ----

Tires held by ----

Brake, position On all driving and tender wheels.

Operating Parts: Engine, sch. No. 6 ET. Westg. combined auto. and straight air. Eng. Tr'k, sch. ----

Foundation Parts: Drivers, sch. WN-2-BC American outside equalized. Eng. Tr'k, sch. ----

Air pump Two 9½" Pos. Both left side.

Train connections Front and back.

Train signal, sch. None.

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1695.

Weight, with fuel and water, about 124,000 pounds.

Tender to be weighed: Yes.

***Tank** 6,000 Gallons, B'k 5732.

Tank "U" shaped, straight top. Fuel capacity, 10 tons.

Tank to have welded seams and joints (Now 6 seams)

Tool Boxes Steel, top.

Frame Steel, 12" channels, with bumpers of wood reinforced with steel channel.

Front Drawbar height 29⅜"

Pilot, None.

Back drawhead, center above rail 33½"

Coupler M. C. B. Automatic.

Steps Hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.

Both trucks to have side bearings.

Springs Elliptic, B. L. W. Make.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.

Tires None. Cen. diam. --- Size ---

Tires held by ----

Safety chains Single.

Brake Position On all wheels.

Brake sch. No. 6 ET. Westg. ~~combined~~ auto. and straight air, with 12" x 12" tender brake cylinders.

*Rear headlight to be mounted on top of rear end of tender. Marker brackets on rear of tank with necessary wiring for same. Lamps not to be provided.

List of tools, sch. 158.

Photo sch. No. 2. Inspection B. L. W., (Sup. 1 ~~16~~)

To be weighed Yes. Material specns B. L. W.

Certificate of boiler test (See sup. 5)

Junior laws to 11-14-21. Shipment On own wheels.

Brass shop finish, No. 1.

Machine shop finish D-165.

B. L. W. Patents: None.

Property plates None.

Painting, style 291, Olive green and aluminum.

Mark on cab panels, C. C. R. R. No. 6

Mark on tank sides: Campbell's Creek R. R. Co.

Mark on tank collar at back: C. C. R. R. Co.

Road Nos. Pos. Road Nos Name None.

F. No. plate. 6

Sand box.

Cab panels.

Back of tank.

Actual Dimensions of Loco. Extreme height over all 14' 2"

Extreme Width: Cab boards 10' 1"; Cylinders or valve motion 9' 9"

Length outside face front bumper of engine to face of tender wedge = 33' 3"

Length face of tender wedge to outside face back bumper of tender = 26' 7½"

Total length outside face front bumper of engine to outside face back bumper of tender = 59' 10½"

SPECIFICATION FOR LOCOMOTIVES:- 10 34 E 2113,

FOR:- THE CAMPBELL'S CREEK COAL CO.

HNW.

64

1 MR. W. B. CANTERBURY, MASTER MECHANIC, DANA, WEST VIRGINIA, IS TO BE NOTIFIED IN AMPLE TIME TO REACH EDDYSTONE TO WITNESS ASSEMBLING OF LOCOMOTIVE.
COPY OF NOTICE TO MR. CANTERBURY TO BE SENT TO MR. E. O. DANA, PRESIDENTS OF THE CAMPBELL'S CREEK COAL CO. AND ALSO COPY TO PITTSBURGH OFFICE OF THE B. L. W.

2 MR. J. B. HENSFORD, TRAIN-MASTER OF CAMPBELL'S CREEK R. R. CO., AT DANA, WEST VIRGINIA, DESIRES TO BE PRESENT DURING THE LAST WEEK OF ASSEMBLING OF LOCOMOTIVE. ADVISE HIM IN AMPLE TIME TO ARRIVE HERE, SENDING COPY OF SUCH NOTICE TO B. L. W. PITTSBURGH OFFICE.

3 CLEARANCE DIAGRAM AS B. L. W. TRACING NO. 45863, APPROVED.

4 LOCOMOTIVE TO BE USED IN I. C. C. SERVICE.

5 BOILER TEST CERTIFICATE: THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

6 AUXILIARY DOME, NONE.

7 SMOKE BOX TO HAVE M. M. SELF CLEANING FRONT END.

8 CAB TO BE WELDED TOGETHER.

9 CAB BOARDS TO BE COVERED WITH WOOD.

10 RUNNING BOARDS TO HAVE BUTTONS PUNCHED ON EDGE TO PREVENT MAN FROM SLIPPING.

11 MARKER BRACKETS ON SIDES OF SMOKE BOX WITH NECESSARY WIRING FOR SAME. LAMPS NOT TO BE PROVIDED.

12 HEADLIGHT AND EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHT.

13 CYLINDER HEADS: FRONT CAST IRON, BACK CAST STEEL.

14 PISTON RODS TO BE KEYED TO CROSSHEADS.

15 PARALLEL RODS TO HAVE SOLID ENDS.

16 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

17 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6484.

Memorandum Spec'n 20091.

SPECIFICATION FOR LOCOMOTIVES 8 48 E I and 2. Gen. as Photo. 6109 (Except two sand boxes at front same position as at rear, one 8½" C. C. air pump and with O. S. steam pipe.

FOR Cambria Steel Company.

JEX.

Engine Drawing No. 1.

4-8-20.

Gauge of Road 4' 8½" Flg. ⅞" except 1" for F. & B. Drivers.
Wheelbase, Rigid 16' 0" Driving 16' 0" Total 16' 0"
Total wheelbase, eng. and tend. (Actual 52' 2" / Limited to ---

Curves and Grades. (See sup. 23.)
Rails 85 pounds and 100 pounds.
Limits, Height (See sup. 21.) Width (See sup. 21.)
Weight (approximate) in working order, Total 270,000 pounds.
On F. tr'k --- lbs. Drivers 270,000 lbs. B. tr'k --- lbs.

Tractive power 68,000 lbs., Ratio of adhesion 3.97
Work'g St'm Pres. 205 lbs. Service Switching.
Fuel Soft Coal.

1. **Boiler** Steel. Thick ⅞" 9150 for hereafter. Bill 9089
5. Front Tube Sheet ⅝" Thick
Boiler, Diam. 86" Plan Straight Top.
3. Allowable st'm pres. 205 lbs.
6. With Factor of Safety of 5.06 **Tested to** 225 lbs. steam pres. / 308 lbs. water pres.
6. Longitud. seams Butt jointed, double covering strips, 90% seams.
5. Main Dome, One-piece type. Auxiliary Dome, None.
Dome, diam. 36" Pos. Central.

Firebox Steel. Combustion chamb. None.
10. Firebox, length 114" Width 72½" Depth F. 77½" B. 62⅜"
Firebox, Tube 9/16" Crown ⅜" Sides ⅜" Back ⅜"
28. Firedoor opening 13" x 18"
Water space, Front 6" Sides 6" Back 5"
Water space frame Double Riveted
7. Water space stays 1" diam. with 3/16" holes 1½" deep from O.S.
7. Radial stays 1⅛" diam. Sling stays from {Three Rows B. L. W. / Expansion Stays.
Button heads below crown on Ten central rows
Crown bars None. Placed --- above crown
Crown bolts ---

4. Flues No. 9 B. W. G. Steel.
18. **Tubes** No. 12 B. W. G. Charcoal Iron.
Tube ends Swaged for copper ferrules fire box ends.
Number {40 / 237 Diam. {5½" / 2" Length 14' 11"

Heating Surface Flues 854⁰ Combus. Chamb. --- Total 2933⁰
Tubes 1841⁰ Fire Box 211⁰ Fire Brick Tubes 27⁰
Grate area 57.2⁰ Ratio to Heating Surface 1: 51.2
Superheater 742⁰

Fire Brick Arch, American Security Arch on four tubes of seamless steel, 3" O.S. diam. No. 7 B. W. G. Thick.

34. **Grates** (See sup. 33.)
34. **Ash Pan,** Dampers Right and Left.

Throttle Balance. Pos. Dome.
Dry pipe Steel.

Superheater Schmidt type. (See sup. 30.)

5. **Smokebox** extenstion With. 31. Cleaning hole and cap L. S. Only.
Spark ejector or hopper With.
32. Netting and deflect. plates With.

Exhaust nozzles Double, High.

Stack Straight. (Sup. 33.) Dia. 19"

8. 16. (Spec) **Safety Valves** Two Consolidated 3" Open.
5½. Safety valves both with relief lever, Set to 205 pounds.
8. **Whistle** One B. L. W. Plain.

8. 45. (One) **Steam Gauge** Iron 7". Maker: Crosby.
Steam gauge stand Iron. **Clock** None.

8. **Water Gauge** One Mauger, No. 5. **Cab Lamps** to burn oil.
8. **Gauge Cocks** Three Back. Surface valve None.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
8. **Blower Valve** B. L. W.

8. **Blow off Cock** One B. L. W. Pos: L. S. Only.
Cleaning Plugs One plug above fire door.
Firebox, Corners diagonal, sides and back.
Crown, three each side and four back.
Waist, Two under, one front and one back.
Front tube sheet. One. Fusible plug One.

Pump None.

Injectors to be placed outside of cab.
Injectors Two Sellers, Class "N" (Spec) No. 11½
Injectors, Pos. R. and L. Steam pipes Copper.
34. Pipes, Check Iron. Feed Iron. Overflow Iron.
13. Check B. L. W., with stop valve. Pos. R. and L.

Steam Heat None.

21. **Cab** Steel. Rushton Ventilator.

Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler.

35. **Back Bumper** Bar Steel. Back drawbar height 27"

Pilot None.
Front Bumper Cast Steel.
Steps (See sup. 36.) Bumper plate With.

Front Drawhead, Center above rail 33½"
Coupler Tower M. C. B. Auto.

Signal fixtures None.

Headlights to be "Star".
Headlight Two Round Case 18". Reflector, To burn Kerosene.
Headlight, Nos. on sides With. H'd'l't step With.
Lamp shelf None. Nosing ---

Bell 92 pounds
Sand Box Four Diam. 37" Body Iron Painted. Pipes Iron.
Sander (Spec) Leach Air Trap No. 1, in each box, to sand front and back.
Omit Hand Sanders.
Dome casing Iron Painted.

Boiler Jacket #18 Soft Steel Pt'd. Bands Iron. Style 9 and 14.
Boiler Lagging Magnesia Sectional.
Back head to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

W. A. Bardsley Aug. 1920.

SPECIFICATION FOR LOCOMOTIVES 8 48 E I and 2.

FOR Cambria Steel Co.

JEX.

66

Furnish Drawings. (See sup. 24.)

Frames Cast Steel.

21. **Cylinders,** Diam. 27" Stroke 30"
St'm ports, Length 33" Width 1⅞" Bridges ---
Exh. ports, Length --- Width --- Valve lead ⅛"
Valve travel 6¼" Steam lap 1" Exhaust clearance ---
Eccentric crank throw 7⅞" (Spec) By-pass valve None.
S. F. Lubr. Detroit Five Feed Bulls Eye.
Cyl'r heads Cast Steel. Lubr. pipes of copper, under jacket.
Cyl'r casings Iron Painted. Head covers Steel Painted.
St'm chest casings --- Covers ---
St'm chest valves 14" diam., Piston Type.
Met. pkg. (Not Spec) / Piston rods / Valve stems United States, King Type.
40. Piston rods to be keyed to crossheads.
Pistons Heads of Cast Steel, rings of Cast Iron sprung in.
Guides Alligator Type, Steel. Oil cups Needle.
Crossheads Cast Steel, with bearings of Cast Iron, Tinned.
39. **Wrist Pins** (See sup. 39) and Pin Caps (See sup. 22, 37 etc.)

22. 41. **Valve Motion** Walschaerts.
Lmks, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.
Power reverse gear: (See sup. 45.)

All threads on bolts (except stayboltsto be United States Standard.
All unpinned movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners (See sup. 46.)
Drivers, O. S. Diam. 56" Cen. diam. 48" Centers Cast Steel.

Tires Midvale Steel. Held by Shrinkage and Shoulder.
Tires, Flanged, Pos. All. Size 4" x 5½"
Tires, Plain, Pos. None. Size ---
47. Lateral play between driving boxes and wheel hubs = 3/16" total.
47. **Driving Boxes** Cast Steel.
40. **Journals,** Diam. {Main 12½" Length 13" / Others 11"
48. **Springs.** Make B. L. W.

Front Engine Truck None Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck None Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels.
49. Operating / Engine, sch. No. 6 ET. Westinghouse Combined Auto. and Straight Air.
Parts / Eng. Tr'k, sch. ---
Foundation / Drivers, sch. W-4 American O. S. Equalized.
Parts / Eng. Tr'k, sch. ---
50. Air pump One 8½" C.C. Pos. Left Side.
Train connections Front and Back.
Train signal, sch. None.

61. **Tender** Eight Wheeled, Drawing No. 1570.
Weight, with fuel and water, about 155,000 pounds.
Tender to be weighed: Yes.
61. **Tank** 8000 Gallons, Bill 5396.
Tank "U" shape, water bottom type. Fuel capacity 14 Tons.

Tool Boxes Hard Wood, Top.

Frame Steel, 12" channels, with bumpers of wood and channels.

62. Front Drawbar height 29"
Pilot None.
Back drawhead, center above rail 33½"
Coupler M. C. B. Auto. with 6" x 8" shank, with slotted knuckle and with Westg. friction draft gear, type D-3.
63. Steps (See sup. 64.)

Trucks Arch bar type with bolsters of Cast Steel.
Both trucks to have side bearings.
Springs Coil, Make B. L. W.
Journals, Diam. 5½" Length 10"
65. Wheels, Diam. 33" Tread 1½" Kind Solid forged rolled steel.
Tires None. Cen. diam. --- Size ---
Tires held by --- Wheel rims 2½" thick.
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6-ET. Westg. Auto. and Straight Air with 14" x 12" tender brake cylinder.

List of tools, sch. 29.
Photo sch. No. 2. Inspection B. L. W., except boiler. (Sup. 26)
To be weighed Yes. Material specns B. L. W. (See sup. 25.)
2. Certificate of boiler test Three copies B. L. W. form 1036.
Junior laws to 6-1-20. Shipment On own wheels. (Sup. 52.)

Brass shop finish, No. 1.
Machine shop finish D-165.

B. L. W. Patents / Feed Water Strainer, Patented Sept. 1, 1903 (Cast On.)

Property plates None.

Painting, style 291, Olive Green and Color.

Mark on Tank Sides: CAMBRIA
Front Number Plate to carry CAMBRIA STEEL CO., the number of the locomotive and year of purchase.
Road Nos. Pos. Road Nos. Name None.
F. No. Plate. 44 and 45
Cab Sides.
Back of Tank.

Actual Dimensions of Loco. Extreme height over all 14' 6¾"
Extreme Width: Cab boards 10' 2" ; Cylinders or valve motion = 10' 1"
Length outside face front bumper of engine to face of tender wedge = 37' 6⅝"
Length face of tender wedge to outside face back bumper of tender = 27' 1⅜"
Total length outside face front bumper of engine to outside face back bumper of tender = 64' 11½".

SPECIFICATION FOR LOCOMOTIVES 8 48 E 1 AND 2

FOR CAMBRIA STEEL COMPANY

RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF PENNSYLVANIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	⅜"	7/16"	⅞"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝". (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS: AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S
PENNSYLVANIA
(State in which boiler is to be used)
No. 30 & 32
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (Builder's number)
(LEAVE BLANK) (Year put in service)
(Manufacturer's Serial number)
205 POUNDS
(Maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVES 8 48 E 1 AND 2

FOR: CAMBRIA STEEL COMPANY

Specification for Type A Double Loop Superheater AS SPEC. # O-14152, DATED JUNE 16, 1920

BOILER TUBES	232 in number 2 o.d 15-14 ft 8'-11" in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	40 in number 5½ o.d #9 BWG of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card 1524-F
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card 1137
TUBE SHEET LAYOUT	Card 3L-50623
UNITS	40 units 12 o.d #9 BWG Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 800 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card 10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on Card 1052
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A Card 1064-N
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card 11118
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with. Card SEE ARNGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 11314
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer Card 1067
S. H. ARRANGEMENT	To be in accordance with Card 4-4064?
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 11406-Y	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 11274	S. H. PIPE BAND	Card 1988
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1066-M	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1069	RETURN BENDS	Card 1022
DAMPER SHAFT BEARING (O.S.)	Card 1140-B	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (L.S.)	Card 1039-M	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10805-A
DAMPER RIGGING	CARD 11393-B	PYROMETER	NONE

69
69¼

SPECIFICATION FOR LOCOMOTIVES 8 48 E 1 AND 2.

FOR CAMBRIA STEEL CO.

JCK.

21 LIMITS HEIGHT 14' 9".
WIDTH AND HEIGHT OF CAB AT EAVES MUST NOT EXCEED P. R. R. CLEARANCE DIAGRAM.
WIDTH OVER CYLINDERS NOT TO EXCEED 10' 2".

22 ALL MACHINERY ON LOCOMOTIVES TO BE PLACED AS HIGH ABOVE TOP OF RAIL AS POSSIBLE.
LOWEST PART OF BACK END OF MAIN ROD MUST NOT BE LESS THAN 3" ABOVE TOP OF RAIL WHEN TIRES ARE NEW.

23 CURVES AND MAXIMUM GRADE IN COMBINATION ARE 12 DEGREES CURVE AND 1¼ GRADE. SHARPEST CURVES ARE 24 DEGREES.

24 THREE COMPLETE SETS OF PRINTS TO BE FURNISHED, ORDERED THROUGH EXTRA WORK DEPT. ON EXTRA ORDER 18543, 1920.

25 LOCO. FOR OPERATION IN PENNSYLVANIA, AND BOILER TO MEET THE PENNSYLVANIA STATE LAWS, I.E. THE A. S. M. E. CODE. (SUP 1-4)

26 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY. (SEE SUP. 1.)

27 F. H. MOYER, CHIEF ENGINEER, CAMBRIA STEEL CO., JOHNSTOWN, PA., TO BE ADVISED TWO WEEKS BEFORE BOILERS ARE READY FOR TEST, SO THAT HIS REPRESENTATIVE MAY VISIT THESE WORKS TO MAKE A GENERAL INSPECTION AND WITNESS THE TEST.

28 FIRE DOOR TO BE FRANKLIN PNEUMATIC, NO. 8.

29 GRATES; ROCKING BARS WITH DROP PLATES AT FRONT AND BACK, DUMPING INTO ASH PAN.

30 SUPERHEATER AS THE LOCO. SUPERHEATER CO'S. SPECN. O-14152, DATED JUNE 16, 1920.
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX, AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBER.
ROYALTY PAYABLE BY THE B. L. W.

31 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

32 NETTING TO BE 3 x 3 MESH, OF AMPLE AREA. THESE ENGINES MUST NOT THROW INCANDESCENT SPARKS.

33 SMOKE STACK OF CAST IRON. OMIT COPPER TOP.

34 INJECTOR OVERFLOW PIPES TO RUN TO ASH PAN.

35 B. L. W. RADIAL BUFFER OF CAST STEEL, WITH DOUBLE SPRINGS, BETWEEN ENGINE AND TENDER, PLACED ON TENDER SAME AS FOR 6 36 D 282 AND 283. (SEE SUP. 62.)

36 STEPS ACROSS FRONT OF ENGINE WITH SUITABLE HAND RAILS. STEPS HAND HOLDS ETC. TO CONFORM TO I. C. C. REQUIREMENTS.

37 MAIN ROD TO HAVE FORKED BACK END.
SIDE RODS TO HAVE SOLID END.
BUSHINGS TO BE WELL SECURED IN ROD TO PREVENT TURNING.

38 ALL CONNECTING RODS TO HAVE GREASE CUPS OF AMPLE CAPACITY, FORGED ON RODS.

39 AXLE PINS OF STEEL, COFFIN PROCESS.

40 PISTON RODS, CRANK PINS AND AXLES FROM CAMBRIA STEEL CO.

41 VALVE MOTION, IF POSSIBLE, TO HAVE CROSSHEAD LINK ATTACHED TO CROSSHEAD PIN; IF NOT, MAKE THE CROSSHEAD LUG AND COMBINING LEVER AS SHORT AS POSSIBLE.

45 RAGONNET POWER REVERSE GEAR, TYPE "B" FOR USE WITH AIR OR STEAM, COVERED BY EXTRA ORDER NO. 20369 DATED 7-7-20.

46 DRIVING WHEELS TO HAVE HUB LINERS OF BRONZE AS LARGE AS POSSIBLE.

47 DRIVING BOXES TO BE EXTRA HEAVY DESIGN.

48 EQUALIZING BEAMS OF FORGED STEEL.

49 THREE WESTINGHOUSE ENAMELLED AIR RESERVOIRS.

50 AIR PUMP TO BE LOCATED ON BARREL OF BOILER AHEAD OF FIRE BOX AND TO BE SET LOW SO AS NOT TO OBSTRUCT FORWARD VIEW FROM CAB.

51 DETROIT AIR CYLINDER LUBRICATOR FOR AIR PUMP.

52 SAFETY VALVES WITH RELIEF LEVERS TO BE SHIPPED DIRECT FROM MANUFACTURER TO CAMBRIA STEEL CO. AND THE VALVES APPLIED ON THE LOCO. WHEN SHIPPED, TO BE RETURNED TO B. L. W.

55 FOR HEREAFTER: ASH PAN TO HAVE TWO PIECES OF NETTING ON SIDES (BACK) 7" x 24". UPPER EDGE OF PAN TO BE DROPPED ABOUT 2" ALONG SIDES TO PERMIT CLEANING.
FRONT DROP PLATE TO BE HUNG AT FRONT TO SWING FRONT.
CLEANING PIPE TO BE SIMILAR TO CLEANING PIPE CARD #1652.
DAMPER CYLINDER COUNTERWEIGHT AND ARM TO BE PLACED BACK OF CYLINDER, INSTEAD OF IN FRONT.
BLOWER CONNECTION TO DAMPER CYLINDER TO BE PLUGGED AND BLOWER PIPE DISCONNECTED. DAMPER CYLINDER TO CONNECT TO MAIN CYLINDER ONLY. PRESENT DAMPER CYLINDER IS OF THE DOUBLE ACTING TYPE (BASED ON REPORT OF MR. CHARLES HERMAN, INSPECTOR).

TENDER

61 TANK COLLAR SET IN LINE WITH COAL SPACE SO AS NOT TO OBSTRUCT BACKWARD VIEW FROM CAB.

62 B.L.W. RADIAL BUFFER OF CAST STEEL WITH DOUBLE SPRINGS, BETWEEN ENGINE AND TENDER, PLACED ON TENDER, SAME AS FOR 6 36 D 282 AND 283. (SEE SUP. 35.)

63 LADDER TO BE PROVIDED ON REAR END OF TENDER.

64 STEPS ACROSS REAR OF TENDER WITH SUITABLE HAND RAILS. STEPS HAND HOLDS, ETC. TO CONFORM TO I. C. C. REQUIREMENTS.

65 ROLLED STEEL TENDER WHEELS FROM CAMBRIA STEEL CO.

THE BALDWIN LOCOMOTIVE WORKS DUP. 10 30 D 673, WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20075

SPECIFICATION FOR LOCOMOTIVES 10 30 D 682

FOR CISCO & NORTHEASTERN RY. CO. ~~SUGARLAND RAILWAY COMPANY~~

HW

Gen. as PHOTO. 3252

Engine Drawing No. 98

5-26-20

Gauge of Road 4' 8½" Play ⅜"

Wheelbase, Rigid 11' 4" Driving 11' 4" Total 22'2"

Total wheelbase, eng. and tend. {Actual 49' 0½" / Limited to ---

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 126,000 POUNDS

On F. tr'k 28,000 lbs. Drivers 98,000 lbs., B. tr'k --- lbs.

Tractive power 23,200 lbs., Ratio of adhesion 4.2

Work'g St'm Pres. 185 lbs., Service FREIGHT

3 **Fuel** OIL, WITH SPECIFIC GRAVITY OF 12

Boiler STEEL Thick ⅜" & 11/16" Bill 9065

Front Tube Sheet ½" Thick

Boiler, Diam. 58" Plan EXTENDED WAGON TOP

{Allowable st'm pres. 200 lbs. / With Factor of Safety of 5. **Tested to** { 220 lbs. steam pres. / 267 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

AUXILIARY DOME FOR INTERIOR INSPECTION

Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL Combustion chamb. NONE

Firebox, length 95 15/16" Width 41⅜" Depth F. 62⅞" B. 61½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" DIA. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame SINGLE Riveted

2. Water space stays ⅝" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O. S.

Radial stays 1" DIAM. Sling stays front {TWO ROWS B.L.W. EXPANSION STAYS.

Button heads below crown on EIGHT central rows

Crown bars NONE Placed --- above crown

Crown bolts ---

Flues #9 W. G. STEEL

Tubes #11 W. G. SEAMLESS STEEL

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number {21 / 130 Diam. {5⅜" / 2" Length 13'1"

Heating Surface	Flues	38.4	Combus. Chamb.	--- Total	2101.2
	Tubes	1565	Fire Box	152.8 Fire Brick Tubes	---
Grate area		28.0	Ratio to Heating Surface 1:		50.8
Superheater		306.0			

Fire Brick ARCH NONE

FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

3 **Grates** NONE

Ash Pan, Dampers FRONT ONLY

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater SCHMIDT TYPE (SEE SUP. 5)

Smokebox extenstion WITH 6 Cleaning hole and cap NONE

Spark ejector or hopper NONE

~~Netting and~~ deflect. plates WITH

Exhaust nozzles, SINGLE LOW

CLEANING PIPE - WITH

Stack STRAIGHT Dia. 18"

(NOT Spec) **Safety Valves** TWO STAR 3" ONE MUFFLED

Safety valves NONE with relief lever, Set to {185 LBS. MUFFLED / 188 LBS. OPEN

Whistle ONE B. L. W. CHIME

7 **Steam Gauge** ONE IRON 6" MAKER: STAR

Steam gauge stand IRON **Clock** NONE

~~WATER GAUGE TO BE A. S. M. E. STANDARD AS PRINT B 503 A.~~

Water Gauge ONE ~~B.L.W. IRONCLAD~~ **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock ½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE EVERLASTING POS: FRONT

Cleaning Plugs

Firebox, CORNERS BACK ONE DIAGONAL AND BACK

Crown, TWO EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT ONE

Front tube sheet, TWO Fusible plug ~~NONE~~

Pump NONE

(NOT Spec) **Injectors** TWO SELLERS, CLASS "M" {ONE No. 9 / ONE No. 8½

Injectors, Pos. (SEE SUP. 8) Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check SELLERS DUPLEX TYPE Pos. TOP (SEE SUP. 9)

Steam Heat NONE (SEE SUP. 15)

Cab STEEL CAB TO HAVE VENTILATOR IN ROOF.

CAB SADDLE TO BE SECURELY BRACED TO BOILER.

Cab boards WOOD Nosing NONE

Running boards WOOD Nosing NONE

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 26⅝"

Pilot OF WOOD Pushing shoes NONE

1 **Front Bumper** OAK Bumper plate WITH

Steps HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 3+½"

1 **Coupler** SHARON M. C. B. AUTO.

UNCOUPLING ARRANGEMENT, ATLANTIC COAST LINE STANDARD.

10 Signal fixtures IRON ON BUMPER.

11 **Headlight** ONE ROUND CASE 18" Reflector, ~~To burn~~ ---

Headlight, Nos. on sides WITH H'd'l't step WITH

Lamp shelf NONE Nosing ---

Bell 92 POUNDS

(NOT Spec) **Sand Box** ONE Diam. 28" Body IRON PAINTED Pipes IRON

Sander LEACH, AIR DOUBLE TRAP A-10

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9

Boiler Lagging MANGESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

W. BOLTON Oct. 1920

SPECIFICATION FOR LOCOMOTIVES 10 30 D 682

FOR CISCO & NORTHEASTERN RY. CO. ~~SUGARLAND RAILWAY COMPANY~~

HW

71

70

Frames CAST STEEL

Cylinders, Diam. 18" Stroke 26"

St'm ports, Length 20.84" Width 1⅜" Bridges ---

Exh. ports, Length --- Width --- Valve lead 1"

Valve travel 5½" Steam lap 1⅜" Exhaust clearance ---

Eccentric crank throw 14 11/16" By-pass valve NONE

(NOT Spec) S. F. Lubr. DETROIT EVE FEED NO. 42 BULL'S EYE

Cyl'r heads CAST IRON. LUBR. PIPES OF IRON, UNDER JACKET.

Cyl'r casings IRON PTD. Head covers STEEL PAINTED

St'm chest casings IRON PTD. Covers STEEL PAINTED

St'm chest valves 9½" DIAM., PISTON TYPE.

(NOT Spec) Met. pkg. PISTON RODS VALVE STEMS UNITED STATES, KING TYPE.

PISTON RODS BOLTED TO CROSSHEADS WITH NUT AND COTTER.

Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN

Guides STEEL Oil cups B.L.W. NEEDLE

Crossheads ALLIGATOR TPE, CAST STEEL (SEE SUP. 12)

Wrist Pins STEEL Rod cups GREASE, FORGED ON

PARALLEL RODS TO HAVE SOLID ENDS.

MAIN RODS I SECTION SIDE RODS RECTANGULAR SECTION.

Valve Motion WALSCHAERTS.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboltS) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings DAMASCUS BRONZE

Driving wheel hub liners BRONZE

Drivers, O. S. Diam. 57" Cen. diam. 49½" CENTRES CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. ALL Size 3" x 5½"

Tires, Plain, Pos. NONE Size ---

Lateral play between driving boxes and wheel hubs 3/16" TOTAL

Driving Boxes CAST STEEL

Journals, Diam. 8½" Length 8½"

Springs. Make STANDARD STEEL WORKS

Front Engine Truck FOUR WHEELED SWING BOLSTER, CENTRE BEARING

To swing 3" each side of cen., Cen. pin liners NONE

Journals, Diam. 5" Length 10" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 28" Tread 4½" Kind CHILLED CAST IRON SPOKE

Tires NON Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck NONE Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Engine, sch. No. 6 ET WESTG. COMBINED AUTO. AND

Parts Eng. Tr'k, sch. --- STRAIGHT AIR.

14 Foundation Drivers, sch. WM-1 AMERICAN O. S. EQUALIZED

Parts Eng. Tr'k, sch. ---

13 Air pump TWO 9½" Pos. L. S.

Train connections FRONT AND BACK

Train signal, sch. "L"

Tender EIGHT Wheeled, Drawing No. 1545

Weight, with fuel and water, about 109,500 LBS.

TENDER TO BE WEIGHED: YES.

2 **Tank** OIL 2400 Gallons, Bill 5368

WATER 5000 5297

TANK "U" SHAPE, STRAIGHT TOP, NOT OVER 5'0" HIGH.

Tool Boxes HARD WOOD, TOP.

Frame STEEL 12" CHANNELS WITH FRONT BUMPER OF WOOD, REINFORCED WITH CHANNEL AND REAR BUMPER OF STEEL PLATE.

Front Drawbar height 30½"

Pilot NONE Pushing shoes NONE

Back drawhead, center above rail 34½"

1 **Coupler** SHARON M. C. B. AUTO.

UNCOUPLING ARRANGEMENT, ATLANTIC COAST LINE STANDARD.

Steps AND HAND HOLDS, ETC. TO CONFORM TO I. C. C. REQUIREMENTS.

LADDER APPLIED TO BACK OF TANK.

Trucks ARCH BAR TYPE, WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, STANDARD STEEL WORKS.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind CHILLED CAST IRON PLATE.

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake Position ON ALL WHEELS

Brake sch. No. 6 ET WESTG. AUTO. AND STRAIGHT AIR, WITH 12" x 12" TENDER CYLINDER.

List of tools, sch. 31

Photo sch. NONE Inspection B.L.W.

To be weighed NO. Material spec'ns B.L.W.

Certificate of boiler test THREE COPIES OF B.L.W. FORM 1036

Junior laws to 4-1-20 Shipment ON OWN WHEELS

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents FEED WATER STRAINER, PAT'D SEPT. 1. 1903 (CAST ON)

Property plates ~~NONE~~ B. L. W., FOR ENGINE AND TENDER.

Painting, style 291, OLIVE GREEN AND ALUMINUM

~~MARK ON TANK SIDES TO BE IN 8" OR 10" LETTERS, WHICH EVER IS THE BETTER FOR SIZE OF TANK, SAME AS FOR 10 30 D 673.~~

Mark on TANK SIDES: ~~SUGARLAND RAIL WAY~~ CISCO & NORTHEASTERN RY CO.

~~MARK ON BACK OF TANK, JUST ABOVE CENTER: S. L. RY.~~

~~THE NUMBER OR CAB TO BE AS LARGE AS CAN BE USED TO LOOK WELL.~~

	Road Nos. Pos.	Road Nos.	Name NONE
F. No. PLATE	~~10~~		
SAND BOX	31		
CAB SIDES			
BACK OF TANK			

Actual Dimensions of Loco. Extreme height over all 14'3½"

Extreme Width: Cab boards 9'11" Cylinders ~~or valve motion~~ 9'5½"

Length outside face front bumper of engine to face of tender wedge 31'5½"

Length face of tender wedge to outside face back bumper of tender 22'1"

Total length outside face front bumper of engine to outside face back bumper of tender 53'10½"

SPECIFICATION FOR LOCOMOTIVES 10 30 D 682

CISCO & NORTHEASTERN RAILWAY CO.
FOR ~~SUGARLAND RAILWAY COMPANY~~

Specification for Type A Double Loop Superheater No. O-14218 DATED JUNE 25TH, 1920.

BOILER TUBES	130 in number 2 o. d. 13 ft 1 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	21 in number 2 5/8 o. d #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 ..... Card 10115-Q
BOILER FLUE SETTING	in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections ..... Card 1136
TUBE SHEET LAYOUT	..... Card 31-5637
UNITS	21 units 1½ o. d. #9 B.W.G. Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide ..... Card 10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on ..... Card 1043
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A ..... Card 10695
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. ..... Card 10893-C
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place ..... Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with ..... Card SEE ARRGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 1140-H
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer ..... Card 1061
S. H. ARRANGEMENT	To be in accordance with ..... Card 4030-B
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 11037-L	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 1115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 1114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. PIPE BAND	Card 1933
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1068	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O.S.)	Card 1148	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 1275-G	DEFLECTING PLATE HANDLE	Card 1492
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10309
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809
(PYROMETER NONE)			

SPECIFICATION FOR LOCOMOTIVES 10 30 D 682
FOR CISCO & NORTHEASTERN RY. CO. ~~SUGARLAND RAILWAY COMPANY~~
HW

.73
72

1 LOCO. TO CONFORM TO ALL I. C. C. REQUIREMENTS.

2 FLEXIBLE STAYS BOUT 250 TATE, IN BREAKING ZONE.

3 OIL BURNING ARRANGEMENT B. L. W. WITH BURNER IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

4 FIRING VALVE TO BE BETTER FITTED THAN FOR 10 28 D 142 &143.

5 SUPERHEATER AS LOCO. SUPERHEATER CO'S SPECIFICATION NO. O-14218, DATED 6-25-20 (COPY ATTACHED)
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

6 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

7 STEAM GAUGE TO BE LOCATED ABOUT CENTER OF TOP OF BOILER IN PLAIN VIEW OF BOTH ENGINEER AND FIREMAN.
FIRING VALVE TO BE PLACED A LITTLE CLOSER TO LEFT SIDE.
POSITION OF WATER GLASS AND FIRING VALVE AS PLACED ON 10 30 D 673, TO BE REVERSED ON 10 30 D 682.

8 INJECTORS NO. 9½ ON R. S. AND NO. 8½ ON L. S.

9 INJECTOR CHECK TO BE LOCATED FRONT OF SAND BOX.

10 CLASSIFICATION SIGNAL HOLDERS ON EACH SIDE FRONT END OF BOILER HEAD.

11 HEADLIGHT EQUIPMENT TO BE PYLE-NATIONAL ELECTRIC TYPE K-2 WITH TURBINE GENERATOR AND INCANDESCENT EQUIPMENT.
HEADLIGHT GENERATOR TO BE LOCATED NEXT TO CAB, IF POSSIBLE, TO DO SO WITHOUT INTERFERING WITH AUXILIARY DOME AS SHOWN ON PHOTO. 5872, 10 32 D 11 59.

12 CROSSHEAD WITH REMOVABLE SHOES, BABBITT LINED.
CROSSHEAD GIBS TO HAVE FOUR BOLTS SAME AS FOR CO'S LOCO. NO. 103, B. L.W. CLASS 10 30 D 557.

13 AIR PUMP EHAUST TO BE PIPED INTO CYLINDER SADDLE.
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

14 DRIVER BRAKE SHOES TO BE AMERICAN BRAKE SHOE & FDY. CO'S STEEL LINED FLANGED BRAKE SHOE.

15 ENGINE AND TENDER TO BE ARRANGED SO STEAM HEAT EQUIPMENT COVERED ON EXTRA ORDER NO. 25803 DATED - 1920, MAY BE APPLIED BY THE CUSTOMER AFTER DELIVERY OF LOCO. (SHIPMENT OF LOCOMOTIVE IS NOT TO BE DELAYED ON THIS ACCOUNT).

—TENDER—

26 TANK TO HAVE 2" WATER CONNECTION IN CENTER AT REAR ABOUT 4" FROM BOTTOM SO THAT WATER CAR CONNECTION CAN BE MADE.

27 MARKER HOLDERS EACH SIDE BACK OF TANK.

THE BALDWIN LOCOMOTIVE WORKS — AS SPECN. C-6746

Memorandum Spec'n 20143

SPECIFICATION FOR LOCOMOTIVES 6 30 D 476

FOR COLONIAL STEEL COMPANY.

FXD

Gen. as PHOTO. 6549

Engine Drawing No. 63

10.1.20.

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"
Total wheelbase, eng. and tend. Actual --- Limited to ---

Curves 15 DEGREES. GRADES - 3½%

Limits, Height --- Width ---
Weight (approximate) in working order, Total 121000 POUNDS.
On F. tr'k --- lbs., Drivers 121000 lbs., B. tr'k --- lbs.

Tractive power 25500 lbs., Ratio of adhesion 4.6
Work'g St'm Pres. 170 lbs., Service SWITCHING
Fuel SOFT COAL

Boiler STEEL Thick 9/16" Bill 9398
Front Tube Sheet ½" Thick
Boiler, Diam. 54" Plan STRAIGHT TOP
Allowable st'm pres. 170 lbs. **Tested to** 190 lbs. steam pres.
With Factor of Safety of 5.34 255 lbs. water pres
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.
MAIN DOME, ONE-PIECE TYPE. AUXILIARY DOME. NONE
Dome, diam. 25" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE
Firebox, length 69⅜" Width 42" Depth F. 54¼" B. 52¾"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.
Water space, Front 4" Sides 3" Back 3"
Water space frame DOUBLE Riveted
Water space stays ⅞" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O.S.
Radial stays 1" DIAM. Sling stays front } TWO ROWS B.L.W. EXPANSION STAYS.
Button heads below crown on EIGHT central rows
Crown bars NONE Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 B.W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 193 Diam. 2" Length 12' 4"

Heating Surface Flues --- Combus. Chamb. --- Total 1331
Tubes 1238 Fire Box 93 Fire Brick Tubes ---
Grate area 20.2 Ratio to Heating Surface 1: 66
Superheater. ---

Fire Brick ARCH: ON STUDS.

Grates ROCKING BARS AND DROP PLATE.
Ash Pan, Dampers FRONT AND BACK.

Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L.S. ONLY
Spark arrester or hopper WITH
Netting and deflect. plates WITH
Exhaust nozzles DOUBLE, HIGH

Stack, CAST IRON, STRAIGHT Dia. 18"

Safety Valves TWO COALE 2½" OPEN (NOT SPEC)
Safety valves BOTH with relief lever, Set to 170 POUNDS
Whistle ONE B.L.W. PLAIN

Steam Gauge ONE 7" IRON. MAKER: ASHCROFT
Steam gauge stand - IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** TO BURN OIL
Gauge Cocks THREE BACK Surface valve NONE
Lowest gauge cock ¾" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B.L.W.

Blow off Cock ONE B.L.W. POS: FRONT
Cleaning Plugs
Firebox, CORNERS FRONT ONES DIAGONAL, SIDES AND BACK.
Crown, TWO EACH SIDE AND TWO BACK.
Waist, ONE UNDER FRONT.
Front tube sheet, ONE Fusible plug ONE

Pump NONE

Injectors TWO MONITOR (NOT SPEC) No. 7
Injectors, Pos. R. & L. Steam pipes COPPER
Pipes, Check IRON Feed IRON Overflow IRON
Check B.L.W. WITH STOP VALVE Pos. R. & L.

Steam Heat NONE

Cab WOOD

Cab boards WOOD Nosing NONE
Running boards WOOD Nosing NONE
Hand rail IRON Located on TANK

Back Bumper OAK

Pilot NONE Pushing shoes ---
Front Bumper OAK Bumper plate NONE
Steps ACROSS FRONT AND BACK OF ENGINE WITH HAND HOLDS.
STEPS, AND HAND HOLDS ETC., TO CONFORM TO I.C.C. REQUIREMENTS.
F. & B. Drawhead, Center above rail 33½"
Coupler M. C. B. AUTOMATIC.

Signal fixtures NONE

Headlight TWO ROUND CASE 16" Reflector, To burn KEROSENE
Headlight, Nos. on sides WITH H'd'l't step WITH
Lamp shelf NONE Nosing WITH

Bell 92 POUNDS
Sand Box TWO Diam. 28" Body IRON PAINTED Pipes IRON
Sander (NOT SPEC) LEACH AIR TRAP A-1 IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED WITH PRESSED STEEL TOP AND BOTTOM RINGS.

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9
Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

E. O. ELLIOTT Feb-1921

SPECIFICATION FOR LOCOMOTIVES 6 30 D 476

FOR FXD COLONIAL STEEL COMPANY

74 75

Frames CAST STEEL

Cylinders, Diam. 15" Stroke 24"
St'm ports, Length 16" Width 1½" Bridges 1"
Exh. ports, Length 15" Width 3½" Valve feet 1/16"
Valve travel 5¼" Steam lap ¾" Exhaust clearance ---
Eccentric throw 5¼" By-pass valves NONE
S.P. Lubr. (NOT SPEC) DETROIT No. 22 TRIPLE BULL'S EYE
Cyl. heads CAST IRON Lubr. PIPES, IRON UNDER JACKET
Cyl. casings IRON PTD. Jacket covers STEEL PAINTED
Stm. chest castings IRON PTD. Covers STEEL PAINTED
Stm. chest valves RICHARDSON BALANCED WITH VACUUM VALVES.
Met. pkg. (NOT SPEC) UNITED STATES RING TYPE.
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN
Guides LAIRD TYPE, STEEL Oil cups NEEDLE
Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.
Wrist Pins STEEL Rod cups PLUNGER, FORGED ON.
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be
well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners NONE
Drivers, O. S. Diam. 44" Cen. diam. 38" CENTERS CAST IRON

Tires STEEL How fit SHRINKAGE AND SHOULDER
Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"
Tires, Plain, Pos. MIDDLE Size 3" x 6½"
Lateral play between driving boxes and wheel hubs 3/16" TOTAL
Driving Boxes STEELED CAST IRON
Journals, Diam. 8" Length 8½"

Springs. Make B. L. W.

Front Engine Truck NONE Wheels
To swing --- each side of cen. Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck NONE Wheels
To swing --- each side of cen. Cen. pin liners
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVERS. (NO TENDER)
Operating Engine, sch. No 6 E.T. Westg. COMBINED AUTO AND STRAIGHT AIR
Parts Eng. Tr'k, sch. ---
Foundation Drivers, sch. WM-2 AMERICAN O.S. EQUALIZED.
Parts Eng. Tr'k, sch. ---
Air pump 9½" Pos. L.S.
Train connections FRONT AND BACK
Train signal, sch. ---
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS

(1) **Tender** NONE

(2) **Tank** 1800 Gallons Bill 5547
SADDLE TANK OVER TOP OF BOILER.
(3) COAL BOX ON REAR EXTENSION OF ENGINE FRAME, BACK OF CAB
CAPACITY 14 TONS.
(4) LOCOMOTIVE FOR OPERATION IN PENNSYLVANIA.
LOCOMOTIVE WILL OPERATE AT CO'S PLANT AT MONACA, BEAVER COUNTY, PA.
CO'S OFFICE ADDRESS 334 FOURTH AVE., PITTSBURGH PA.
(5) BOILER TO CONFORM TO PENNSYLVANIA STATE LAWS, I.E., TO A. S. M. E. CODE. (1918) (SUP 1-4)
(6) BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

List of tools, sch. 29
Photo sch. No. 2 Inspection B.L.W. (EXCEPT SEE SUP. 1-4)
To be weighed No. Material specns B.L.W. (EXCEPT SEE SUP. 4)
Certificate of boiler test THREE COPIES OF B.L.W. FORM 1036
Junior laws to 11-1-20 Shipment ON OWN WHEELS

Brass shop finish, No. 1
Machine shop finish D-165

B. L. W. NONE
Patents

Property plates NONE

Painting, style 222 OLIVE GREEN AND ALUMINUM

Mark on TANK SIDES: COLONIAL STEEL COMPANY

Road Nos. Pos. Rly. Nos. Name NONE
F. No. PLATE 10
CAB SIDES
BACK OF FUEL BOX

Actual Dimensions of Loco. Extreme height over all 13' 8"
Extreme Width Over cab boards 10' 0" Over Front Bumper 9' 0"
Over cylinders 8' 10"
Length outside face of front bumper to outside face of back bumper of engine 28' 6½"

SPECIFICATION FOR LOCOMOTIVES 6 30 D 476

FOR COLONIAL STEEL COMPANY

RTL

76

75

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF PENNSYLVANIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL	A.S.M.E. SPEC. PAGE 11
MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 15
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 31
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 37
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 34
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 40
BOILER TUBES	

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MASERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:-

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜". (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6850. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS, AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S

PENNSYLVANIA
(State in which boiler is to be used)
37
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (LEAVE BLANK)
(State's number) (Year put in service)
(manufacturer's serial number)
170 POUNDS
(Maximum working pressure when built)

THE BALDWIN LOCOMOTIVE WORKS DUP. 10 36 E 1348, WITH SAME EXTRAS, EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20113

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3534

FOR COLUMBIA, NEWBERRY & LAURENS R. R. Co.

H'W.

Gen. as PHOTO. 5724

Engine Drawing No. 99

5-27-20 (SPEC)

Gauge of Road 4'8½" Play ⅜" EXCEPT 7/16" FOR F. & B. DRIVERS

Wheelbase, Rigid 15'3" Driving 15'3" Total 23'4"

Total wheelbase, eng. and tend. {Actual 53'4" / Limited to ---

RAILS, 56 POUNDS, 16 TIES TO RAIL

Curves 8 DEGREES

Safety Valves THREE STAR 2½" ONE MUFFLED, TWO OPEN

Safety valves NONE with cut-off lever, Set to {200 LBS. MUFFLED / 203 LBS. OPEN

Whistle ONE (SEE SUP. 15)

Steam Gauge ONE IRON 7" MAKER: STAR (SPEC)

Steam gauge stand IRON **Clock** NONE

1 **Limits,** Height --- Width SAME AS FOR 10 36 E 1348

Weight (approximate) in working order, Total ~~150,000~~ 161,000 POUNDS

On F. truck ~~25,000~~ 22,000 lbs. Drivers ~~110,000~~ 139,000 lbs. B. truck --- lbs.

WEIGHT LIMITED (SEE SUP. 2)

Tractive power 34800 lbs. Ratio of adhesion 4.

Work'g St'm Pres. 200 lbs. Service FREIGHT

Fuel SOFT COAL

Water Gauge ONE KLINGER TYPE A **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock ½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W. (SEE SUP. 38)

Blow off Cock ONE EVERLASTING 2" POS:- FRONT

Cleaning Plugs

Firebox, CORNERS DIAGONAL, SIDES AND BACK

Crown, TWO EACH SIDE AND FOUR BACK

Waist, ONE UNDER FRONT

Front tube sheet TWO Fusible plug NONE

2 **Boiler** STEEL Thick 11/16" B 9132

Front Tube Sheet ½" Thick

Boiler, Diam 66" Plan STRAIGHT TOP.

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 5.24 267 lbs. water pres.

Longitud. seams (SEE SUP. 5)

Pump NONE

6 **Dome,** diam. 33" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 84-3/16" Width 60⅛" Depth F. 62½" B 49½"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

7 Firedoor opening ONE OVAL 13X 19"

Water space, Front 4" Sides 4" Back 4"

Water space frame SINGLE Riveted

8 Water space stays ⅜" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays from {TWO ROWS B.L.W. EXPANSION STAYS

Button heads below crown on EIGHT central rows

Crown bars NONE Placed --- above crown

Crown bolts ---

Injectors TWO SELLERS TYPE "M" (SPEC) No. 9½

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON (SUP. 16)

Check (SEE SUP. 17) Pos. TOP OF BOILER

Steam Heat CONSOLIDATED SYSTEM, WITH LESLIE REGULATOR

9 Flues #9 W.G. SEAMLESS STEEL

Tubes #11 W.G. SEAMLESS STEEL

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS

Number 24 / 152 Diam 5½" / 2" Length 14'6"

Heating Surface Flues 487.6 Combus. Chamb. --- Total 1763.6

Tubes 1147.0 Fire Box 119.0 Fire Brick Tubes 10.0

Grate area 35.1 Equiv. Heating Surface 50.3

Superheater 39.6

Fire Brick ARCH ON TWO TUBES 3" O. S. DIAM.

Cab STEEL VENTILATOR IN CAB ROOF.

Cab boards IRON Nosing T-IRON

Running boards ROUGHENED IRON Nosing T-IRON

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawhead height 33½"

Pilot WOOD Pilot wheels NONE

Front Bumper OAK Bumper plate WITH

Steps AND HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler SHARON, M.C.B. AUTO.

Signal fixtures IRON ON BUMPER

10 **Grates** ROCKING TABLE TYPE, RY. Co's PATTERN

11 **Ash Pan,** Dampers AT BACK

THROTTLE TO HAVE AUXILIARY DRIFTING VALVE

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater SCHMIDT TYPE (SEE SUP. 12 ETC)

Headlight ONE ROUND CASE 18" Reflector

Headlight, Nos. on sides WITH Hood WITH

Lamp shelf NONE Visors ---

Bell 92 POUNDS GOLLMAR AIR BELL RINGER

Sand Box ONE Diam. 28" Body IRON PAINTED Pipes IRON

Sanders (SEE SUP. 32)

Dome casing IRON PAINTED

Smokebox extension WITH 13 Cleaning hole and cap L. S. ONLY

Spark ~~ejector~~ hopper WITH

14 Netting and deflect. plates WITH

Exhaust nozzles SINGLE HIGH

Stack CAST IRON, STRAIGHT Dia. 16"

Boiler Jacket 22 SOFT STEEL PTD. Bands IRON style 9

Boiler Lagging JOHNS-MANVILLE FIRE FELT.

THE BALDWIN LOCOMOTIVE WORKS

W. E. Moore Oct. 1920

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3534

FOR COLUMBIA, NEWBERRY & LAURENS R. R. Co.

H'W.

78

77

Frames CAST STEEL (SEE SUP. 33 ETC)

36 **Cylinders,** Diam. 21" Stroke 28"

St'm ports, Length 25" Width 1½" Bridges ---

Exh. ports, Length --- Width --- Valve bore 8"

Valve travel 5½" Steam lap 1" Exhaust clearance ---

Eccentric crank throw 15" By-pass valve (SEE SUP. 37 & 46)

S. F. Lubr. DETROIT FIVE FEED No. 42 BULLS EYE.

Cyl'r heads CAST STEEL Lubr. PIPES OF IRON UNDER JACKET

Cyl'r casings IRON PTD. Head coverings STEEL PAINTED

St'm chest casings --- Liners ---

AD St'm chest valves 10" DIAM. PISTON TYPE (NOT SPEC)

Main pkg. U. S. KING TYPE

Pistons RINGS SPRUNG INTO SOLID HEAD (SEE SUP. 41)

Guides STEEL RY. Co's PATTERN Type HANCOCK NEEDLE

Crossheads CAST STEEL (SEE SUP. 42 ETC)

Wrist Pins STEEL AA Plugs PLUNGER, FORGED ON

Valve Motion WALSCHAERTS

Links, sliding blocks, pins, lifting links and eccentric rod pins to be

well case hardened or to have hardened bushings

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings DAMASCUS BRONZE

Driving wheel hub liners NONE (SEE SUP. 45)

Drivers, C. S. Diam. 56" Cen. diam. 50" CENTRES CAST STEEL

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. ALL Size 3" x 5½"

Tires, Plain, Pos. NONE Size ---

Lateral play between driving boxes and wheel hubs 3/16" TOTAL

Driving Boxes CAST STEEL

Journals, Diam. {MAIN 8½" Length 12" / OTHERS 8" 10"

Springs. Make B. L. W.

Front Engine Truck TWO Wheels SWING BOLSTER

To swing 32" each side of cen. Cent. pin liners NONE

Journals, Diam. 5½" Length 10" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 30" Tread --- Kind CAST IRON SPOKE CENTRES

Tires STEEL Cen. diam. 25" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER

Back Engine Truck NONE Wheels ---

To swing ---each side of cen. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

51 **Brake,** position ON ALL DRIVING AND TENDER WHEELS

Operating Parts: Engine, sch. NO. 6 ET WESTG. COMBINED AUTO. AND STRAIGHT AIR. / Eng. Trk. sch. ---

53 Foundation Parts: Drivers, sch. WN-2 AMERICAN O. S. EQUALIZED / Eng. Trk. sch. ---

38 51 Air pump TWO 9½" Pos. BOTH LEFT SIDE

Train connections FRONT AND BACK

Train signal, sch. "L"

Tender EIGHT Wheeled Drawing No. 1600

Weight, with fuel and water, about 120,000 POUNDS

TENDER TO BE WEIGHED: YES

Tank 6,000 Gallons B 5473

TANK WATER BOTTOM TYPE. FUEL CAPACITY 10 TONS.

WATER HOLE IN TANK TO BE OBLONG, 30" LONG.

Tool Space OF HARD WOOD, TOP.

Frame STEEL 12" CHANNELS WITH BUMPERS OF WOOD REINFORCED BY CHANNEL. CAST STEEL BUFFER AS RY. Co's PT. BET. ENGINE AND TENDER

Front Drawhead height 31"

Pilot NONE Push-pole brace NONE

Back drawhead, height above rail 33½"

Coupler SHARON M.C.B. AUTO. WITH JANEY FRICTION DRAFT GEAR.

STEPS, FRAMES TO BE OF WROUGHT IRON, WITH WOODEN TREADS.

STEPS HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTERS.

EDWARDS TENDER SIDE BEARINGS AS RY. Co's SKETCH

Springs ELLIPTIC, B. L. W. MAKE

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind CHILLED CAST IRON PLATE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake Position ON ALL WHEELS

Brake sch. NO. 6 ET WESTG. AUTO. AND STRAIGHT AIR, WITH 12"x12" TENDER CYLINDER.

List of tools, sch. 29

Photographs NONE Inspection B. L. W.

To be weighed NO Material specs B. L. W.

Certificates required THREE COPIES OF B. L. W. FORM 1036

Junior laws 8-15-20 Shipment ON OWN WHEELS

Brass shop finish No. 1

Machine shop finish D-165

B. L. W. nos. NONE

Patents

Property plates NONE

Painting, style 291, OLIVE GREEN AND COLOR

LETTERING ETC. TO BE APPLIED IN GOLD PAINT SAME AS 10 36 E 1288 AND 1348.

Mark on CAB PANELS: C. N. & L.

54 Road Nos. Pos. Road Nos. Name NONE

F. No. PLATE 23

SAND BOX

SIDES OF TANK

BACK OF TANK

Actual Dimensions of Loco. Extreme height over all 15'2"

Extreme Width: Cab boards 10'0" Cylinders or valve motion 10'0"

Length outside face front bumper of engine to face of tender wedge 33'3½"

Length face of tender wedge to outside face back bumper of tender 25'7½"

Total length outside face front bumper of engine to outside face back bumper of tender 58'11"

1 DISTANCE FROM CENTER OF RAIL TO NEAREST PLATFORM IS 5' 6".

2 WEIGHT ON DRIVING WHEELS LIMITED TO 140,000 POUNDS.

3 BACK HEAD OF BOILER TO BE SLOPED 15 DEGREES.

4 LOCOMOTIVE TO CONFORM TO ALL I.C.C. REQUIREMENTS.

5 LONGITUDINAL SEAMS BUTT JOINTED, DOUBLE COVERING STRIPS SEXTUPLE RIVETED, 90% SEAM.

6 DOME TO BE ONE PIECE TYPE.
DOME OPENING IN TOP OF BOILER TO BE SUFFICIENTLY LARGE FOR MAN TO ENTER WITHOUT TAKING DOWN STAND PIPE.

7 FIRE DOOR TO BE FRANKLIN BUTTERFLY TYPE.

8 STAYBOLTS OF ULSTER STAYBOLT IRON.
FLEXIBLE STAYBOLTS, AMERICAN 300 IN NUMBER TO BE LOCATED IN BREAKING ZONE.

9 SUPERHEATER TUBES TO BE ELECTRICALLY WELDED TO BACK TUBE SHEET.

10 GRATES TO ROCK IN FOUR SECTIONS, NO DROP PLATE.

11 ASH PAN TO HAVE 2½" OPENING BETWEEN THE MUD RING AND PAN.
ASH PAN TO HAVE SINGLE HOPPER WITH ROUNDED BOTTOM SIMILAR TO B.L.W. CARD 4491, WITH BLOWER TO CLEAN ASH PAN.
ASH PAN BLOWER TO BE FURNISHED AND TO BE ARRANGED TO BLOW FROM THE FRONT END OF THE ASH PAN SO THAT IT WILL CLEAN THE ENTIRE SURFACE.

12 SUPERHEATER AS LOCO. SUPERHEATER CO'S SPECN. NO. O-14842 DATED AUGUST 16, 1920, (COPY ATTACHED)
SUPERHEATER TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO STEAM CHESTS.
ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. W.

13 ADDITIONAL HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

14 FRONT END TO HAVE MASTER MECHANICS ASSOCIATION IMPROVED ARRANGEMENT.

15 WHISTLE TO BE CHIME WITH COARSE LOUD TONE.

16 INJECTOR OVERFLOW TO BE PIPED TO INSIDE OF PAN.

17 INJECTOR CHECK TO BE SELLERS COMBINED MAIN TOP CHECK WITH STOP VALVES.

18 CAB TO HAVE LARGE SIDE WINDOWS.
CAB TO HAVE THE UPPER WINDOW GUIDES SECURED TO THE TOP SILL OF THE CAB.

19 CAB DECK UNDER THE FIRE DOOR TO BE COVERED WITH STEEL PLATE ¼" THICK.

20 RUNNING BOARD TO HAVE HOLES UNDER AIR PUMPS SUFFICIENTLY LARGE TO REMOVE HEADS.

21 FOOT PLATE OF CAST STEEL.

21½ CHAFING CASTING ON REAR OF ENGINE (BETWEEN ENGINE AND TENDER) TO BE OF CAST STEEL OR CHILLED CAST IRON IN ONE PIECE WITH 8" FACE, NO ADJUSTING WEDGE TO BE USED.

27 PILOT TO BE IN ACCORDANCE WITH A.C.L. STANDARD DESIGN.

28 CLASSIFICATION LAMPS TO BE DRESSEL COMBINATION OIL AND ELECTRIC LAMPS WITH BRACKETS FRONT OF ENGINE.

29 ONE INCANDESCENT LAMP IN TOP PANEL OF CAB.

30 HEADLIGHT EQUIPMENT TO BE PYLE-NATIONAL ELECTRIC TYPE K-2 WITH INCANDESCENT HEADLIGHT.
HEADLIGHT TO HAVE DIMMERS.

31 PYLE BACK-UP WHITE LIGHT IN CENTER OF REAR OF TANK, CONNECTED WITH GENERATOR.

32 SANDER TO BE ATLANTIC COAST LINE HOME-MADE SANDERS AS A.C.L. PRINT C-241-C HEREWITH, TO SAND FRONT OF FRONT AND BACK OF MAIN DRIVERS.

33 ENGINE FRAME, CAST STEEL 40% CARBON 80,000 TENSILE STRENGTH.

34 FRAMES TO HAVE SINGLE FRONT RAILS.
FRAME LUGS IN PEDESTAL CAPS 1½" LONG.

35 PEDESTAL WEDGE BOLTS TO HAVE 1" BODY UNDER HEAD.

36 CYLINDERS AND VALVE CHAMBERS TO BE BUSHED WITH HUNT-SPILLER IRON.

37 CYLINDER BY-PASS VALVES TO BE FURNISHED FREE BY R.R. Co. AND ~~APPLIED BY B. L. W.~~ (SEE SUP. 46)
BY-PASS VALVE PIPES TO BE 2½" WITH STEAM CHEST CONNECTIONS TO SUIT.

38 OKADEE DRAIN VALVES TO BE PROVIDED AS FOLLOWS:-
ONE IN EACH AIR PUMP EXHAUST, ONE IN EACH EXHAUST UNDER CYLINDER SADDLE AND ONE IN BLOWER PIPE.

39 OIL PIPES TO CYLINDERS TO BE SAME AS ON RY. CO'S PREVIOUS SUPERHEATER LOCOMOTIVE 10 36 E 1348.

40 STEAM CHEST VALVES TO HAVE PACKING RINGS OF HUNT-SPILLER IRON.

41 PISTONS HEADS TO BE HUNT SPILLER IRON WITH PACKING RINGS OF HUNT-SPILLER IRON SPRUNG IN. PISTON RODS TO BE BOLTED TO CROSSHEADS.

42 CROSSHEAD AS A.C.L. PATTERN WITH HUNT SPILLER GUN IRON CROSSHEAD SHOES.

43 CROSSHEAD PINS, AND VALVE MOTION PINS TO HAVE TAPER OF ⅜" IN 13".

44 MAIN RODS "I" SECTION, SIDE RODS RECTANGULAR SECTION.
MAIN RODS TO HAVE FORKED ENDS.
MAIN ROD FRONT END AS AM. LOCO. CO'S. PRINT 722-Sel 1390.
PARALLEL RODS TO HAVE SOLID ENDS.
KNUCKLE PINS TO HAVE TAPER OF 1½" IN 12", WITH 2½" NUTS.

45 DRIVING BOXES TO HAVE EDWARDS LATERAL PLATES, SECURED BY A BOLT TO TOP OF DRIVING BOX AS RY. CO'S SKETCH RECEIVED NOV. 29TH, 1915.

46 BY-PASS VALVES TO BE APPLIED AFTER DELIVERY OF LOCOMOTIVES. B.L.W. TO DRILL AND TAP CYLINDERS AND PLUG WITH PIPE PLUGS.

51 AIR PUMP TO BE LOCATED FORWARD OF FIREBOX TO FACILITATE STAYBOLT INSPECTION.
AIR PUMP TO HAVE U. S. KING TYPE METALLIC PACKING.
AIR PUMP EXHAUST TO BE PIPED INTO BOTTOM OF CYLINDER SADDLE.

52 AIR RESERVOIRS TO HAVE LARGE CAPACITY, AND TO HAVE HYDROSTATIC TEST OF 210 POUNDS.
AIR RESERVOIRS LOCATED UNDER FRONT SECTIONS OF RUNNING BOARDS.

53 BRAKE SHOES TO BE APPLIED TO REAR OF DRIVERS.

54 ROAD NUMBERS TO BE PLACED ON SIDES AND BACK OF TANK IN LARGE FIGURES ABOUT 8" HIGH AND IN SMALLER FIGURES ON SIDES OF SAND BOX AND ON SIDES OF HEADLIGHT AND FRONT NUMBER PLATE.

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-943 except as specified.

Memorandum Spec'n 20056

SPECIFICATION FOR LOCOMOTIVES 8 40 D 9 and 10

FOR Cornwall Ore Bank Company

HW

Gen. as Photo. 5552 {except with main valves balanced and the omission of outside steam pipes and fuel deck from tender.

Engine Drawing No. 3

4.5.20

Gauge of Road 4' 8½" Play ⅜"
Wheelbase, Rigid 11'6" Driving 11'6" Total 20'0"
Total wheelbase, eng. and tend. {Actual 50'3¾" {Limited to ---
Rails 80 lbs. Grades 4.2%
Curves 150 feet radius

Limits, Height --- Width ---
Weight (approximate) in working order, Total 180,000 pounds
On F. tr'k 20,000 lbs. Drivers 160,000 lbs. B. tr'k --- lbs.

Tractive power 39,350 lbs. Ratio of adhesion 4.07
Work'g St'm Pres. 175 lbs. Service Switching
Fuel Bituminous coal.

Boiler Steel Thick ½" Bill 9033
Front Tube Sheet 9/16" Thick
Boiler, Diam. 80" Plan Straight Top
{Allowable st'm pres. 175 lbs. **Tested to** 195 lbs. steam pres.
{With Factor of Safety of 5.1 263 lbs. water pres.
Longitud. seams (See sup. 30)

Dome, diam. 33" Pos. Central
Dome One Piece Type
Firebox Steel Combustion chamber None
Firebox, length 95-3/16" Width 75½" Depth F. 70½" B. 60"
Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"
Firedoor opening One oval 16" x 20"
Water space, Front 4½" Sides 4" Back 4"
Water space frame Double Riveted
Water space stays ⅞" diam. with 3⅛" holes 1¼" deep from O.S.
Radial stays 1" diam. Sling stays front {Three rows B.L.W. Expansion stays
Button heads below crown on Ten central rows
Crown bars None Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 S.G. Charcoal Iron or Steel (B.L.W. Option)
Tube ends Swaged for copper ferrules, fire box ends.
Number 439 Diam. 2" Length 12'0"

Heating Surface {Flues --- Combus. Chamb. --- Total 29.3
{Tubes 2739 Fire Box 164 Fire Brick Tubes ---
Grate area 50.1 Ratio to Heating Surface 1: 58.
Superheater ---

Fire Brick Arch None

Grates Rocking bars and drop plates
Ash Pan. Dampers None

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

Smokebox extenstion With Cleaning hole and bar L.S. Only
Spark ~~arrester~~ hopper With
Netting and deflect. plates With

Exhaust nozzles Double, High

Stack Straight Dia. 19"

Safety Valves Three Coale 2½" Open (Not Spec)
Safety valves All with relief lever. Set to 175 pounds
Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Maker: Ashcroft (Not Spec)
Steam gauge stem Iron **Clock** None

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric
Gauge Cocks Three Back Surface valve None
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome.
Blower Valve B. L. W.

Blow off Cock One B.L.W. Pos: Front
Cleaning Plugs One plug above fire door.
Firebox, Corners diagonal,
Crown, Two right side, three left side and three back
Waist, Two under, one front and one back
Front tube sheet, One 10 ~~handle plug~~ One

Pump None

Injectors Two Monitor (Not Spec) No. 12
Injectors, Pos. Right and Left Steam pipes Copper.
Pipes, Check Iron Feed Iron Overflow Iron
Check B.L.W. with stop valve Pos. Right and Left

Steam Heat None

Cab Steel lined with wood (A/C mistake)

Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 34½"

Pilot None Pushing shoes Front
Front Bumper Oak Bumper plate With
Steps across front, with hand rails.
Steps, hand holds, etc. to conform to I.C.C. requirements.
Front Drawhead, Center above rail 33½"
Coupler M.C.B. Auto.

Signal fixtures **Iron on Bumper**

Headlight Two round case 10" Reflector
Headlight, Nos. on sides With Headlight step With
Lamp shelf None Nosing ---

Bell 92 pounds
Sand Box Two Diam. 31" Body Iron Pto. Plate Iron
Sander (Not Spec) Leach air trap A-1 in each box, to sand front and back.

Dome casing Iron Painted

Boiler Jacket #18 Soft Steel Pto. Brass Iron Style 9 and 14
Boiler Lagging Magnesia sectional
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS
J. A. Pfeiffer July 1920

SPECIFICATION FOR LOCOMOTIVES 8 40 D 9 and 10

FOR Cornwall Ore Bank Company

HW

Frames Cast Steel

Cylinders, Diam. 23" Stroke 26"
St'm ports, Length 19" Width 1⅞" Bridges 1⅝"
Exh. ports, Length 19" Width 3" Valve lead ⅛"
Valve travel 5¾" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 13⅜" By-pass valve None
35 (Not Spec) **L. F. Lubr.** Detroit four feed No. 32 Bull's Eye
Cyl'r heads Cast Iron Lubr. pipes of iron, under jacket.
Cyl'r casings Iron Pto. Head covers Steel Painted
St'm chest casings Iron Pto. Covers Steel Painted
St'm chest valves Balanced with vacuum valves
Met. pkg. (Not Spec) Piston rods U. S. King type Valve stems
Piston rods to be keyed to crossheads

Pistons heads of cast iron with cast iron rings sprung in.
Guides Alligator type, steel Oil cups Needle
Crossheads Cast Steel with bearings, cast iron, tinned.
Wrist Pins Steel Rod cups Plunger, forged on.
Parallel rods to have solid ends.

34 **Valve Motion** Walschaerts
Links, sliding blocks, pins, lifting links and eccentric rod liners to be well case hardened or to have hardened bushings

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.
Driving wheel hub liners Bronze
Drivers, O. S. Diam. 52" Cen. diam. 44" centres cast steel

Tires Steel Held by Shrinkage and Shoulder
Tires, Flanged, Pos. All Size 4" x 5½"
Tires, Plain, Pos. --- Size ---
Lateral play between driving boxes and wheel hubs 3/8" total
Driving Boxes Cast Steel
Journals, Diam. 10" Length 12"

Springs. Make B.L.W.

Front Engine Truck Two Wheeled Swing bolster centre bearing
To swing 5½" each side of cen., Cen. pin liners None
Journals, Diam. 6" Length 10" Boxes Cast Iron
Wheel hub liners None
Wheels, Diam. 30" Tread 4½" Kind Chilled Cast Iron Plate
Tires None Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck None Wheeled ---
To swing ---each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels
Operating {Engine, sch. No. 6 ET Westg. combined auto. and straight air.
Parts {Eng. Tr'k, sch. ---
Foundation {Drivers, sch. M-3 American O.S. Equalized
Parts {Eng. Tr'k, sch. ---
35 Air pump One 9½" and one 8½" cross compound, both L.S.
Train connections Front and Back
Train signal, sch. None
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1594
Weight, with fuel and water, about 103,500 lbs.
Tender to be weighed: Yes
Tank 5,000 Gallons, S.B. 3887
Tank "U" shape, sloping back. Fuel capacity, 7 tons.

Tool Boxes of hard wood, top.

Frame Steel, 8" and 10" channels, with bumpers of wood.
Bumpers to have a heavy plate in front and back.
Front Drawbar height 33½"
Pilot None Pushing shoes at rear
Back drawhead, center above rail 33½"
Coupler M.C.B. Auto.

Steps, hand holds, etc. to conform to I.C.C. requirements.
Steps across rear of tender, with hand rails.
Steps and hand rails on sloping back of tank.
Trucks Arch bar type with cast steel bolsters.
Bearings at sides of both trucks.
Springs Elliptic, B.L.W.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate
Tires None Cen. diam. --- Size ---
Tires held by ---
Safety chains Single

Brake Position On all wheels.
Brake sch. No. 6 ET Westg. auto. and straight air brake, with 12" x 12" tender brake cylinder.

List of tools, sch. 29
Photo sch. No. 2 Inspection B.L.W. (Except sup. 1 to 27 inc.)
To be weighed Yes Material specifications B.L.W. (Except sup. 44)
24 Certificate of boiler test Three copies of B.L.W. form 1036
Jurisdiction laws to 6-30-20 Shipment On own wheels.

Brass shop finish, No. 1
Machine shop finish D-165

B. L. W. Patents None

Property plates None

Painting, style 291, Black and Gold

Marking to be same as for 6 38 D 64
Mark on Tank sides, Cornwall Ore Bank Co.

	Road Nos. Pos.	Road Nos.	Name None
F. No. Plate		8	
F. Sand Box		9	
Cab Sides			
Back of Tank			

Actual Dimensions of Loco. Extreme height over all 15'3"
Extreme Width: Cab boards 10'2" Cylinders or valve motion 10'4½"
Length outside face front bumper of engine to face of tender wedge 31'10⅜"
Length face of tender wedge to outside face back bumper of tender 24'7"
Total length outside face front bumper of engine to outside face back bumper of tender 56'5⅜"

SPECIFICATION FOR LOCOMOTIVES 8 40 D 9 AND 10

FOR CORNWALL ORE BANK COMPANY

P

1 BOILER TO BE OPERATED IN THE STATE OF PENNSYLVANIA
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND -ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	⅜"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜". (I. R., USE FUSIBLE PLUG CARD 4414 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1215 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6858.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG: ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT EXCEEDING ¼" LESS THAN FULL SIZE FOR PLATES OVER ⅝" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES ⅝" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ⅜". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(Manufacturer's serial number)	PENNSYLVANIA (State in which boiler is to be used)
	No. 11 AND 12 (Manufacturer's State Standard Number)
	THE BALDWIN LOCOMOTIVE WORKS (Name of manufacturer)
	(LEAVE BLANK) (State's number) (LEAVE BLANK) (Year put in service)
	175 LBS. (Maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVES 8 40 D 9 AND 10

FOR CORNWALL ORE BANK COMPANY.

P

83

26 LOCOMOTIVE FOR OPERATION IN PENNSYLVANIA.

27 BOILER TO CONFORM TO THE PENNSYLVANIA STATE LAWS, A.S.M.E. CODE AS SHEET ATTACHED.

28 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

29 LOCOMOTIVE TO HAUL SIX 20 YARD STEEL DUMP CARS OF [illegible] CAPACITY AND 90,000 POUNDS WEIGHT AT AN AVERAGE SPEED OF [illegible] MILES PER HOUR.

30 LONGITUDINAL SEAMS BUTT JOINTED, DOUBLE COVERING STRIPS, SEXTUPLE RIVETED.

31 TAPE STAYS ABOUT 42S IN BREAKING ZONE.

32 FRONT BUMPER TO HAVE HEAVY PLATE IN FRONT AND BACK.

33 HEADLIGHT EQUIPMENT TO BE PYLE-NATIONAL ELECTRIC, TYPE "K-2" WITH INCANDESCENT HEADLIGHTS.

34 BAGONNET POWER REVERSE GEAR TYPE "B" AS COVERED ON EXTRA ORDER No. 2040 DATED 4-22-20.

35 AIR PUMPS TO HAVE SEPARATE FEEDS FROM LUBRICATOR.

36 KILBOURNE AND JACOBS MFG. CO'S ARRANGEMENT FOR OPERATING AIR DUMP CARS.

THE BALDWIN LOCOMOTIVE WORKS (As Specn. C-7241. Dup. of 8 24 C 221 with same extras, except where otherwise specified.)

Memorandum Spec'n 21032.

SPECIFICATION FOR LOCOMOTIVES 8 24 C 222. Gen. as Photo. 7154, (Except to have Vanderbilt type enders and spoke center engine truck wheels.)

RNF/ **FOR** Dayton-Goose Creek R. R. Co. **Engine Drawing No.** 28.

HNB.

10-14-21

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 8' 0" Driving 8' 0" Total 21' 9"
Total wheelbase, eng. and tend. {Actual 46' 5¾" / Limited to ---

Curves 12 degrees, 30 minutes.
Grades, 7/10 of 1%. Rails, 60 pounds per yard.
Limits, Height --- Width ---
Weight (approximate) in working order, Total 89,000 pounds.
On F. tr'k 34,500 lbs., Drivers 54,500 lbs., B. tr'k ---- lbs.

Tractive power 13,770 lbs., Ratio of adhesion 3.95
Work'g St'm Pres. 180 lbs., Service Passenger.
2. **Fuel** Oil, with specific gravity of 22 to 24.

Boiler Steel. Thick ½" and 9/16" Diameter 9489.
Front Tube Sheet ½" Thick
Boiler, Diam. 48" Plan Extended wagon top.
Allowable st'm pres. 200 lbs. Tested to 220 lbs. steam pres
With Factor of Safety of 4.7 267 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips.
Main dome, one-piece type.
Dome, diam. 25" Pos. Forward of fire box.
Auxiliary dome, None.
2. **Firebox** Steel. Combustion chamb. None.
Firebox, length 64-15/16" Width 34½" Depth F. 55½" B 54½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" diam. Crown and sides in one sheet.
Water space, Front 4" Sides 3" Back 3"
Water space frame Single. Riveted
Water space stays ⅞" diam. with 3/16" holes 14" deep from O.S.
Hollow stays located in inaccessible places.
Radial stays 1" diam. Sling stays front {Two rows B.L.W. / Expansion stays,
Button heads below crown on six central rows to suit fuel oil
Crown bars None. Placed --- above crown
Crown bolts -----

Flues No. 9 B. W. G. Steel. For 222 only. #12 for hereafter
Tubes No. 11 B.W.G. Charcoal iron or steel. (B.L.W. option).
Tube ends Spaced for copper ferrules, fire box ends.
Number {13 / 177} Diam. {5⅜" / 2"} Length 10' 6"

Heating Surface (Flues 1910 Combus. Chamb. ---- Total 6980
Tubes 4200 Fire Box 870 Fire Brick Tubes ---
Grate area 15.50 Ratio to Heating Surface 1:45.
Superheater 1570

Fire Brick Arch, None.
2. Fire box lined with fire brick, for oil burning.
Fire brick pavement in pan.
Grates None.
Ash Pan, Dampers Front only.

Throttle Balance. Pos. Dome.
Dry pipe Steel.

Superheater Schmidt type. (See sup. 3 etc)

Smokebox extension With. Cleaning hole and cap None.
Spark ejector or hopper None.
Superheater defect. plates With.

Exhaust nozzles Double, low.
Cleaning pipe, with.
Stack Cast iron, straight. Dia. 15½".

Safety Valves (Spec) Two Coale 2" Open.
Safety valves None, with relief lever, Set to 180 pounds.
Whistle One 4" Chime.

Steam Gauge One iron, 7". Maker: Ashcroft.
Steam gauge stand Iron. **Clock** None.

1. **Water Gauge** One Nathan Reflex **Cab Lamps** Electric.
Gauge Cocks Three back. Surface valve None.
Lowest gauge cock 3" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.
Cleaning Plugs
Firebox, Corners, sides and back.
Crown, Two each side and one back.
Waist, One under front.
Front tube sheet. One. Fusible plug One.

Pump None.

Injectors Two Monitor. (Spec) No. 6
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Copper. Feed Copper. Overflow Steel.
Check B. L. W. Pos. R. and L.

Steam Heat Gold System.

Cab Steel, lined with wood.
Cab to be large and roomy.
Cab boards to be covered with wood.
Cab boards Steel. Nosing T-iron.
Running boards Steel. Nosing T-iron.
Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. (See sup. 7 & 9) Back drawbar height 35¼"

Pilot Wood.
Front Bumper Cast steel. Bumper plate With.
1. **Steps** Hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"
1. **Coupler** M. C. B. Auto., with blotted knuckle 15" deep, same as for 8 24 C 221.

Signal fixtures Iron on bumper.
Classification brackets at front.

9. **Headlight** One round case 18" Reflector,
Headlight, Nos. on sides With. Hdlt step With
Lamp shelf None. Nosing ----

Bell 85 pounds.
Sand Box Two. Diam. 28" Body Iron painted. Pipes Iron.
Sander Leach air, trap A-1, to sand front and back.

Dome casing Iron painted, with pressed steel top and bottom rings.

Boiler Jacket, 22 Soft steel, ptd. Bands Iron. Style 9 and 14.
Boiler Lagging Magnesia Sectional.
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

E. O. Elliott Nov. 1921

SPECIFICATION FOR LOCOMOTIVES 8 24 C 222.

FOR Dayton-Goose Creek R. R. Co.

HNB.

Frames Cast steel, extra heavy.

Cylinders, Diam. 15" Stroke 24"
Stm ports, Length 2⅝" Width 1⅛" Bridges ---
Exh. ports, Length --- Width --- Valve lear 3/16"
Valve travel 5" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 11-9/16" By-pass valve None.
S. P. Lubr. (Spec) Michigan five feed Bull's Eye.
Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.
Cyl'r castings Iron painted, Head covers Steel painted.
St'm chest castings ---- Covers ----
St'm chest valves 8" diam. piston type.
Met. pkg. (Spec) United States, King type.
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron with rings of cast iron sprung in.
Guides Alligator type, steel. Oil cups Needle.
Crossheads Cast steel, with bearings of brass.
Wrist Pins Steel. Rod cups for grease, forged on.
Parallel rods to have solid ends.

Valve Motion Walschaerts.
Links, sliding blocks, pins, lifting links and eccentric rod laws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners Brass.
10. **Drivers,** O. S. Diam. 60" Cen. diam. 54" centers cast iron.

11. **Tires** Steel. Held by Shrinkage and shoulder.
10. Tires, Flanged, Pos. All. Size 3" x 5½"
Tires, Plain, Pos. None. Size ---
Lateral play between driving boxes and wheel hubs = (See sup. 12)
Driving Boxes Cast steel.
Journals, Diam. 7" Length 8"

Tender Eight Wheeled. Drawing No. 1692.
Weight, with fuel and water, about 89,800 pounds. {Tender to be weighed: Yes.
Tank {Dry, 2000 / Water, 4000} Gauges, Bill 5723 / 5722
Tank, cylindrical type, Vanderbilt No. 2817.
Royalty, if any, on Vanderbilt tender, payable by The B. L. W.
Tool Boxes of wood, front of tender.

Frame Steel angles and plates, with front and back bumpers of cast steel.
Front Drawbar height 33½"
Pilot None.
Back drawbar, center above rail 33½"
1. **Coupler** M. C. B. Auto., with 5" x 7" shank, 24½" long (Sup. 34)

Steps and hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, Standard Steel Works.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 33" Tread —— Kind Cast iron plate center.
Tires Steel. Cen. diam. 28" Size 2½" x 5½"
Tires held by Shrinkage and shoulder.
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6 ET. Westg. Auto. and straight air, with 10" x 12" tender cylinder.

2. List of tools, sch. 157.
Photo sch. No. 2. Inspection B. L. W.
To be weighed No. Material specns B. L. W.
Certificate of boiler test (See sup. 22)
Junior laws to 11-1-21. Shipment On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

15. **Springs.** Make Standard Steel Works, extra heavy.

Front Engine Truck Four Wheeled Swing bolster, center bearing.
13. To swing 3" each side of cen. Cen. pin liners ----
Journals, Diam. 4½" Length 7½" Boxes Cast iron.
Wheel hub liners None.
14. Wheels, Diam. 28" Tread 7½" Kind Cast iron spoke center.
Tires Steel. Cen. diam. 23" Size 2½" x 5½"
Tires held by Shrinkage and shoulder.

Back Engine Truck None. Wheeled ----
To swing ---- each side of cen., Cen. pin liners ----
Journals, Diam. ---- Length---- Boxes ----
Wheel hub liners ----
Wheels, Diam. ---- Tread ---- Kind ----
Tires ---- Cen. diam. ---- Size ----
Tires held by ----

Brake, position On all driving and tender wheels.
Operating Parts { Engine, sch. No. 6 ET. Westg. combined Auto. and straight air. / Eng. Tr'k, sch. ----
Foundation Parts { Drivers, sch. WY-1-BC, American O.S. Equalized. / Eng. Tr'k, sch. ----
Air pump One 9½" Pos. Left side.
Train connections Front and back.
Train signal, sch. "L".
Air reservoirs to have hydrostatic test of 210 pounds.

B. L. W. Patents None.

Property plates B. L. W., for engine and tender.

Painting, style 291, Olive green and aluminum.

Lettering, etc., to be same as for 8 32 D 779.
Mark on tank sides: Dayton-Goose Creek Railway Co.

Road Nos. Pos. Road Nos. Name None.
F. No. plate. 104
F. Sand box.
Cab sides.
Back of tank.

Actual Dimensions of Loco. Extreme height over all 12' 11⅝"
Extreme Width: Cab boards 8' 3" ; Cylinders ~~outside motion~~ 8' 3½"
Length outside face front bumper of engine to face of tender wedge = 28' 4⅝"
Length face of tender wedge to outside face back bumper of tender = 24' 10"
Total length outside face front bumper of engine to outside face back bumper of tender = 52' 6¼"

SPECIFICATION FOR LOCOMOTIVES 8 24 C 222

FOR Dayton-Goose Creek R. R. Co.

Specification for Type A Double Loop Superheater SPEC'N. No. 0-17013 DATED OCTOBER 18, 1921

BOILER TUBES	77 In number 2" o.d. 10 ft. 6 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	13 In number 5½" o.d. No. 9 of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card	1523-N
BOILER FLUE SETTING	1/8 in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card	1136
TUBE SHEET LAYOUT	Card	50439
UNITS	13 units 1½ o.d. No. 9 Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in. Card	10773
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card	1043
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card	10695
UNIT CLAMP BOLT	In accordance with The Superheater Company Material Specification No. 12-A Card	11112-A
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with ast ammoniac. Header casing to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages so as to insure soundness of all partition walls. Card	1323
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card	See Amdt.
STEAM PIPE JOINT RINGS	Of cast iron. Card	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units. Card	1067
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	None
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card	
PYROMETER	Model No. Pyrometer Card	
PYROMETER ARRANGEMENT	Generally in accordance with. Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration. Card	50441-D
S. H. ARRANGEMENT	In accordance with. Card	
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card N	11242-V.	**S. H. UNIT BOLT WASHER**	Card	1071
DAMPER CYL. ARM	Card	11-11559-A	**S. H. UNIT CLAMP**	Card	1073
DAMPER CYL. PIPE FITTING	Card	11115	**S. H. UNIT CLAMP WASHER**	Card	10805
DAMPER CYL. PIPE UNION	Card	11114	**S. H. PIPE END**	Card	1388
DAMPER CYL. PIPE CONNECTION	Card	11-11437	**S. H. PIPE BAND**	Card	1389
DAMPER CYL. PIPING DIAGRAM	Card	3L-11440	**SPACING OF BANDS AND SUPPORTS**	Card	10799
DAMPER CYL. SUPPORT	Card		**TYPE OF RETURN BENDS**		Forged
DAMPER SHAFT	Card	1068-B	**RETURN BENDS**	Card	11022
DAMPER SHAFT ARM	Card	1074-C	**LUBRICATOR CONNECTION**	Card	3003
DAMPER SHAFT BEARING (O.S.)	Card	11323-V	**DEFLECTING PLATE HANDLE**	Card	1487
DAMPER SHAFT BEARING (I.S.)	Card	11107 (L.S.)	**DEFLECTING PLATE STUDS**	Card	10808
DAMPER SHAFT LINK	Card	11177	**DEFLECTING PLATE CLAMP**	Card	10809-A
PATENT PLATE	Card	3L-3367-A			
DAMPER RIGGING	Card	3L-11562-B			

SPECIFICATION FOR LOCOMOTIVES 8 24 C 222

FOR DAYTON-GOOSE CREEK R. R. CO.

88

51

1 LOCOMOTIVE TO OPERATE UNDER I. C. C. JURISDICTION.

2 OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH BURNER PLACED IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

3 SUPERHEATER AS SUPERHEATER COMPANY'S SPECIFICATION NO. 0-17013, DATED 10-18-21. (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
SUPERHEATER TO HAVE SWITCH ENGINE DAMPER RIGGING ARRANGEMENT.
ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. W.

4 PATENT PLATE (HEREWITH) FROM THE SUPERHEATER COMPANY, COVERING THE SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

5 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

6 WATER GAUGE TO BE AS NATHAN BULLETIN NO. 25, PAGE 1.

7 BACK BUMPER TO BE HEAVY TYPE, TO PERMIT JACKING UP OF ENGINE.

8 TENDER WEDGE FACE TO BE AT LEAST 10" DEEP. (SEE SUP. 33)

9 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE "E", WITH INCANDESCENT HEADLIGHTS. WIRING TO BE PROVIDED TO REAR OF TENDER FOR LIGHTING TRAIN.

10 DETROIT FLANGE OILER, TWO FEED, PENDULUM TYPE, TO BE APPLIED TO FRONT DRIVERS.

11 DRIVING WHEEL TIRES FROM STANDARD STEEL WORKS.

12 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING PLAY IN PEDESTAL FITS, - 7/32" TOTAL.

13 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING PLAY IN PEDESTAL FITS, - 3/16" TOTAL.

14 ENGINE TRUCK WHEELS FROM STANDARD STEEL WORKS.

15 EQUALIZING BEAMS TO BE EXTRA HEAVY.

16 ONE PATH JOHNSON BREAKING FROG, TYPE "Z", FOR 60 POUND RAILS.

17 CERTIFICATE OF BOILER TEST: THREE COPIES B. L. W. FORM 1036, AND TWO COPIES B. L. W. FORM 491.

—TENDER—

21 OIL TANK TO BE SEPARATE FROM WATER TANK, READILY REMOVABLE SIMILAR TO SOUTHERN PACIFIC STYLE.

22 CLASSIFICATION BRACKETS AT REAR.

23 TENDER WEDGE BLOCK FACE TO BE AT LEAST 10" DEEP. (SUP. 8)

24 COUPLER KNUCKLE TO BE 15" DEEP WITH SLOT FOR LINK AND PIN CONNECTION.

25 TENDER WHEELS FROM STANDARD STEEL WORKS.

26 TENDER COUPLER TO HAVE EXTRA HEAVY DRAFT RIGGING WITH STANDARD DRAWHEAD SPRINGS ETC. TO ABSORB SHOCK AND TO WITHSTAND HARD SERVICE.

THE BALDWIN LOCOMOTIVE WORKS As Specn. 6-5712.

Memorandum Spec'n 20123

SPECIFICATION FOR LOCOMOTIVES 10 26 D 347.

FOR Deering South-western Railway.

Gen. as Photo. 4211 { Except to have cab of wood, firebox on top of frames, spoke center eng. trk. wheels and headlight at rear.

Engine Drawing No. 64.

7-29-20.

Gauge of Road 4' 8½" Pilot 4"

Wheelbase, Rigid 11' 0" Driving 11' 0" Total 21' 0"

Total wheelbase, eng. and tend. { Actual 47' 3" / Limited to ---

Curves 12 degrees on main line, and 30 degrees maximum.

Grades, (See sup. 27) Rails, 75 pounds.

Limits, Height --- Width ---

Weight (approximate) in working order. Total 101,000 pounds.

On F. trk 30,000 lbs. Drivers 71,000 lbs. B. trk --- lbs.

Weight limited, (See sup. 40)

Tractive power 17,750 lbs. Ratio of adhesion 4.

Work'g St'm Pres. 170 lbs. Service Passenger and freight.

Fuel Illinois bituminous coal.

Boiler Steel. Thick 9/16" Bill 9254.

Front Tube Sheet ½" Thick.

Boiler, Diam. 50" Plan Extended wagon top.

Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.

With Factor of Safety of 5.05 270 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips.

Dome, diam. 29" Pos. Forward of fire box.

Auxiliary dome, None.

Firebox Steel. Combustion chamb. None.

Firebox, length 62⅛" Width 41¼" Depth F. 58½" B 57"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" diam.

Water space, Front 4" Sides 3" Back 3"

Water space frame Double Riveted

Water space stays ⅝" diam. with 3⅛6" holes 1¼" deep from O. S.

Radial stays 1" diam. Sling stays front { Two rows B. L. W. Expansion stays.

Button heads below crown on Six central rows

Crown bars None. Placed --- above crown

Crown bolts ---

Flues ---

Tubes No. 12 B. W. G. Charcoal iron.

Tube ends Swaged for copper ferrules, fire box ends.

Number 170 Diam. 2" Length 12' 6".

Heating Surface Flues --- Combus. Chamb. --- Total 1195 sq.

Tubes 1105 sq. Fire Box 90 sq. Fire Brick Tubes ---

Grate area 18.1 sq. Ratio to Heating Surface 1: 66.

Superheater ---

Fire Brick Arch, None.

Grates Rocking bars and drop plate.

Ash Pan, Dampers Front and back.

Throttle Chambers balanced. Pos. Dome.

Dry pipe Steel.

Superheater None.

Smokebox extension With. Cleaning hole and cap L. S. Only.

Spark ejector hopper With.

Netting and deflect. plates With.

Exhaust nozzles Double high.

Stack Straight. Dia. 14.

(Not Spec) **Safety Valves** Two Coale 2½" Open.

Safety valves Both with raised lever. Set to 170 pounds.

Whistle One B. L. W. Plain.

Steam Gauge One Iron 7" Maker: Ashcroft.

Steam gauge stand Iron **Clock** None.

Water Gauge One Nathan (Sup. 33) **Cab Lamps** Electric.

Gauge Cocks Three back. Surface valve None.

Lowest gauge cock 3" above highest part of crown None.

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.

Cleaning Plugs One filling plug in top of boiler.

Firebox, Corners diagonal and sides.

Crown, Two each side and two back.

Waist, One under front (and see sup. 34)

Front tube sheet, One. Fusible plug One

Pump None.

Injectors Two Monitor (Spec) No. 7.

Injectors, Pos. Right and left. Steam pipes Copper.

Pipes, Check Iron. Feed Iron. Overflow Iron.

Check B.L.W., with stop valve. Pos. Right and left.

Steam Heat (With)

Cab Wood.

Cab boards Wood. Nosing None.

Running boards Wood. Nosing None.

Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 31½"

Pilot Wood.

Front Bumper Oak. Bumper plate With.

Steps Hand holds, etc., to conform to I.C.C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Automatic.

Signal fixtures Iron on bumper.

Headlight Two round case 18" Reflector.

Headlight, Nos. on sides With. H'd'l't step With.

Lamp shelf None. Nosing ---

Bell 85 pounds.

Sand Box (Not Spec) One Diam. 31" Body Iron painted. Pipes Iron.

Sander Leach air, trap A-10 double. (See sup. 37)

Dome casing Iron painted.

Boiler Jacket #22 Soft steel pto. Bands Iron. Style 9

Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

C. Wagner Sept 1920

SPECIFICATION FOR LOCOMOTIVES 10 26 D 347.

FOR Deering Southwestern Railway.

89 90

Frames Cast steel.

Cylinders, Diam. 16" Stroke 24"

Stm ports, Length 15" Width 1¼" Bridges 1"

Exh. ports, Length 15" Width 2½" Valve lead ¼"

Valve travel 4¾" Steam lap ¾" Exhaust clearance ---

Eccentric crank throw 9-1 1/16" By-pass valve None.

(Not Spec) S. F. Lubr. Nathan triple No. 9 Bull's Eye.

Cyl'r heads Cast iron. Lubr. pipes (See sup.

Cyl'r casings Iron painted. Head cover Steel painted.

Stm chest casings Iron painted. Covers Steel painted.

Stm chest valves Richardson balanced with vacuum valves.

(Not Spec) Met. pkg. Valve stems United States, King type.

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron, rings of cast iron sprung in,

Oil cups Needle.

Guides Steel.

Crossheads Cast steel, with bearings of cast iron, tinned.

Wrist Pins Steel. Rod cops Plunger, forged on.

Parallel rods to have solid ends.

Valve Motion Walschaerts.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be (well case hardened or to have hardened bushings

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners None.

Drivers, O. S. Diam. 50" Cen. diam. 41½" Centers cast iron.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. Front and back. Size 3" x 5½"

Tires, Plain, Pos. Middle. Size 3" x 6½"

Lateral play between driving boxes and wheel hubs 3⅛6" total.

Driving Boxes Cast iron.

Journals, Diam. 7½" Length 8"

Springs. Make B. L. W.

Front Engine Truck Four Wheeled Swing bolster, center bearing.

To swing each side of cen., Gen. pin liners

Journals, Diam. 4½" Length 8" Boxes Cast iron.

Wheel hub liners None.

Wheels, Diam. 28" Tread 1¼" Kind Chilled cast iron spoke.

Tires None. Cen. diam. --- Size ---

Tires held by ---

B. L. W. None.

Patents

Property plate None.

Back Engine Truck None. Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels.

Operating Parts: Engine, sch. No. 6 ET. Westg. combined auto. and straight air.

Eng. Trk. sch. ---

Foundation Parts: Drivers, sch. M-1, American outside equalized.

Eng. Trk. sch. ---

Air pump One 9½" Pos. Left side.

Train connections Front and back.

Train signal, sch. "L"

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1629

Weight, with fuel and water about 91,500 pounds.

Tender to be weighed:- Yes.

Tank 4,500 Gallons, U. S. 5127

Tank "U" shape, straight top. Fuel spacity, 6 tons.

Tool Boxes Hard wood, top.

Frame Steel, 8" and 10" channels, with bumpers of wood reinforced with steel plate.

Front Drawbar height 29½"

Pilot None.

Back drawhead, center above rail 33½"

Coupler M. C. B. Automatic.

Steps hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, B. L. W.

Journals, Diam. 4½" Length 8"

Wheels, Diam. 30" Tread 4½" Kind Chilled cast iron plate.

Tires None. Cen. diam. --- Size ---

Tires held by ---

Safety chains Single.

Brake Position On all wheels.

Brake sch. No. 6 ET. Westg. auto. and straight air, with 10" x 12" tender brake cylinder.

List of tools, sch. 26

Photo sch. None. Inspection (See sup. 28.31)

To be weighed Yes. Material specifies B.L.W. (Except F. & Boiler) (Sup 30)

Certificate of boiler test Three copies B. L. W. form 1036.

Jacket laps to 10-25-20. Shipment On own wheels.

Brass shop finish No. 1.

Machine shop finish D-165.

Painting, style 291, Olive green and aluminum.

Mark on tank sides:- Deering Southwestern Railway

Road Nos. Pos. Road Nos. Name None.

F. No. plate. 8

Cab sides.

Back of tank.

Actual Dimensions of Loco. Extreme height over all 13' 8½"

Extreme Width: Cab boards 9' 9" Cylinders or valve motion 9' 10½"

Length outside face front bumper of engine to face of tender wedge 28' 2"

Length face of tender wedge to outside face back bumper of tender 24' 3½"

Total length outside face front bumper of engine to outside face back bumper of tender 52' 5½"

SPECIFICATION FOR LOCOMOTIVES 10 26 D 347

FOR DEERING SOUTHWESTERN RAILWAY

RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF MISSOURI MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL	A.S.M.E. SPEC. PAGE 11
MATERIAL FOR ONE-PIECE DOME	
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MASERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6899. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYBOLT DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

13 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	⅜"	7/16"	⅞"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝", (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S

MISSOURI
(State in which boiler is to be used)
4
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (Builder's number)
(LEAVE BLANK) (Year put in service)
(Manufacturer's Serial number)
180 POUNDS
(Maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVE:- 10 26 D 347. 92 91

FOR:- DEERING SOUTHWESTERN RAILWAY.

RTL.

26 LOCOMOTIVE TO HAUL 750 TONS OF CARS AND LADING AND MEET THE SCHEDULE GIVEN IN RY. CO'S TIME TABLE NO. 18, DATED OCTOBER 26TH, 1919.

27 COMPANY'S ROAD BED IS VERY ROUGH AND IN BAD CONDITION. TRACK IS PRACTICALLY LEVEL WITH NO PERCEPTIBLE GRADES. KEEP CENTER OF GRAVITY AS LOW AS POSSIBLE.

28 INSPECTION OF MATERIALS, WORKMANSHIP AND CONSTRUCTION BY A. LOVELL. FURNISH MR. LOVELL WITH COPIES IN DUPLICATE OF THE PRINCIPAL MATERIAL ORDERS COVERING MATERIALS USUALLY TESTED AND INSPECTED BY HIM, AND ARRANGE TO GIVE HIM THE USUAL FACILITIES TO LOOK AFTER THE INSPECTION OF THE VARIOUS MATERIALS AND WORKMANSHIP OF THE ENGINE AS THEY PASS THROUGH THE SHOPS. FURNISH HIM WITH COPIES OF SPECIFICATION, ALSO COPIES OF BOILER PRINT AND ERECTING CARD.

29 LOCOMOTIVE TO OPERATE EXCLUSIVELY IN THE STATE OF MISSOURI.

30 BOILER TO MEET THE A. S. M. E. BOILER CODE. (Sup 1-c)

31 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

32 FIRE BOX ON TOP OF FRAMES.

33 WATER GAUGE TO BE THREE-SIDE TYPE.

34 CLEANING PLUG LOCATION AS SHOWN BY B. L. H. TRACING 43442 APPROVED BY RY. CO., EXCEPT APPLY ADDITIONAL PLUG UNDER WAIST 20" AHEAD OF THROAT SHEET, AND ALSO ONE EACH SIDE IN TOP HALF OF BOILER DIRECTLY OVER THE AFOREMENTIONED PLUG, ALSO ONE EACH SIDE IN TOP HALF OF GUSSET SHEET OVER INJECTOR CHECK.

35 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHTS.

36 SAND BOX TO BE OF EXTRA LARGE CAPACITY.

37 SANDER TO BE PIPED TO FRONT OF FRONT DRIVING WHEELS AND TO BACK OF MAIN WHEELS.

38 LUBRICATOR PIPES OF COPPER PLACED IN STEEL OR IRON PIPE UNDER JACKET, FOR HEREAFTER.
LUBRICATOR PIPES OF IRON UNDER JACKET, NOT ENCASED IN STEEL OR IRON PIPE, FOR 10 26 D 347, ONLY.

40 WEIGHT NOT TO EXCEED 12,000 LBS ON ANY ONE WHEEL.

THE BALDWIN LOCOMOTIVE WORKS — As Specn. C-7286, Dup. 10 28 ¼ D 153, except where otherwise specified.

Memorandum Spec'n 21039

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 154. — Gen. as photo. 7757, except with straight stack, dynamo in front of stack, two air pumps, oil tank on tender, and omitting wood rack around top of tank and platform back of tank.

FOR Dolbeer and Carson Lumber Co. — **Engine Drawing No.** 36

HNW. — 11-23-21.

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 9' 6" Driving 9' 6" Total 24' 10"
Total wheelbase, eng. and tend. {Actual 46' 10" {Limited to ---

Curves 30 degrees. Grades, ¾ compensated.
Rails, 56 pounds.
Limits, Height 14' 0" Width 10' 0" (except across bumpers may be 10'3".)
Weight (approximate) in working order, Total 124,000 pounds.
On F. tr'k 13,000 lbs., Drivers 96,500 lbs., B. tr'k 14,500 lbs.

Tractive power 23,400 lbs., Ratio of adhesion 4.1
Work'g St'm Pres. 175 lbs., Service Logging.
Fuel Oil, (See sup. 26)

Boiler Steel. Thick 23/32" & ¾" Blt 9521.
Front Tube Sheet ½" Thick
Boiler, Diam. 62" Plan Wagon top.
{Allowable st'm pres. 200 lbs. **Tested to** {225 lbs. steam pres.
{With Factor of Safety of 5.2 {300 lbs. water pres.
Longitud. seams (See sup. 28)
Main dome, one-piece type. Auxiliary dome, none.
Dome, diam. 29" Pos. Forward of fire box.

Firebox Steel. Combustion chamb. none.
Firebox, length 72" Width 42" Depth F. 65¼" B. 59¼"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening Oval, 13" x 18" Crown and sides in one sheet.
Water space, Front 4" Sides 3" Back 3"
Water space frame Double Riveted
Water space stays (See sup. 29)
Radial stays (Sup. 29) Sling stays front {Two rows B. L. W. {Expansion stays.
Buttom Heads below crown on Eight central rows, to suit oil fuel.
Crown bars None. Placed --- above crown
Crown bolts ----

Flues No. 9 B. W. G. Seamless steel.
Tubes No. 12 B. W. G. Seamless steel
Tube ends Swaged for copper ferrules, fire box ends.
Number {22 {142 Diam. {5⅜" {2" Length 12' 0"

Heating Surface {Flues 364⁰ Combus. Chamb. --- Total 1342⁰
{Tubes 874⁰ Fire Box 104⁰ Fire Brick Tubes ---
Grate area 21⁰ Ratio to Heating Surface 1: 63.8
Superheater 292⁰

Fire Brick Arch, none.
Fire box lined with fire brick, for oil burning.
Fire brick pavement in pan.
Grates None.
Ash Pan, Dampers Front only.
Fire pan of steel.

Throttle Balance. Pos. Dome.
Dry pipe Steel.

Superheater Schmidt type, (See sup. 30)

Smoke box to have short extension.
Smokebox extenstion Short. Cleaning hole and cap None.
Spark ejector or hopper None.
Superheater flue deflect. plates with.

Exhaust nozzles Double, Low.
Cleaning pipe, with.
Stack Cast iron, straight. Dia. 16"

Safety Valves Two Consolidated 2½" Open.
Safety valves Both with relief lever. Set to 175 pounds.
Whistle One B. L. W. Plain.

Steam Gauge One Iron 6¾" Maker: Ashcroft.
Steam gauge stand Iron. **Clock** None.

Water Gauge One Reflex **Cab Lamps** Electric.
Gauge Cocks Three back. Surface valve None.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One Crane 2", Pos: Throat.
Cleaning Plugs One filling plug in top of boiler.
Firebox, corners, back ones diagonal.
Crown, Two each side and two back.
Waist, One under front. One plug above fire door.
Front tube sheet. One Fusible plug One

Pump None.

Injectors Two Nathan Monitor (spec) No. 8
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check B. L. W., with stop valve. Pos. Right and left.

Steam Heat None.

Cab Steel, not lined. Cab roof to be wood lined with ventilator
Cab boards to be covered with wood.
Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 34½"

Pilot Wood.
Front Bumper Cast steel. Bumper plate With.
Steps Hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 34"
Coupler Sharon M. C. B. Auto. with slotted knuckle.

Signal fixtures Iron on bumper.

Headlight Two round case 18" Reflector,
Headlight, Nos. on sides With. H'd'l't step With.
Lamp shelf None. Nosing ----

Bell 92 pounds. Gollmar air bell ringer.
Sand Box Two Diam. 28" Body Iron painted. Pipes Iron.
Sander (Spec) Leach air trap A-1 and hand, in each box, to sand front and back.
Dome casing Steel painted, with pressed steel top and bottom rings.

Boiler Jacket #18 Soft steel ptd. Bands Iron. Style 9.
Boiler Lagging Magnesia sectional, for fire box, and plastic magnesia from B. L. W. stock for barrel of boiler.

THE BALDWIN LOCOMOTIVE WORKS — 94

L. G. Tandy — Jan-1922 — 95

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 154.

FOR Dolbeer and Carson Lumber Co.

HNW.

Frames Cast steel, 4" wide.

Cylinders, Diam. 17" Stroke 24"
St'm ports, Length 20.84" Width 1¼" Bridges ---
Exh. ports, Length ---- Width ---- Valve lead ¼"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ----
Eccentric crank throw 10-11/16" (Spec) By-pass valve None.
S. F. Lubr. Nathan five feed, Bull's Eye.
Cyl'r heads Cast iron Lubr. pipes of copper under jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings ---- Covers ----
St'm chest valves 9½" (Spec) diam., Piston type.
Met. pkg. (Piston rods, valve stems) United States, King type.
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron, packing rings of cast iron.
Guides Laird type, forged steel. Oil cups Needle.
Crossheads Cast steel, with bearings of bronze.
Wrist Pins Steel. Rod cups (See sup. 40)
Parallel rods to have solid ends.

Valve Motion Walschaerts.
(Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings. (Sup. 41)

All threads on bolts (except stayboits) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners (See sup. 43)
Drivers, O. S. Diam. 44" Cen. diam. 38", centers cast iron.

Tires Steel. Held by Shrinkage
Tires, Flanged, Pos. Front and back. Size 3" x 5½"
Tires, Plain, Pos. Middle. Size 3" x 6½"
Lateral play between driving boxes and wheel hubs = (See Sup 45)

Driving Boxes Cast steel.
Journals, Diam. 8" Length 10"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing.
To swing 3¾" each side of cen., Cen. pin liners None.
Journals, Diam. 5" Length 9" Boxes Cast iron.
Wheel hub liners (See sup. 47)
Wheels, Diam. 28" Tread --- Kind Rolled steel.
Tires None. Cen. diam. --- Size ---
Tires held by --- Wheel rims 2½" thick x 5½" wide.

Back Engine Truck Two. Wheeled B. L. W., Inside bearing.
To swing 3¾" each side of cen., Cen. pin liners None.
Journals, Diam. 5" Length 9" Boxes Cast iron.
Wheel hub liners (See sup. 49)
Wheels, Diam. 28" Tread --- Kind Rolled steel.
Tires None. Cen. diam. --- Size ---
Tires held by --- Wheel rims 2½" thick x 5½" wide.

Brake, position On all driving and tender wheels.
Operating Parts {Engine, sch. No. 6 ET. Westg. Combined auto. and straight air.
{Eng. Tr'k, sch. ---
Foundation Parts {Drivers, sch. Wh-I-American outside equalized.
{Eng. Tr'k, sch. ---
Air pump Two 9½" Pos. Both left side.
Train connections Front and back.
Train signal, sch. None.
Air reservoir to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1674. Tender to be weighed: Yes.
Weight, with fuel and water, about 75,500 pounds.
Tank {Oil, 1500 5671
{Water, 3500 Gallons, Bll 4338
Tank "U" shape, straight top.

Tool Boxes of Wood, top.

Frame Steel, 6" and 8" channels with bumpers front and back of cast steel. Frame bolster trussed type.
Front Drawbar height 31¾"
Pilot None.
Back drawhead, center above rail 34"
Coupler Sharon M. C. B. Auto., with slotted knuckle.

Steps Hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with channel spring planks, with bolsters of cast steel.
Springs Elliptic, B. L. W. make
Journals, Diam. 4½" Length 8"
Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.
Tires None. Cen. diam. ---- Size ----
Tires held by ---
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6 ET. Westinghouse auto. and straight air, with 10" x 12" tender brake cylinder.

List of tools, sch. 157 One pair of wrecking frogs.
Photo sch. No. 2. Inspection B. L. W., except for boiler, (Sup. 24)
To be weighed Yes. Material specs as B. L. W., except for boiler,
Certificate of boiler test (See sup. 25)
Junior laws to 12-21-21 Shipment On own wheels.

Brass soap finish, No. 1.
Machine shop finish D-165.

Patents B. L. W. None.

Property plates None.

Painting, style 291, Olive green and aluminum.

Mark on tank sides: H. N. Ry.

Road Nos. Pos	Road Nos.	Name None.
F. No. Plate.	3	
F. Sand box.		
Cab sides.		
Back of tank.		

Actual Dimensions of Loco. Extreme height over all 13' 8½"
Extreme Width: Cab boards 9' 11" Cylinders or valve motion 9' 1½"
Length outside face front bumper of engine to face of tender wedge 30' 9"
Length face of tender wedge to outside face back bumper of tender 21' 5½"
Total length outside face front bumper of engine to outside face back bumper of tender 52' 2½"

SPECIFICATION FOR LOCOMOTIVES 10 28 ½ D 154

FOR DOLBEER & CARSON LUMBER Co.

RTL

96
95

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF CALIFORNIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL	A.S.M.E. SPEC. PAGE 11
MATERIAL FOR ONE-PIECE DOME	
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 3408.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

13 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜". (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

14 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6855. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

15 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

16 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

17 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

CALIFORNIA
(State in which boiler is to be used)
8
(Manufacturer's State (builder's) number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (State's number)
(LEAVE BLANK) (Year put in service)
(manufacturer's Serial number)
200 POUNDS
(Maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 154

FOR Dolbeer & Carson Lumber Co.

Specification for Type A Double Loop Superheater SPECN.NO.O-17244, DATED DEC. 6, 1921.

BOILER TUBES	142 in number. 2" o.d. 12 ft. 0 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18
BOILER FLUES	22 in number. 5½" o.d. #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card 1906
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, headed and prosserted except for copper sheets. Front end rolled and headed. Rollers to have at least 5 rolls. Prosser to have at least 12 sections Card 1136
TUBE SHEET LAYOUT	Card 3L-50874
UNITS	22 units 1½" o.d. No.9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in. Card 10773
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide Card 1043
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints Card 10695
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A Card A. T. 4 x 6 - 2
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls Card 10647-A
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place Card 1323
STEAM PIPE JOINT RINGS	Of cast iron. SEE ABOVE.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units Card
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing Card 3L-11436-A
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer Card 1067-A
PYROMETER	Model No. Pyrometer Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration Card
S. H. ARRANGEMENT	In accordance with Card 3L-40859
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 1012-Z
DAMPER CYL. ARM	Card 1074
DAMPER CYL. PIPE FITTING	Card 11115
DAMPER CYL. PIPE UNION	Card 11114
DAMPER CYCL. PIPE CONNECTION	Card 1L-11437
DAMPER CYL. PIPING DIAGRAM	Card 3L-11440
DAMPER CYL. SUPPORT	Card
DAMPER SHAFT	Card 1235-M, R. & L.
DAMPER SHAFT ARM	Card 1234-C, RS 1074-C, LS.
DAMPER SHAFT BEARING (O. S.)	Card 1223-B, RS 1148-B, LS.
DAMPER SHAFT BEARING (I. S.)	Card 1086, R. AND L.
DAMPER SHAFT LINK	Card 1070
PATENT PLATE	Card 3L-3367-A
DAMPER RIGGING CARD	3L-11460-J

S. H. UNIT BOLT WASHER	Card 1071
S. H. UNIT CLAMP	Card 1073
S. H. UNIT CLAMP WASHER	Card 10305
S. H. PIPE END	Card 1344
S. H. PIPE BAND	Card 1988
SPACING OF BANDS & SUPPORTS	Card 10759
TYPE OF RETURN BENDS	FORGED
RETURN BENDS	Card 11022
LUBRICATOR CONNECTION	Card 3023
DEFLECTING PLATE HANDLE	Card 1487
DEFLECTING PLATE STUDS	Card 10809
DEFLECTING PLATE CLAMP	Card 10809-A

SPECIFICATION FOR LOCOMOTIVES:- 10 28 ¼ D 154. 97 96

FOR:- DOLBEER AND CARSON LUMBER CO.

HND.

21 LOCOMOTIVE TO BE OPERATED BY THE HUMBOLDT NORTHERN RY. CO.

22 SERVICE CONDITIONS SUCH AS GRADES, CURVES, RAILS, LIMIT OF HEIGHT AND WIDTH, TO BE SAME AS FOR 10 28 ¼ D 153.

23 LOCOMOTIVE TO OPERATE IN THE STATE OF CALIFORNIA, UNDER THE JURISDICTION OF THE CALIFORNIA INDUSTRIAL ACCIDENT COMMISSION AND MUST MEET ALL THE REQUIREMENTS OF THE STATE OF CALIFORNIA. SEE A. S. M. E. CODE ATTACHED (SUP. 1 3c)

24 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

25 BOILER TEST CERTIFICATE: THREE COPIES B. L. W. FORM 1036 AND FIVE COPIES B. L. W. FORM 1915.

26 FUEL OIL, SAME AS FOR 10 28 ¼ D 153, I.E., GRAVITY 19., FLASH 172, FIRE 218 DEGREES, COLD BELOW ZERO. (DEGREES GIVEN ARE FAHRENHEIT SCALE).

27 OIL BURNING ARRANGEMENT, HEINTZELMAN WITH BURNER IN FRONT OF FIRE BOX. ROYALTY, IF ANY, PAYABLE BY THE B. L. W. OIL CONTROL ON LEFT SIDE OF BACKHEAD IN CAB.

28 LONGITUDINAL SEAMS, BUTT JOINTED, WITH DOUBLE COVERING STRIPS, SEXTUPLE RIVETED.
CIRCUMFERENTIAL SEAMS DOUBLE RIVETED, LAP JOINTS.

29 CROWN STAYS TO HAVE TAPER FIT THROUGH CROWN SHEET AND RIVETED OVER.
CROWN STAYS 15/16" ON BODY, 1⅛" AT ENDS.
STAYBOLTS IN SIDES, THROAT AND BACKHEAD 1" DIAMETER.
HOLLOW STAYBOLTS BEHIND BRICK WORK IN FIRE BOX, OTHER WATER SPACE STAUBOLTS TO HAVE 3/16" HOLE 1¼" DEEP FROM OUTSIDE.

30 SUPERHEATER TO BE IN ACCORDANCE WITH THE SUPERHEATER CO'S SPECIFICATION NO. O-17244, DATED DEC. 6, 1921, (COPY ATTACHED) SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. W.

31 PATENT PLATE (HEREWITH) FROM THE SUPERHEATER COMPANY COVERING THE SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

32 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

33 SMOKE BOX SHEET ½" THICK, MADE SEPARATE FOR EASY REMOVAL.

34 CAB SASH OF HARDWOOD WITH DOUBLE STRENGTH GLASS.

35 CAB SEATS TO BE CONVENIENT WITH CUSHION AND TOOL BOX FOR ENGINEER AND FIREMAN.

36 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2 WITH INCANDESCENT HEADLIGHT.

37 FRAMES DOUBLE FRONT ENDS SECURELY BOLTED AND KEYED TO MAIN FRAME.

38 FRAME PEDESTAL CAPS OF FORGED STEEL.

39 GUIDES AND CROSSHEADS SAME AS FOR 10 28 ¼ D 153. PHOTO. 8029.

40 MAIN AND SIDE ROD TO HAVE GREASE CUPS FORGED ON.

41 LINKS, SLIDING BLOCKS AND ALL WEARING SURFACES TO BE CASE HARDENED. ALL PIN BEARINGS TO HAVE CASE HARDENED PINS AND BUSHINGS.

42 DRIVING TIRES TO HAVE M. M. STANDARD TREAD AND FLANGE.

43 DRIVING BOXES TO HAVE BRONZE WEARING PLATES ON SHOE AND WEDGE FACE.
DRIVING BOXES TO HAVE BRASS WEARING FACE CAST ON NEXT TO HUBS OF WHEELS.

44 DRIVING BOXES TO HAVE HARD GREASE CELLARS.

45 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN DRIVING BOX PEDESTAL FITS, 7/32" TOTAL.

46 FRONT ENGINE TRUCK FRAME TO BE CAST STEEL.

47 FRONT ENGINE TRUCK BOXES WITH BRASS WEARING FACES CAST ON NEXT TO HUBS OF WHEEL.

48 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN FRONT ENGINE TRUCK BOX PEDESTAL FITS, 5/16" TOTAL.

49 BACK ENGINE TRUCK BOXES WITH BRASS WEARING FACES CAST ON NEXT TO HUBS OF WHEEL.

50 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BACK ENGINE TRUCK BOX PEDESTAL FITS, 5/16" TOTAL.

51 AIR PUMPS REGULATED BY A 1¼" GOVERNOR SO ARRANGED THAT ONE OR BOTH PUMPS CAN BE OPERATED BY SAME GOVERNOR.

52 DRIVER BRAKE CUT-OUT PLACED IN CAB WITHIN REACH OF ENGINEER.

53 TOOLS TO INCLUDE ALL NECESSARY WRENCHES AND SPANNERS, ONE HARD AND ONE SOFT HAMMER, MONKEY WRENCH, COLD CHISEL, THREE OIL CANS, TWO JACK SCREWS AND TWO CAMEL BACK FROGS.

TENDER

61 TANK TOP, BOTTOM AND INSIDE TO BE ¼" THICK; OUTSIDE TO BE 3/16" THICK.

62 TANK TO HAVE TANK VALVES AND STRAINERS AND CLEANING HOLES.

63 FOOT BOARDS ACROSS BACK OF TENDER, WITH WROT IRON SUPPORTS.

THE BALDWIN LOCOMOTIVE WORKS {As Specn. C-6571, Dup. 6 38 D 79, (See sup. 4) Except where otherwise specified.

Memorandum Spec'n 20148.

SPECIFICATION FOR LOCOMOTIVES 6 38 D 141 and 142. Gen. as Photo. 5973. {Except to have inside steam pipes and electric headlight dynamo.

FOR Donora Southern Railroad Company. 12-21-20. **Engine Drawing No.** —24

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"

Total wheelbase, eng. and tend. {Actual 45' 0" Limited to ----

Curves 150 ft. radius, with rails spread to 4'9".

No. 4 Frogs. Grades, 3%.

Limits, Height --- Width 10' 0"

Weight (approximate) in working order, Total 165,000 pounds.

On F. tr'k --- lbs., Drivers 165,000 lbs., B. tr'k ---- lbs.

Tractive power 41,100 lbs., Ratio of adhesion 4.02

Work'g St'm Pres. 200 lbs., Service Switching.

Fuel Soft coal.

2 **Boiler** Steel. Thick ¾" and 13/16" Bill 9339.

Front Tube Sheet ½" Thick

Boiler, Diam. 74" Plan Extended wagon top.

Tested to {Allowable st'm pres. 200 lbs. 220 lbs. steam pres. With Factor of Safety of 4.7 267 lbs. water pres.

Longitud. seams (See sup. 5)

1 **Dome,** diam. 33" Pos. Forward of fire box.

2 **Firebox** Steel. Combustion chamb. None.

Firebox, length 110" Width 41⅛" Depth F. 75" B. 71½"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

1 Firedoor opening 16" diam.

Water space, Front 4" Sides 3½" Back 3½"

Water space frame Single. Riveted

9 Water space stays ⅜" diam. with 3/16" holes 1¼" deep from O.S. {Three rows B. L. W.

Radial stays 1" diam. Sling stays front {Expansion stays.

Button heads below crown on Eight contral rows

Crown bars None. Placed --- above crown

Crown bolts ---

Flues ---

2 **Tubes** No. 12 B. W. G. Cold drawn seamless steel.

Tube ends Swaged for copper ferrules fire box ends.

Number 371 Diam. 2" Length 10' 6"

Heating Surface {Flues --- Combus. Chamb. --- Total 2202 sq. ft. {Tubes 2023 sq. ft. Fire Box 179 sq. ft. Fire Brick Tubes ---

Grate area 31.5 sq. ft. Ratio to Heating Surface 1: 69.9

Superheater

Fire Brick Arch, None.

Grates Rocking bars with drop plate, front and rear.

11 **Ash Pan,** Dampers Front and back.

Throttle Balance. Pos. Dome.

Dry pipe Steel.

Superheater None.

Smokebox extension With Cleaning hole and cap L. S. Only.

Spark {deflector hopper With.

Netting and deflect. plates With. /

Exhaust nozzles Double, high.

Stack Cast iron, Straight. Dia. 16".

Safety Valves (Spec) Three Coale 3" Open.

Safety valves None, with relief lever, Set to 200 pounds

Whistle One Chime.

Steam Gauge One Iron 7". Maker: Ashcroft.

Steam gauge stand Iron. **Clock** None.

10 **Water Gauge** One Klinger. **Cab Lamps** Three Electric.

Gauge Cocks Three back. Surface valve None.

Lowest gauge cock 5½" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve Riggin.

Blow off Cock One Everlasting, Pos: Left side.

Cleaning Plugs One plug above fire door.

Firebox, Corners diagonal and right side.

Crown, Three each side and two back.

Waist, One under front.

Front tube sheet, One. Fusible plug One.

Pump None.

Injectors Two Sellers, Class "K" (Spec) No. 10½

Injectors, Pos. Right and left. Steam pipes Copper.

Pipes, Check Iron. Feed Iron. Overflow Iron (Sup. 11)

Check (See sup. 12) Pos. Right and left.

Steam Heat for Train, None; For cab, (See sup. 13)

2 14 **Cab** Steel, lined with wood. Ventilator in cab roof.

Cab boards Steel. Nosing T-iron.

16 Running boards Steel. Nosing T-iron.

Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 34½"

37 Franklin Radial buffer between engine and tender.

Pilot None. Pushing shoes at front.

Front Bumper Oak, 14" x 16". Bumper plate (See sup. 15)

16 **Steps** across front, with hand rail.

16 **Front Drawhead,** Center above rail 33½"

Coupler Simplex M. C. B. Automatic.

Signal fixtures None.

17 **Headlight** Two round case 18" Reflector,

Headlight, Nos. on sides With. H'd'l't step With.

Lamp shelf None. Nosing ----

Bell 92 pounds. Bell ringer, Collmar automatic.

Sand Box Two Diam. 31" Body Iron painted. Pipes Iron.

Sander (Spec) Leach air, trap A-1, in each box, to sand front and back.

Dome casing Iron painted.

Boiler Jacket #18 Soft steel pod. Bands Iron. Style 9

Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

L. G. Tandy April-1920

SPECIFICATION FOR LOCOMOTIVES 6 38 D 141 and 142.

FOR Donora Southern Railroad Company.

20 **Frames** Cast steel.

Cylinders, Diam. 22" Stroke 26"

St'm ports, Length 26½" Width 1⅞" Bridges ---

18 Exh. ports, Length --- Width --- Valve lead 1/32"

Valve travel 5¼" Steam lap ⅞" Exhaust clearance ---

Eccentric (Spec) throw 4⅝" By-pass valve None.

S. F. Lubr. Nathan triple No. 9 Bull's Eye.

Cyl'r heads Cast iron. Lubr. pipes of copper under jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

St'm chest casings --- Covers ---

St'm chest valves 11" diam. Piston type.

Met. pkg. (Spec) Piston rods twelve sets Jerome.

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron with rings of cast iron sprung in.

Guides Alligatory type, steel. Oil cups Needle.

Crossheads Cast steel, with bearings of brass.

Wrist Pins Steel. Rod cups Plunger, forged on rods.

Parallel rods to have solid ends.

19 **Valve Motion** Stephenson.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Brass.

Drivers, O. S. Diam. 52" Cen. diam. 44" centers cast steel.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. Front and back. Size 4" x 5½"

Tires, Plain, Pos. Middle Size 4" x 6½"

Lateral play between driving boxes and wheel hubs = 3/16" total.

20 21 **Driving Boxes** Cast steel.

Journals, Diam. 9" Length 12"

Springs. Make B. L. W.

Front Engine Truck None. Wheeled

To swing -- each side of cen., Cen. pin liners ---

Journals, Diam. -- Length -- Boxes --

Wheel hub liners --

Wheels, Diam. -- Tread -- Kind --

Tires -- Cen. diam. -- Size --

Tires held by --

Back Engine Truck None. Wheeled --

To swing -- each side of cen., Cen. pin liners --

Journals, Diam. -- Length -- Boxes --

Wheel hub liners --

Wheels, Diam. -- Tread -- Kind --

Tires -- Cen. diam. -- Size --

Tires held by --

22 **Brake,** position On all driving and tender wheels.

Operating {Engine, sch. A-1, and SNA Vestg. Automatic and Parts' {Eng. Tr'k, sch. --- straight air.

24 Foundation {Drivers, sch. NM-3-BC American outside equalized. Parts {Eng. Tr'k, sch. ----

Air pump One 8½" Cross compound. Pos: Left side.

Train connections Front and back.

Train signal, sch. None.

Tender Eight Wheeled, Drawing No. 1657.

Weight, with fuel and water, about 116,000 lbs.

Tender to be weighed: Yes.

24 **Tank** 6,000 Gallons, Bill 5610

24 Tank "U" shape, sloping back. Fuel capacity, 6 tons.

Tool Boxes Hard wood, top.

Frame of structural steel, 12" channels with heavy transoms and cast steel center plates.

31 Front Drawbar height 34"

Pilot None. Pushing shoes at rear.

Back drawhead, center above rail 33½"

38 **Coupler** Simplex M. C. B. Auto. with 5" x 7" shank and Vestg.

38 **Draft Gear** Inghouse Farlow.

38 **Steps** front and rear, with hand rail.

Steps on sloping back of tank.

Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic. Make: B. L. W.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind Schoen pressed steel.

Tires ---- Cen. diam. ---- Size ----

Tires held by ---- Wheel rims, 2½" thick.

Safety chains Single.

Brake Position On all wheels. Brake beams to be Davis No. 3.

Brake sch. FL-1212 and SNB Vestg. Auto. and straight air.

List of tools, sch. 29.

Photo sch: No. 2. Inspection: B. L. W. (See sup. 3)

To be weighed Yes. Material specns (See sup. 1 etc)

Certificate of boiler test Three copies B.L.W. form 1036.

Junior laws to 2-1-21. Shipment On own wheels.

Brass shop finish, No. 1.

Machine shop finish D-165.

Springs. Make B. L. W. / Patents. None.

Property plates None.

Painting, style --- Olive green, no striping.

Lettering, etc., in gold leaf, similar to 6 38 D 79.

26 Mark on cab sides: D. S. R. R.

26 Mark on tank sides: Donora Southern R. R.

Road Nos. Pos. 26 Road Nos. Name None.

F. No. Plate. 19

26 Sand boxes. 20

Cab panels.

Back of tank.

Actual Dimensions of Loco. Extreme height over all 14' 9"

Extreme Width: Cab boards 9' 11"; Cylinders or valve motion = 9' 9"

Length outside face front bumper of engine to face of tender wedge = 30' 2⅝"

Length face of tender wedge to outside face back bumper of tender = 26' 9⅝"

Total length outside face front bumper of engine to outside face back bumper of tender = 57' 0"

SPECIFICATION FOR LOCOMOTIVES 6 38 D 141 AND 142.

FOR DONORA SOUTHERN RAILROAD COMPANY.

HNW.

1 ALL MATERIALS, SOLD OR MANUFACTURED BY ANY CONSTITUENT COMPANY OF THE UNITED STATES STEEL CORPORATION WHICH ARE USED IN THE CONSTRUCTION OF THIS LOCOMOTIVE ARE TO BE PURCHASED FROM SUCH COMPANY, EXCEPT (SEE SUP. 2)

2 RY. CO. TO FURNISH SREE THESE WORKS BOILER, FIRE BOX AND TANK PLATES, AND TUBES, ALSO CAB AND MISCELLANEOUS STEEL PLATES. FOR ALL ORDERS FOR TUBES AND PLATES, SEND THE ORIGINAL AND ONE COPY TO MR. J. M. FLEMING, PURCHASING AGENT, DONORA SOUTHERN R. R., CLEVELAND, OHIO, AND ONE COPY TO MR. R. P. KEENOY, SUPT., 15TH ST., AND PENNA. AVE., PITTSBURGH, PA.

3 MATERIALS AND WORKMANSHIP TO BE INSPECTED BY MR. C.F.W. RYS, METALLURGICAL ENGINEER, CARNEGIE STEEL COMPANY, PITTSBURGH, PA., FURNISH TO HIM TWO (2) COPIES OF ORDERS FOR MATERIALS TO BE INSPECTED, AND ONE COPY OF DRAWING ROOM SPECIFICATION. CO'S ORDER NUMBER DS-819-A TO APPEAR ON ALL ORDERS FOR MATERIALS SUBJECT TO INSPECTION BY MR. RYS.

4 PARTICULAR ATTENTION TO BE GIVEN TO KEEPING ALL PARTS DUPLICATE OF PARTS USED ON 6 38 D 79.

5 LONGITUDINAL BOILER SEAMS TO BE BUTT JOINTED WITH DOUBLE COVERING STRIPS, SEXTUPLE RIVETED 90% SEAMS.

6 MAIN DOME TO BE ONE PIECE TYPE.
AUXILIARY DOME TO BE PROVIDED FOR SAFETY VALVES AND WHISTLE.

7 FIRE DOOR OPENING TO HAVE O'CONNOR FLANGE.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

8 PATENT PLATES NOS. 8796 AND 8797 (HEREWITH) FROM PRATT & O'CONNOR, COVERING O'CONNOR FIRE DOOR FLANGE TO BE ATTACHED TO BACK HEAD OF BOILER WITH ¼" MACHINE SCREWS TAPPED HALF WAY THRU SHEET.

9 FLEXIBLE STAYBOLTS, ABOUT 700 AMERICAN 15/16" DIAM. TO BE APPLIED IN BREAKING ZONE.

10 WATER GAUGE TO HAVE B. L. W. FITTINGS.

11 INJECTOR OVERFLOW TO BE PIPED TO ASH PAN.

12 INJECTOR CHECKS TO BE SELLERS 2" MAIN CHECK AND STOP VALVE, CLASS "C".

13 STEAM HEAT TO BE PROVIDED IN RIGHT AND LEFT SIDES OF CAB.

14 STEAM TURRET TO BE PROVIDED IN CAB.

15 PLATE OF STEEL 1¼" THICK BY 15" DEEP, TO BE APPLIED BACK OF FRONT BUMPER.

16 LOCOMOTIVE WILL BE USED IN I. C. C. SERVICE AND MUST MEET ALL REQUIREMENTS OF THE U. S. SAFETY APPLIANCE STANDARDS AND OF THE I. C. C.
ENGINE TO CONFORM TO THE U. S. SAFETY APPLIANCE STANDARDS, I.E., RUNNING BOARDS, STEPS, COUPLERS, HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

17 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, FOR INCANDESCENT HEADLIGHTS.

18 CYLINDERS TO BE PROVIDED WITH PORT DOOR.

19 RAGONNET POWER REVERSE GEAR COVERED BY EXTRA ORDER NO. 5767, DATED 2-1-21.

20 PEDESTAL SHOES AND GIB OF CAST STEEL.

21 DRIVING BOX PEDESTAL FACES TO BE LINED WITH BABBITT (ACCOUNT OF STEEL WEDGE AND GIB).

22 ENGINEERS BRAKE VALVE TO BE WESTINGHOUSE G-6.
STRAIGHT AIR BRAKE VALVE TO BE S-3-A.

23 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

24 FOUNDATION BRAKE TO BE AS SHOWN ON AMERICAN BRAKE CO'S DRAWING 71897.

26 ROAD NUMBERS ON SAND BOXES TO BE IN 5" FIGURES.
THE ROAD NUMBER ON SAND BOXES TO BE ON FRONT BOX ON RIGHT SIDE AND ON BACK BOX ON LEFT SIDE.
MARK ON CAB WITH ROAD NUMBERS UNDERNEATH, IN 7" LETTERS AND FIGURES.
MARK ON TANK TO BE IN 7" LETTERS.

TENDER

36 OIL BOX TO BE PROVIDED IN LEFT SIDE OF FRONT END OF "U", BUILT INTO TANK.

37 FRANKLIN RADIAL BUFFER BETWEEN ENGINE AND TENDER.

38 LOCOMOTIVE WILL BE USED IN I. C. C. SERVICE, AND MUST MEET ALL REQUIREMENTS OF THE U. S. SAFETY APPLIANCE STANDARDS, AND OF THE I. C. C.
TENDER TO CONFORM TO U. S. SAFETY APPLIANCE STANDARDS, I.E., RUNNING BOARDS, STEPS, COUPLETS, HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

THE BALDWIN LOCOMOTIVE WORKS {SUP. 12 3+½ E 47 WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20090

SPECIFICATION FOR LOCOMOTIVES 12 3+½ E 57

WG

FOR THE EAST BROAD TOP RAILROAD AND COAL COMPANY

HB

Gen as PHOTO. 5976

Engine Drawing No. 17

Gauge of Road 3' 0" Play ⅜"

Wheelbase, Rigid 13' 6" Driving 13' 6" Total 28' 8"

Total wheelbase, eng. and tend. {Actual 54' 8½" / Limited to ---

GRADES 2½% RAILS:- 60 LBS. PER YARD

Curves {17 DEGREES, (338 FT.) ON MAIN LINE / {23 DEGREES, (250 FT.) ON Y'S

Limits, Height 12'10" Width 9'0"

Weight (approximate) in working order, Total 161,000 POUNDS

On F. tr'k 11,000 lbs., Drivers 131,000 lbs. B. tr'k 19,000 lbs.

Tractive power 30,600 lbs. Ratio of adhesion 4.28

Work'g St'm Pres. 180 lbs., Service PASS. AND FREIGHT

Fuel SOFT COAL

1 34 **Boiler** STEEL Thick ⅞" Bill 9104

Front Tube Sheet ½" Thick

Boiler, Diam. 66" Plan STRAIGHT TOP

3 Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

6 With Factor of Safety of 5.7 300 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

37 **Dome,** diam. 29" Pos. CENTRAL

5 39 **Firebox** STEEL Combustion chamb. NONE

Firebox, length 101 11/16" Width 59⅜" Depth F. 62¼" B. 51½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

40 Firedoor opening 16" DIAMETER

Water space, Front 3½" Sides 3" Back 3"

Water space frame DOUBLE Riveted

7 Water space stays ⅞" DIAM. (SEE SUP. 41 &c)

42 Radial stays 1" DIAM. Sling stays front {TWO ROWS B.L.W. EXPANSION STAYS

Button heads below crown on EIGHT central rows

Crown bars NONE Placed --- above crown

Crown bolts ----

Tubes #11 W. G. STEEL

Tubes #11 W. G. HOT ROLLED SEAMLESS STEEL

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 22 / 147 Diam. 5⅜" / 2" Length 17'6"

Heating Surface Flues 539⁰ Combus. Chamb. --- Total 2020⁰

Tubes 1340⁰ Fire Box 141⁰ Fire Brick Tubes ---

Grate area 42.5⁰ Ratio to Heating Surface 1: 47.6

Superheater 465⁰

Fire Brick ARCH NONE

Grates ROCKING BARS WITH DROP PLATE (SEE SUP. 44)

Ash Pan, Dampers NONE (SUP. 45, 73)

THROTTLE TO BE PROVIDED WITH AUXILIARY DRIFTING VALVE.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater SCHMIDT TYPE (SEE SUP. 49)

50 **Smokebox** extenstion WITH Cleaning hole and cap L.S. ONLY

Spark ejector ~~on tapper~~ (SEE SUP. 80)

Netting and deflect. plates WITH

Exhaust nozzles SINGLE HIGH

Stack CAST IRON, STRAIGHT Dia. 18"

STACK TO HAVE EXTENDED END FOR CLEANING PIPE.

4-7-20 (SPEC)

53 **Safety Valves** TWO CONSOLIDATED 3" OPEN

Safety valves BOTH with relief lever, Set to 180 POUNDS

Whistle (SEE SUP. 54)

55 **Steam Gauge** ONE IRON 7" MAKER: ASHCROFT (SPEC)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE (SEE SUP. 56) 57 **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

58 **Blower Valve** B.L.W.

Blow off Cock ONE (SEE SUP. 59)

17 **Cleaning Plugs** ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS DIAGONAL, FRONT AND BACK.

Crown, TWO EACH SIDE AND TWO BACK.

Waist, ONE UNDER FRONT

Front tube sheet, TWO Fusible plug ONE

Pump NONE

15 60 **Injectors** TWO HANCOCK (SPEC) No. 8

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

33 Pipes, Check IRON Feed IRON Overflow IRON

Check B.L.W. WITH STOP VALVE Pos. R. AND L.

33 61 **Steam Heat** CONSOLIDATED CAR HEATING Co's SYSTEM WITH TRAIN CONNECTIONS ON RIGHT SIDE OF TENDER.

Cab STEEL (SUP. 62, 63, 71)

Cab boards WOOD Nosing ANGLE IRON

Running boards WOOD Nosing ANGLE IRON

Hand rail IRON Located on BOILER

65 71 **Back Bumper** BAR STEEL Back drawbar height 24"

64 **Pilot** WOOD, SHORT PATTERN Pushing shoes NONE

Front Bumper (SEE SUP. 72) Bumper plate WITH

Steps (SEE SUP. 73)

Front Drawhead, Center above rail 26"

73 **Coupler** CLIMAX AUTO. THREE-QUARTER SIZE, OF CAST STEEL.

Signal fixtures IRON ON BUMPER

74 **Headlight** ONE ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH H'dl't step WITH

Lamp shelf NONE Nosing ---

76 **Bell** 92 POUNDS BELL RINGER (SEE SUP. 75)

Sand Box (SPEC) TWO Diam. 31" Body IRON PAINTED Pipes IRON

Sander LEACH AIR, TRAP A-1 IN EACH BOX TO SAND FRONT OF FORWARD DRIVERS AND BACK OF REAR DRIVERS.

Dome casing IRON PAINTED

77 **Boiler Jacket** #18 SOFT STEEL Pto. Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

LAGGING OVER STAYBOLTS TO BE REMOVABLE.

THE BALDWIN LOCOMOTIVE WORKS

W.E. Moore. JULY, 1920

SPECIFICATION FOR LOCOMOTIVES 12 3+½ E 57

FOR THE EAST BROAD TOP RAILROAD AND COAL COMPANY

HB

102

10

Frames CAST STEEL

Cylinders Diam. 20" Stroke 24"

Saddle casting, Length 96 3/4" Width 12" Bridges —

Exh. ports, Length --- Width --- Valve bar ⅝"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ---

Eccentric rank throw 20" Bronze valve NONE

S.P. Link DETROIT FIVE FEED No. 40 BULLS EYE (SEE SUP. 90) (SPEC)

Cyl'r bushs. CAST IRON

Cyl'r castings IRON PTD. Head covers STEEL PAINTED

Steam chest castings --- Covers ---

Steam chest valves 9" DIAM. PISTON TYPE

Valve stem packing (SPEC) UNITED STATES, KING TYPE.

Pistons CAST IRON RINGS SPRING INTO SOLID HEAD

Guides O. H. STEEL (SUP. 92 &c) Oil cups (SUP. 92)

Crossheads CAST STEEL

Wrist Pins STEEL Rock. bgs. (SEE SUP. 95 & 97)

Valve Motion SOUTHERN

All links, shaking blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboltts) to be United States Standard.

All bushed movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.

Driving wheel hub liners (SEE SUP. 105)

Drivers. O. S. Diam. 48" Cen. diam. 42" CENTRES CAST IRON.

Tires HARD STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"

Tires, Plain, Pos. INTERMEDIATE Size 3" x 6"

Lateral play between driving boxes and wheel hubs (1/16" TOTAL)

Driving Boxes CAST STEEL (SEE SUP. 87, 106)

Journals, Diam. 8" Length 8"

Springs. Make B.L.W.

Front Engine Truck TWO Wheels SWING BOLSTER CENTER BEARING

To swing 4" each side of cen. Cen. pin liners NONE

Journals, Diam. 4" Length 7" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 24" Tread --- Kind CAST IRON SPOKE CENTRE

Tires STEEL Cen. diam. 19" Size 2½" x 5"

Tires held by SHRINKAGE AND SHOULDER

Back Engine Truck TWO Wheels BALDWIN RADIAL O.S. BEARING

To swing 4" each side of cen. Cen. pin liners NONE

Journals, Diam. 5" Length 9" Boxes CAST STEEL

Wheel hub liners (SEE SUP. 110)

Wheels, Diam. 25" Tread --- Kind CAST IRON SPOKE CENTRES

Tires STEEL Cen. diam. 21" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Engine, sch. NO. 6 ET WESTG. COMBINED AUTO. AND STRAIGHT AIR.

Parts Eng. Trk. sch. ---

115 Foundation Driver, sch. N-2 AMERICAN O.S. EQUALIZED

Parts Eng. Trk. sch. ---

114 Air pump TWO 11" Pos. BOTH ON LEFT SIDE

Train connections FRONT AND BACK

111 Train signal, sch. "L"

112 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

121 **Tender** EIGHT Wheeled, Drawing No. 435

Weight, with fuel and water, about 90,000 POUNDS

TENDER TO BE WEIGHED:- YES

122 **Tank** 4,500 Gallons Bill 46H8

TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 8½ TONS.

Tool Boxes OF HARD WOOD, TO--.

TENDER FLOOR BOARDS TO BE SPACED ABOUT 1" APART.

Frame STEEL, 10" CHANNELS, WITH BUMPERS OF WOOD.

FRAME TO BE SAME AS FOR 12 3+½ E 47, WITH WOOD FLOOR.

125 Front Drawbar height 23½"

Pilot NONE Pushing shoes NONE

Back drawhead, center above rail 28"

126 **Coupler** CLIMAX AUTO. THREE-QUARTER SIZE OF CAST STEEL

Shank (SEE SUP. 127)

SIDE BEARINGS ON BOTH FRONT AND BACK TENDER TRUCKS.

135 **Trucks** VULCAN TYPE WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, B.L.W.

129 Journals, Diam. 4½" Length 8"

131 Wheels, Diam. 26" Tread --- Kind CAST IRON SPOKE CENTER

Tires STEEL Cen. diam. 21" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER

Safety chains SLINGLE

132 **Brake** Position ON ALL WHEELS

Brake sch. NO. 6 ET WESTG. AUTO. AND STRAIGHT AIR, WITH 10" x12" TENDER BRAKE CYLINDER.

BRAKE SHAFT TO PASS THROUGH THE END OF TANK, TO BE OUT OF THE WAY OF FIRE MAN.

List of tools, sch. 29 TWO JOHNSON REPLACERS FOR 60 POUND RAILS

Photo sch. NONE Inspection B.L.W. EXCEPT (SEE SUP. 35 &c 86, 113)

To be weighed NO Material Specs. B.L.W.

Certificate of boiler test (SEE SUP. 36)

Junior lawe to 6.20.20. Shipment ON CAR (SEE SUP. 78)

Brass shop finish, No. 1

Machine shop finish D-165

Patents B.L.W. FEED PIPE STRAINER, PAT. SEPT. 1, 1903 (CAST ON)

Property plates NONE

Painting, style --- OLIVE GREEN, NO STRIPING

LETTERING ETC., IN LIGHT CHROME YELLOW (ORANGE) SAME AS FOR 12 3+½ E 47. FIGURES TO BE 5" ON DOME AND 10" ON CAB SIDES AND 12" x 12" ON BACK OF TANK.

MARK ON TANK SIDES: E. B. T. IN 12" LETTERS.

	Road Nos. Pos.	Road Nos.	Name
F. No. PLATE		18	
DOME			
CAB SIDES			
BACK OF TANK			

Actual Dimensions of Loco. Extreme height over all 12' 10"

Extreme Width: Cab boards 9' 0" ---------- valve motion 8' 2"

Length outside face front bumper of engine to face of tender wedge 36' 6⅝"

Length face of tender wedge to outside face back bumper of tender 23' 9⅜"

Total length outside face front bumper of engine to outside face back bumper of tender 60' 4"

THE BALDWIN LOCOMOTIVE WORKS {Sup. 12 3+½ E 47 with same extras except where otherwise specified.

Memorandum Spec'n 20090

SPECIFICATION FOR LOCOMOTIVES 12 3+½ E 57

WS

FOR The East Broad Top Railroad and Coal Company

HW

Gen'l as Photo. 5976

Engine Drawing No. 17

Gauge of Road 3' 0" Play 8"

Wheelbase, Rigid 13' 6" Driving 13' 6" Total 28' 8"

Total wheelbase, eng. and tend. {Actual 54' 8½" / Limited to ---

Grades 2½% Rails:- 60 lbs. per yard

Curves {17 degrees, (338 ft.) on main line / 23 degrees, (250 ft.) on Y's

Limits, Height 12'10" Width 9'0"

Weight (approximate) in working order, Total 161,000 pounds

On F. tr'k 11,000 lbs., Drivers 131,000 lbs., B. tr'k 19,000 lbs.

Tractive power 30,600 lbs. Ratio of adhesion 4.28

Work'g St'm Pres. 180 lbs., Service Pass. and Freight

Fuel Soft Coal

1 34 **Boiler** Steel Thick 7/16" Bill 9104

Front Tube Sheet ½" Thick

Boiler, Diam. 66" Plan Straight Top

3 6 (Allowable st'm pres. 200 lbs. / With Factor of Safety of 5.7) **Tested to** 220 lbs. steam pres. / 300 lbs. water pres.

Longitud. seams Butt jointed, double covering strips.

37 **Dome,** diam. 29" Pos. Central

5 39 **Firebox** Steel Combustion chamb. None

Firebox, length 101 11/16" Width 59 7/8" Depth F. 62¼" B. 51½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

40 Firedoor opening 16" diameter

Water space, Front 3½" Sides 3" Back 3"

Water space frame Double Riveted

7 Water space stays ⅞" diam. (See sup. 41 &c)

42 Radial stays 1" diam. Sling stays front {Two rows B.L.W. Expansion Stays

Button heads below crown on Eight central rows

Crown bars None Placed --- above crown

Crown bolts ----

43 Flues #9 W. G. Steel

Tubes #11 W. G. Hot Rolled Seamless Steel

Tube ends Swaged for copper ferrules, fire box ends.

Number 22 / 147 Diam. 5⅜" / 2" Length 17'6"

Heating Surface Flues 5390 Combus. Chamb. --- Total 2020⁰

Tubes 1340 Fire Box 141⁰ Fire Brick Tubes ---

Grate area 42.5⁰ Ratio to Heating Surface 1: 47.6

Superheater 465⁰

Fire Brick Arch None

Grates Rocking bars with drop plate (See sup. 44)

Ash Pan, Dampers None (Sup. 45, 73)

Throttle to be provided with auxiliary drifting valve.

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater Schmidt type (See sup. 49)

50 **Smokebox** extenstion With Cleaning hole and door L.S. Only

Spark ejector ~~as heretofore~~ (See sup. 80)

Netting and deflect. plates With

Exhaust nozzles Single High

Stack Cast Iron, Straight Dia. 18"

Stack to have extended end for cleaning pipe.

4-7-20 (spec)

53 **Safety Valves** Two Consolidated 3" Open

Safety valves Both with relief lever, Set to 180 pounds

Whistle (See sup. 54)

55 **Steam Gauge** One Iron 7" Maker: Ashcroft (spec)

Steam gauge stand Iron **Clock** None

Water Gauge One (See sup. 56) 57 **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome

58 **Blower Valve** B.L.W.

Blow off Cock One (See sup. 59)

17 **Cleaning Plugs** One plug above fire door.

Firebox, Corners diagonal, front and back.

Crown, Two each side and two back.

Waist, One under front

Front tube sheet, Two Fusible plug One

Pump None

15 60 **Injectors** Two Hancock (spec) No. 8

Injectors, Pos. Right and Left Steam pipes Copper

33 Pipes, Check Iron Feed Iron Overflow Iron

Check B.L.W. with stop valve Pos. R. and L.

33 61 **Steam Heat** Consolidated Car Heating Co's system with train connections on right side of tender.

Cab Steel (Sup. 62, 63, 71)

Cab boards Wood Nosing Angle Iron

Running boards Wood Nosing Angle Iron

Hand rail Iron Located on Boiler

65 71 **Back Bumper** Bar Steel Back drawbar height 24"

64 **Pilot** Wood, short pattern Pushing shoes None

Front Bumper (See sup. 72) Bumper plate With

Steps (See sup. 73)

Front Drawhead, Center above rail 26"

73 **Coupler** Climax auto. three-quarter size, of cast steel.

Signal fixtures Iron on Bumper

74 **Headlight** One round case 18" Reflector,

Headlight, Nos. on sides With H'd'l't step With

Lamp shelf None Nosing ---

76 **Bell** 92 pounds Bell Ringer (See sup. 75)

Sand Box (spec) Two Diam. 31" Body Iron Painted Pipes Iron

Sander Leach air, trap A-1 in each box to sand front of forward drivers and back of rear drivers.

Dome casing Iron Painted

77 **Boiler Jacket** #18 Soft Steel Pto. Bands Iron Style 9

Boiler Lagging Magnesia Sectional

Lagging over staybolts to be removable.

THE BALDWIN LOCOMOTIVE WORKS

W. E. Moore July 1920

SPECIFICATION FOR LOCOMOTIVES 12 3+½ E 57

FOR The East Broad Top Railroad and Coal Company

HW

86 **Frames** Cast Steel

88 **Cylinders,** Diam. 20" Stroke 24"

Str'm ports, Length 20, 3+" Width 1½" Bridge ---

Exh. ports, Length --- Width --- Valve ibs 1"

Valve travel 5½" Steam lap 1" Exhaust clearance ---

Eccentric crank throw 20" By-pass valve None

S. P. Lubr. (spec) Detroit five feed No. 42 Bulls Eye (See sup. 90)

Cyl'r heads Cast Iron

Cyl'r casings Iron Pto. Head covers Steel Painted

Str'm chest nasings --- Covers ---

Str'm chest valves 9½" diam. Piston Type

Met. pkg (spec) United States, King Type.

91 **Pistons** Cast Iron rings sprung into solid head.

Guides O. H. Steel (Sup. 92 &c) Oil cups (Sup. 92)

94 **Crossheads** Cast Steel

96 **Wrist Pins** Steel and Rod caps (See sup. 95 & 97)

82 98 **Valve Motion** Southern

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.

Driving wheel hub liners (See Sup. 106)

106 **Drivers,** O. S. Diam. 48" Cen. diam. 42" Centres Cast Iron.

83 99 **Tires** Hard Steel Held by Shrinkage and Shoulder

Tires, Flanged, Pos. Front and Back Size 3" x 5½"

Tires, Plain, Pos. Intermediate Size 3" x 6"

Lateral play between driving boxes and wheel hubs 1/16" total

Driving Boxes Cast Steel (See sup. 87, 106)

32 **Journals,** Diam. 8" Length 8"

107 **Springs.** Maker B.L.W.

Front Engine Truck Two Wheeled Swing bolster center bearing

To swing 4" each side of cen. Cen. pin liners None

Journals, Diam. 4" Length 7" Boxes Cast Iron

Wheel hub liners None

109 Wheels, Diam. 24" Tread --- Kind Cast Iron spoke centre

Tires Steel Cen. diam. 19" Size 2½" x 5"

Tires held by Shrinkage and Shoulder

Back Engine Truck Two Wheeled Baldwin radial O.S. bearing

To swing 4" each side of cen. Cen. pin liners None

Journals, Diam. 5" Length 9" Boxes Cast Steel

Wheel hub liners (See Sup. 110)

109 Wheels, Diam. 26" Tread --- Kind Cast Iron Spoke Centres

Tires Steel Cen. diam. 21" Size 2½" x 5½"

Tires held by Shrinkage and Shoulder

Brake, position On all driving and tender wheels

Operating Engine, sch No. 6 ET Westg. combined auto. and straight air.

Parts Eng. Tr'k, sch ---

115 Foundation Drivers, sch. N-2 American O.S. Equalized

Parts Eng. Tr'k, sch. ---

114 Air pump Two 11" Pos. Both on left side

Train connections Front and back

111 Train signal, sch. "L"

112 Air Reservoirs to have hydrostatic test of 210 pounds.

121 **Tender** Eight Wheeled, Drawing No. 435

Weight, with fuel and water, about 90,000 pounds

Tender to be weighed:- Yes

122 **Tank** 4,500 Gallons, Bill 4848

Tank "U" shape, straight top. Fuel capacity 6½ tons.

Tool Boxes of hard wood, top.

Tender floor boards to be spaced about 1" apart.

Frame Steel, 10" channels, with bumpers of wood.

125 Frame to be same as for 12 3+½ E 47, with wood floor.

Front Drawbar height 23½"

Pilot None Pushing shoes None

Back drawhead, center above rail 26"

126 **Coupler** Climax, auto, three-quarter size of cast steel

Shoe (See sup. 127)

Side bearings on both front and back tender trucks.

128 **Trucks** Vulcan type, with cast steel bolsters.

Springs Elliptic, B.L.W.

129 Journals, Diam. 4½" Length 8"

131 Wheels, Diam. 26" Tread --- Kind Cast Iron spoke center

Tires Steel Cen. diam. 21" Size 2½" x 5½"

Tires held by Shrinkage and Shoulder

Safety chains Single

132 **Brake** Position On all wheels

Brake sch. No. 6 ET Westg. auto. and straight air, with 10" x 12" tender brake cylinder.

Brake shaft to pass through the end of tank, to be out of the way of fire man.

List of tools, sch. 29 Two Johnson replacers for 60 pound rails

Photo sch. None Inspection B.L.W. except (See sup. 35 &c 86, 113)

To be weighed No Material specs B.L.W.

Certificate of boiler test (See sup. 36)

Junior laws to 6.20.20. Shipment On car (See sup. 78)

Brass shop finish, No. 1

Machine shop finish D-165

B.L.W. Feed Pipe Strainer, Pat. Sept. 1, 1903 (cast on)

Patents

Property plates None

Painting, style --- Olive Green, No striping

Lettering etc., in light chrome yellow (orange) same as for 12 3+½ E 47, figures to be 5" on dome and 10" on cab sides and 12" x 12" on back of tank.

Mark on tank sides: E. B. T. in 12" letters.

Road Nos. Pos.	Road Nos	Name
F. No. Plate	18	None
Dome		
Cab Sides		
Back of Tank		

Actual Dimensions of Loco. Extreme height over all 12' 10"

Extreme Width: Cab boards 9' 0" ~~Guard irons~~ valve motion 8' 2"

Length outside face front bumper of engine to face of tender wedge 36' 6⅝"

Length face of tender wedge to outside face back bumper of tender 23' 9⅜"

Total length outside face front bumper of engine to outside face back bumper of tender 60' 4"

SPECIFICATION FOR LOCOMOTIVES 12 34 ½ E 57

FOR THE EAST BROAD TOP RAILROAD AND COAL COMPANY

RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF PENNSYLVANIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

Tubes may have variation in gauge of 10% either way.

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.

ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYBOLT DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

13 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES;

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1½"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	⅜"	7/16"	⅞"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S

PENNSYLVANIA
(State in which boiler is to be used)
NO. 14
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (State's number)
(LEAVE BLANK) (Year put in service)
(manufacturer's serial number)
180 LBS.
(Maximum working pressure when built)

104
103

CLASS: 12 34 ½ E 57

FOR: THE EAST BROAD TOP RAILROAD AND COAL COMPANY.

Specification for Type A Double Loop Superheater. SPEC. NO. D-14157 DATED JUNE 15TH, 1920.

BOILER TUBES 147 in number 2 o.d. ← 17 ft 6 in over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.

BOILER FLUES 22 in number 5½ o.d. 89 BWG of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card 1409-A

BOILER FLUE SETTING ½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, headed and prosser-ed except for copper sheets. Front end to be rolled and headed. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card 1136

TUBE SHEET LAYOUT Card 5691

UNITS 22 units 1½ o.d. 89 BWG. Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends.
Each unit to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.

UNIT PIPE SUPPORTS Of steel fastened securely on superheater pipes so as not to slide. Card 10773

UNIT PIPE JOINT To be made in best possible manner to insure absolutely tight joints in accordance with the notation on Card 1043

UNIT CLAMP BOLT To be in accordance with requirements of Locomotive Superheater Company Mfg. Std. Specification No. 12-A. Card 10695

HEADER To be of close grain cylinder iron, steam tight in every respect. Joint rings for connection to dry pipe to have flat side against header flange. Casting should be machined with the unit joint face down to insure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on to such a location as not to be removed in finishing. No patch plugs or shapers allowed in ball joint seats. Headers must not be treated with nal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card 1942-D

HEADER SUPPORTS To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card 1323

STEAM PIPE JOINT RINGS Should be of cast iron.

DEFLECTING PLATE To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with Card SEE ARRGT.

DAMPER CYLINDER To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 1343-A ~~1143-A~~

DAMPER SHAFT COUNTERWEIGHT To be painted a light color to render it easily visible by the engineer. Card 140

S. H. ARRANGEMENT To be in accordance with Card 4715-A

TEST (FINAL) The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card	1075-K	S. H. UNIT BOLT WASHER	Card	1071
DAMPER CYL. ARM	Card	1074	S. H. UNIT CLAMP	Card	1073
DAMPER CYL. PIPE FITTING	Card	11115	S. H. DRY PIPE WASHER	Card	10393
DAMPER CYL. PIPE UNION	Card	11114	S. H. PIPE END	Card	1341
DAMPER CYL. FITTING DIAGRAM	Card	3258	S. H. PIPE BAND	Card	1938
DAMPER CYL. SUPPORT	Card		SPACING OF BANDS & SUPPORTS	Card	10759
DAMPER SHAFT	Card	1060	TYPE OF RETURN BENDS		FORGED
DAMPER SHAFT ARM	Card	1065	RETURN BENDS	Card	11022
DAMPER SHAFT BEARING (C.S.)	Card	~~1146~~ 1077	LUBRICATOR CONNECTION	Card	3423
DAMPER SHAFT BEARING (L.S. R+L	Card	1275-D	DEFLECTING PLATE HANDLE	Card	1437
DAMPER SHAFT LINK	Card	1070	DEFLECTING PLATE STUDS	Card	10509
PATENT PLATE	Card	3272	DEFLECTING PLATE CLAMP	Card	10509-A
PYROMETER		NONE			

SPECIFICATION FOR LOCOMOTIVES 12 3+2 E 57

FOR THE EAST BROAD TOP RAILROAD AND COAL COMPANY

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104

MR

31 ENGINE AND TENDER TO BE BUILT TO LATEST REQUIREMENTS OF THE INTERSTATE COMMERCE COMMISSION. (SEE SUP. 73)

32 THE AXLES, WRIST PINS, PISTON RODS TO HAVE THE DATE OF APPLICATION, ORIGINAL DIAMETER, AND KIND OF MATERIAL STAMPED ON END.

33 ALL PIPING SUBJECT TO BOILER STEAM PRESSURE TO BE DOUBLE STRENGTH AND TO HAVE EXTRA HEAVY FITTINGS.

34 BOILER TO MEET PENNSYLVANIA STATE LAWS AND TO CONFORM TO A.S.M.E. CODE. (SEE SUP. 1 &c)

35 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

36 BOILER AND MACHINERY TO BE BUILT TO STAND 200 LBS. PRESSURE. PROVIDE BOILER INSPECTION CERTIFICATE TO PENNSYLVANIA STATE RAILROAD REQUIREMENTS, IN ADDITION TO REQUIREMENTS OF THE INTERSTATE COMMERCE COMMISSION, I.C.C., FURNISH THREE COPIES OF D.L.&W. FORM 1036.

37 DOME TO BE ONE PIECE TYPE.
DOME CONSTRUCTION, TO BE D.L.&W. WITH THROTTLE VALVE SIMILAR TO 12 3+2 E 41 AND 47. (SEE SUP. 53)

38 MANHOLE AND COVER TO BE APPLIED IN TOP OF BOILER FOR INSPECTION.

39 FIREBOX TO BE MADE AS DEEP AS PRACTICABLE.
CROWN AND SIDE SHEETS TO BE IN ONE PIECE.

40 FIRE DOOR OPENING TO BE FORMED BY FLANGING OUTWARD AND RIVETING TOGETHER THE INNER AND OUTER SHEETS.
DISTANCE BETWEEN TOP OF FIRE DOOR AND CROWN SHEET TO BE ABOUT 6".
FIRE DOOR TO BE FRANKLIN, BUTTERFLY TYPE, OPERATED BY AIR.
DOOR TO BE HUNG PARALLEL WITH SLOPE OF BACK HEAD.

41 STAYBOLTS (EXCEPT TATE) TO BE FALLS HOLLOW HOLLOW STAYBOLT IRON.
FLEXIBLE STAYBOLTS, TATE 3/8" DIAM. ABOUT 4.1, IN NUMBER AT SIDES OF FIRE BOX AND AT THROAT SAME AS FOR 12 3+ E 47.
ALL OTHER WATER SPACE STAYS TO BE FALLS HOLLOW HOLLOW 3/8" DIAM. IN BACK AND 1" DIAM. IN SIDES

42 STAYBOLTS ALONG THE CENTER OF CROWN SHEET TO HAVE HEADS UNDER THE SHEET.

43 TUBES NOT TO BE SAFE ENDED.
TUBES TO BE BEADED NOT OVER 1/8"; LIGHT FERRULES TO BE USED.
TUBES NOT TO BE WELDED.

44 GRATE BARS TO ROCK IN FOUR SECTIONS AND TO HAVE DRIP PLATE AT FRONT AND BACK
GRATES TO HAVE CENTER FRAME OF CAST STEEL.

45 ASH PAN TO BE SAME AS FOR 12 3+2 E 41.
ASH PAN OF THE SELF DUMPING HOPPER TYPE, WITH BOTTOM AS NEAR AIR TIGHT AS POSSIBLE. AIR SPACE BETWEEN ASH PAN AND MUD RING LARGE ENOUGH TO PROVIDE ALL AIR NECESSARY FOR COMBUSTION.
ASH PAN DOPING TO BE 2" LOWER THAN FOR 12 3+2 E 41.
SPECIAL ATTENTION TO BE PAID TO DESIGNING OF ASH-PAN.
ASH PAN TO BE SO CONSTRUCTED AS TO CLEAR THE RAIL NOT LESS THAN 2" WHEN TIRES ARE DOWN TO SCRAP LIMIT.

46 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPECIAL O-1415 DATED JUNE 15, 1920.
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND WITH OUTSIDE STEAM PIPE CONNECTION TO VALVE CHAMBER.
SUPERHEATER UNITS TO HAVE FORGED RETURN BENDS. (SEE SUP. 79)
ROYALTY ON SUPERHEATER PAYABLE BY THE D. L. & W.

50 SMOKE BOX FRONT OF PRESSED STEEL, 1" THICK, WITH DOOR SIMILAR TO 12 3+2 E 41. DOOR TO BE HELD BY CLAMPS.

51 ADDITIONAL HAND HOLE AND GAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

52 SMOKE BOX ARRANGEMENT TO BE SIMILAR TO 12 3+2 E 41. (SUP. 80)

53 SAFETY VALVES TO BE APPLIED IN SIDE OF DOME.

54 ONE HANCOCK 82" IRON TIME WHISTLE, TO BE CONNECTED TO RIGHT SIDE OF DOME, WITH SUITABLE ANGLE VALVE.

55 STEAM GAUGE MAY BE OF THE AUXILIARY SPRING TYPE AS THE DOUBLE SPRING CRANK MOVEMENT CANNOT BE OBTAINED.

56 WATER GAUGE TO BE ASHCROFT PRISMATIC, LOCATED ON RIGHT SIDE, IN FRONT OF ENGINEER, SAME AS FOR 12 3+2 E 41.
WATER GAUGE NOT TO OBSTRUCT THE PASSAGE TO THE FRONT OF THE CAB, IT SHOULD BE LOCATED CLOSE TO THE BOILER, SAME AS FOR 12 3+2 E 41.

57 ADDITIONAL CAB LAMP FOR USE OF ENGINEER IN READING ORDERS. THIS LAMP TO BE SO CONSTRUCTED THAT IT CAN BE DARKENED WHEN NOT IN USE.

58 BLOWER VALVE FITTING TO BE PLACED NEAR CENTER OF BOILER.

59 BLOW OFF COCK TO BE HANCOCK BINARY 1" LATEST TYPE WITH DOUBLE STEEL DISCS LOCATED IN LEFT SIDE NEAR FRONT END OF FIRE BOX.

60 INJECTORS TO BE PLACED IN FRONT AND OUTSIDE OF CAB.
CHECKS WITH FROST COCKS, D.L.&W. STYLE, ~~OPERATED FROM CAB.~~ (SUP. 81)

61 STEAM HEAT HOSE TO BE CHICAGO STEAM HEATING CO'S PATTERN No. 302, WITH HOSE COUPLINGS COMPLETE WITH HOSE.

62 BRIDGE PIPE THRU WHICH THE THROTTLE STEAM PASSES TO BE MADE LARGE ENOUGH TO TAKE INJECTOR THROTTLE, BLOWER VALVES AND AIR PUMP THROTTLE. ALL STEAM VALVES AND PIPE WORK TO BE PLACED ALONG SIDE OUTSIDE OF CAB.
AS LITTLE PIPE WORK AS POSSIBLE TO BE PLACED OVER JACKET IN CAB SO STAYBOLTS CAN BE EASILY INSPECTED AND REPAIRED.
ALL PIPE WORK IN STAYBOLT ZONE TO BE SO PLACED THAT IT WILL NOT BE NECESSARY TO REMOVE IT WHEN CHANGING STAYBOLTS.

63 CAB TO BE MADE AS ROOMY AS POSSIBLE.
CAB TO HAVE TWO SMALL WINDOWS AND ONE LARGE WINDOW ON EACH SIDE, THE LARGE WINDOW TO BE IN THE MIDDLE 30" x 34" THE SASH BEING MADE IN HALVES, ARRANGED TO SLIDE EACH SIDE OF CENTER.
CAB ROOF TO HAVE WELL ROUNDED CORNERS WITH VENTILATOR IN ROOF.
CAB TO BE PROVIDED WITH FRONT WINDOW CONSTRUCTED SO AS TO BE CONVENIENT FOR ENGINEER WHEN SEATED.
DOOR OPENING IN REAR OF CAB TO BE ABOUT 6' 3" HIGH.

64 PILOT MUST CLEAR THE RAIL WHEN THE SPRINGS ARE DOWN.

65 SPRING BUFFER BETWEEN ENGINE AND TENDER LOCATED ON TENDER.

71 CAB APRON BETWEEN ENGINE AND TENDER TO BE ROUGHENED IN ORDER TO SECURE FOOTING.

72 FRONT BUMPER TO BE OF OAK, CARE TO BE TAKEN IN THE SELECTION OF DRY TIMBER AS THE BUMPER FURNISHED FOR LOCO. #16, 12 3+½ E 41, WAS BADLY PATCHED AND SPLIT.

73 ALL STEPS, GRAB IRONS, UNCOUPLING LEVERS AND ASH PANS TO CONFORM TO THE REQUIREMENTS OF BOTH THE PENNSYLVANIA STATE RAILROAD AND THE INTERSTATE COMMERCE COMMISSION. (SUP. 31)

74 HEADLIGHT EQUIPMENT TO BE PYLE-NATIONAL ELECTRIC TYPE "E" WITH INCANDESCENT HEADLIGHT.
ELECTRIC EQUIPMENT FOR LIGHTING COACHES TO BE LOCATED ON LEFT SIDE OF TENDER. (SUP. 124)
MARKERS TO BE FURNISHED AND WIRED FOR ELECTRIC LIGHT.
DYNAMO BRACKET OF WROT IRON, LOCATED ON SUPPORT OVER MAN-HOLE BACK OF DOME.

75 BELL RINGER TO BE VILOOX IMPROVED AUTO. TYPE.

76 SAND BOXES TO HAVE EXTRA LARGE CAPACITY.
FRONT SANDBOX AND BELL PLACED AHEAD OF DOME, WITH BELL AHEAD OF SANDBOX, WITH EQUAL SPACES BETWEEN STACK, BELL, SAND BOXES, DOME AND CAB, USING LARGEST OUTSIDE DIAMETER FOR SPACING.

77 BOILER JACKET TO BE APPLIED OVER STAYBOLTS SO THAT IT CAN BE REMOVED IN SECTIONS WITHOUT DAMAGE TO JACKET OR REMOVAL OF ANY OF THE INJECTOR PIPES OR OTHER PIPING.

78 ENGINE AND TENDER TO BE LOADED ON CAR ON THEIR OWN WHEELS.

79 SUPERHEATER HEADER TO BE SHORT TO GIVE AMPLE CLEARANCE FOR CLEANING PIPE. (SEE SUP. 49)

80 SPARK EJECTOR OPERATED BY STEAM TO DELIVER TO RIGHT SIDE OF ENGINE, SAME STYLE AS FOR 12 3+½ E 41. (SEE SUP. 52)

81 FROST COCK TO BE SCREWED INTO T-FITTING LOCATED IN INJECTOR CHECK PIPE, JUST BACK OF THE CHECK. THE COCK TO BE OPERATED FROM THE CAB. (SEE SUP. 60)

82 RAGONNET POWER REVERSE GEAR, TO BE TYPE "A" COVERED ON EXTRA ORDER NO. 20837, DATED JULY 2ND, 1920.

83 DRIVING TIRE FLANGES TO BE 1½" THICK.

*Hereafter- Tires to be furnished 5½" wide
*with flg 7/16" wide (instead of ¼" wide)
(Conference 4/8/28 - Mr. J.O. Bohmaster R.R.'s and B&W)

86 ENGINE FRAMES OF HEAVY DESIGN 4" WIDE WELL BRACED.
FRAMES TO HAVE SINGLE FRONT RAILS.
ENGINE FRAMES AFTER BEING MACHINED, TO BE INSPECTED BY THE CO'S REPRESENTATIVES.

87 PEDESTAL WEDGES AND GIBS OF CAST IRON.
PEDESTAL WEDGES AND GIBS TO HAVE FLANGES ⅞" THICK.
PEDESTAL WEDGE BOLTS TO BE 1½" DIAMETER.

88 CYLINDERS TO BE SECURELY BOLTED TOGETHER AND TO SMOKEBOX.
CYLINDERS TO BE PROVIDED WITH A DOUBLE ROW OF BOLTS AROUND THE SMOKEBOX SADDLE AND ALSO FOR THE VERTICAL ROW CONNECTING THE SADDLES TOGETHER.

89 CYLINDER COCKS TO BE NATHAN TYPE L.S. 1343, THREE CYLINDER COCKS ON EACH CYLINDER, CENTRAL COCK TO BE CONNECTED WITH EXHAUST CAVITY BY WROT IRON PIPE, PLACED UNDER CYLINDER JACKET.

90 CYLINDER LUBRICATOR TO HAVE ATTACHMENT TO LUBRICATE AIR END OF AIR PUMP.
CYLINDER LUBRICATOR PIPES OF COPPER UNDER JACKET.

91 PISTON RODS TO BE KEYED TO CROSSHEADS. (SUP. 32)

92 GUIDES TO BE LAIRD TYPE, SAME STYLE AS FOR 12 3+½ E 41.
OIL CUPS ON GUIDES TO BE HANCOCK NEEDLE.

93 GUIDE YOKE BRACES, CROSSTIES, AND WAIST SHEETS TO BE OF AMPLE STRENGTH.

94 CROSSHEADS TO BE SAME STYLE AS FOR 12 3+½ E 47 EXCEPT TO HAVE BEARINGS OF BRASS.
CROSSHEAD PIN THREADED END TO BE 2½" DIAMETER WITH 10 THREADS PER INCH, AND WITH DOUBLE NUTS 1" THICK.

95 MAIN RODS I SECTION, OTHERS RECTANGULAR SECTION.
KEY ON MAIN RODS OF WEDGE TYPE, OPERATED BY THREADED BOLT RUNNING THRU THE WEDGE WITH LOCK NUT UNDERNEATH, SIMILAR TO B.L.W. CARS 4123.
THE BOLT ON THE BACK END OF THE MAIN RODS TO BE PLACED SO THAT NUTS SHALL BE ON THE TOP SIDE INSTEAD OF ON THE BOTTOM.
PARALLEL RODS TO HAVE SOLID ENDS.
CARE TO BE TAKEN IN FITTING SIDE ROD KNUCKLE PINS AS THOSE ON RY. CO'S LOCOMOTIVE NO. 16 CLASS 12 3+½ E 41 WERE NOT FITTED IN TAPER PROPERLY AND WORKED LOOSE WHEN LOCOMOTIVE WAS RECEIVED.
OIL CUPS FORGED ON RODS.
SIDE ROD BUSHINGS TO HAVE ¼" COLLARS ON THE INSIDE.

96 WRIST PIN COLLAR ON NO. 3 FRONT AND NO. 0 BACK PINS TO BE HELD BY THRU BOLT INSERTED FROM INSIDE, WITH TWO NUTS 2" THICK ON THE OUTSIDE AND WITH ¾" DOWEL PIN TO PREVENT TURNING. FRONT WRIST PIN TO HAVE WASHERS WITH RUNNING BOLT THROUGH, WITH NUTS ON OUTSIDE COUNTERBORED IN WASHER. (SUP. 32)

97 OIL CUPS TO BE FORGED SOLID ON MOTION WORK.

98 HEREWITH PATENT PLATES COVERING SOUTHERN LOCOMOTIVE VALVE GEAR TO BE APPLIED TO THE REAR END OF THE LINK SUPPORT ON EACH SIDE OF LOCOMOTIVE.
ROYALTY ON VALVE MOTION AYABLE BY THE B.L.W.

99 FLANGE OILERS TO BE DETROIT TWO-FEED PENDULUM TYPE APPLIED TO FRONT PAIRS OF DRIVING WHEELS.

106 DRIVING WHEEL CENTERS TO HAVE LARGE HUB BEARING SURFACE INSIDE. ALL DRIVING BOXES TO HAVE HUB LINERS OF BRASS ATTACHED TO THE BOXES AND NOT TO THE WHEEL CENTRES.

107 SLOTS IN DRIVING SPRINGS TO BE MADE 4½" x 1⅝" TO PROVIDE FOR A SPRING LINK SECTION OF 3½" x 1". A CIRCULAR PIN IS TO BE PROVIDED, TURNED TO 1½" DIAMETER AT CENTER, 1½" DIAMETER AT ENDS, INSTEAD OF KEY.
OMIT STRAP LINKS.
DRIVING SPRINGS TO HAVE GIB HANGERS INSTEAD OF LOOP.

108 DRIVING SRINGS TO BE STRONG AND TO BE SAME AS FOR 12 3+½ E 47.

109 FRONT AND BACK ENGINE TRUCK WHEELS TO HAVE TREAD 4" WIDE AND FLANGES 1⅛" WIDE AS PER RY. CO'S SKETCH FORM 208-B.

110 BACK ENGINE TRUCK TO HAVE LOOSE COLLAR OF CAST IRON BTWEEN THE BOX AND THE WHEEL SAME AS FOR 12 3+½ E 41.

111 TRAIN SIGNAL TO HAVE TRAIN CONNECTIONS ON RIGHT SIDE OF TENDER.

112 MAIN AIR RESERVOIRS TO BE WESTINGHOUSE ENAMELLED, AND TO HAVE EXTRA LARGE CAPACITY, NOT LESS THAN FOR 12 3+½ E 47.
FURNISH WESTINGHOUSE AIR DRUM COCKS, (INSTEAD OF B.L.W.)
AIR RESERVOIRS TO BE LOCATED FORWARD UNDERNEATH THE RUNNING BOARDS.

113 BRAKE VALVES TO BE LOCATED SO ENGINEER CAN READILY OPERATE, POSITION WILL BE DESIGNATED BY CO'S REPRESENTATIVES.

114 EXHAUST FROM PUMP TO BE MADE INTO THE CYLINDERS INSTEAD OF SMOKE BOX.

115 FOUNDATION BRAKE GEAR SHALL BE SO CONSTRUCTED AS TO CLEAR THE RAIL NOT LESS THAN 2½" WHEN TIRES ARE WORN TO SCRAP LIMIT.

TENDER

121 TENDER TO BE BUILT TO THE LATEST REQUIREMENTS OF THE INTERSTATE COMMERCE COMMISSION. (SUP. 127)

122 TANK COLLAR TO BE 12" HIGH, AT SIDES.

123 TANK FUNNEL TO BE OVAL, ABOUT 14" x 30".
TWO DRAIN PIPES IN REAR OF TANK, NEAR FUNNEL.

124 ELECTRIC EQUIPMENT FOR LIGHTING COACHES TO BE LOCATED ON LEFT SIDE OF TENDER. (SUP. 74)

125 SPRING BUFFER BETWEEN ENGINE AND TENDER, TO BE LOCATED ON TENDER.

126 TENDER COUPLER TO BE APPLIED WITH SIX 1½" BOLTS.

127 STEP AND HAND RAIL AT EACH CORNER OF TENDER.
ALL STEPS, GRAB IRONS, UNCOUPLING LEVERS, ETC., TO CONFORM TO THE REQUIREMENTS OF THE PENNSYLVANIA STATE RAILROAD AND THE INTERSTATE COMMERCE COMMISSION.

128 CLEARANCE OF 3½" BETWEEN BOTTOM OF TENDER TRUCK SIDE FRAME AND THE TOP OF RAIL.

129 AXLES TO HAVE THE DATE OF APPLICATION, ORIGINAL DIAMETER, AND THE KIND OF MATERIAL STAMPED ON END.

130 JOURNALS M.C.B. STANDARD, WITH McCORD CAST STEEL JOURNAL BOXES.
MALLEABLE IRON TENDER TRUCK BOXES TO BE FURNISHED FREE BY RY. CO.
SEND ORDER TO EAST BROAD TOP R.R. AND COAL CO. ROOM 819 NORTH AMERICAN BLDG., PHILADELPHIA.

131 TENDER WHEELS TO HAVE TREAD 4" WIDE AND FLANGES 1⅛" WIDE AS PER RY. CO'S SKETCH FORM 208-B.

132 FOUNDATION BRAKE GEAR SHALL BE SO CONSTRUCTED AS TO CLEAR THE RAIL NOT LESS THAN 2½" WHEN TIRES ARE WORN TO SCRAP LIMIT.

W. A. Bardsley — Fireless Steam Storage Locomotive
Memorandum Spec'n. 20005 — As Spec'n O-6035 April-1920

SPECIFICATION FOR LOCOMOTIVES 6 50 D 1.

FOR Eastman Kodak Company

P

1-14-20

Gen. as B.L.W. Tracing 40549

Engine Drawing No. 1

GAUGE OF ROAD 4' 8½" PLAY ½"
WHEELBASE, Rigid 11' 0" Driving 11' 0" Total 11' 0"
CURVES (See Sup. 2 Deg.)

LIMITS, HEIGHT --- WIDTH ---
WEIGHT (Approximate for working order) Total 134,000 pounds
On F. Trk. --- Lbs. Drivers 134,000 Lbs. Bk. Trk. ---Lbs
Tractive power 22630 Lbs. Ratio of Adhesion 4.35 = 5.22.
Tractive power calculated at 100% working steam pressure.

Work'g. Steam Pres. 60 Lbs. Service: Switching

Reservoir: Steel Thick 15/16" Bill: 8994
Reservoir Diam. 90" inside. Length 22' 3⅜"

Resv. Str'l. Pres. 200 Lbs. Tested to 220 Lbs. Steam Pres.
With factor of safety of 5.13 300 Lbs. Water Pres.
Longitud. Seams (See Sup. 6 and 20 etc.)

DOME, Diam. None Pos. ---
THROTTLE, Balance Pos. At back, outside of reservoir

SAFETY VALVES (Not Spec): Two Coale, both with relief lever.
One Valve 2" set to 200 pounds, for reservoir
One Valve 1¼", set to 70 pounds, for steam pipe
WHISTLE, One B. L. W., Small
STEAM GAUGE One Iron 7" MAKER: Ashcroft (Not Spec)
Steam Gauge stand: Iron; Clock: None
WATER GAUGE One B.L.W. Ironclad; Cab Lamps: To burn Oil
GAUGE COCKS Two B. L. W. Surface Valve: None

BLOW OFF COCK One B. L. W. Pos: Under waist
CLEANING PLUGS: Man hole at front end
One plug under waist.

CHARGING PIPE 4" diam. each side with valves located below water line.

Cab: Steel -Steam Heat: None
Cab Boards: Steel Nosing: T-Iron
Running Boards: Steel Nosing: T-Iron
HAND RAIL: Iron Located on Reservoir

PILOT: None Pushing Shoes: Front and Back
FRONT BUMPER: Cast Iron Bumper Plate, Front only
BACK BUMPER: Oak
STEPS: Across front and back, with hand rails

FRONT AND BACK DRAWHEAD; Center above rail 33½"
COUPLER: M. C. B. Auto.

FLAG FIXTURES: None

HEADLIGHTS: Two Round Case 16" Reflector, to burn Kerosene
Headlight Nos. on Sides: With, Lamp shelf: None

BELL: 28 pounds (See Sup. 35)
SAND BOXES, Four; Body: Iron painted; Pipes: Iron
SANDER: Hand, in each box, to sand front and back

DOME CASING: None
RESERVOIR JACKET #11 Soft Steel ptd. Bands: Iron. Styel 8 & 11
RESV. LAGGING: Magnesia sectional, except front and back head to have plastic magnesia, secured with wire netting imbedded in lagging.

FRAMES: Cast Steel (See Sup. 38)

CYLINDERS, Diam. 28" Stroke 24"
STM. PORTS, Length 13" Width 1¾" Bridges 1"
EXH. PORTS, Length 13" Width 2¾" Valve Lead 1/4"
VALVE TRAVEL 5" Steam Lap 1" Exh. Clearance ---
ECCENTRIC THROW 3¾" By Pass Valve: None
CYLR. LUBR. (Not Spec) Schlacks two-feed force feed mechanical
CYLR. HEADS: Cast Steel. LUBR. PIPES of copper O.S. of jacket
CYLR. CASINGS: Iron painted Head Covers: Steel painted
STM. CHEST CASINGS: Iron painted Covers: Steel painted
STM. CHEST VALVES: Richardson balanced, with vacuum valves.
MET. PKG. (Not Spec) { Piston Rods / Valve Stems } United States, King Type

PISTONS: Heads of cast iron, with rings of cast iron shrunk in
Piston Rods to be keyed to cross-heads
GUIDES: Steel Oil Cups: Needle
CROSSHEADS: Cast Steel, with bearings of cast iron, tinned
WRIST PINS: Steel Rod Cups: Plunger, forged on
Parallel rods to have solid ends

VALVE MOTION: Stephenson
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts ~~(except staybolts)~~ to be U.S. Standard
All finished movable nuts of steel or of iron case hardened.

BEARING BEARINGS: B. L. W.
DRIVERS: O. S. Diam: 44" Cen. Diam. 38" Centers Cast Steel
TIRES: Steel Held by: Shrinkage and Shoulder
Tires, flanged, Pos: Front and back Size: 3" x 5½"
Tires, Plain; Pos: Middle Size: 3" x 5½"
LATERAL PLAY between driving boxes and wheel hubs: 3/16" total
DRIVING BOXES: Steeled Cast Iron; Journals, Diam. 8" Length 10"

SPRINGS, Make: B. L. W.

BRAKE, Position, on all driving wheels.
OPERATING PARTS, Sch: U-6, B. L. W. Steam and hand
FOUNDATION PARTS, Sch. U-6, B. L. W.
SEPARATE LUBRICATOR FOR STEAM BRAKE VALVE.
HAND ~~CYLR.~~ BRAKE TO BE COMBINED WITH STEAM BRAKE ON ALL WHEELS.
BRAKE TO HAVE REDUCING VALVE SET TO 60 POUNDS, LOCATED BETWEEN STOP VALVE AND ENGINEER'S VALVE.

List of Tools, Sch: 130
Photo. Sch: No. 2 Inspection: B. L. W. Except. (Sup.
To be weighed: Yes. Material Specings: B. L. W.
Certificate of boiler test: Three copies B.L.W. Form 1036
Junior Laws to: 2/1/20 Shipment: On own wheels

Brass shop finish: No. 1
Machine Shop Finish: D-165

Patent Plates } None

Property Plates: None

Painting, Engine, Style --- Olive Green, No Striping
Mark on Steam Reservoir: Eastman Kodak Company

No. Pos	Road No.	Name: None
Front end of reservoir	2	

SPECIFICATION FOR LOCOMOTIVES 6 50 D 1

FOR EASTMAN KODAK COMPANY

P

109
108

1 BOILER TO BE OPERATED IN THE STATE OF NEW YORK
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS. (See page 23)

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND-ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

Boiler and Fire Box Steel / ~~Material for One-Piece Dome~~	A.S.M.E. Spec, Page 11
Boiler Rivet Steel	A.S.M.E. Spec. Page 15
Boiler Rivet Iron	A.S.M.E. Spec. Page 31
~~Boiler Grade Iron~~	~~A.S.M.E. Spec. Page 37~~
~~Boiler Staybolt Iron~~	~~A.S.M.E. Spec. Page 39~~
~~Boiler Tubes~~	~~A.S.M.E. Spec. Page 40~~

5 ~~FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL~~
ALL BOILER ~~AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME~~ SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6050.
~~SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.~~

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (5.13)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:-

Size of Pipe Connection or Corresponding Taper Tap.	1" & 1¼"	1½" & 2"	2½" to 4"
No. of Threads per Inch.	11½	11½	8
Minimum No. of Threads required in Opening.	4	5	7
Minimum Thickness of Material required to give above No. of Threads.	¾"	7/8"	1"

If thickness of boiler material is not sufficient to give the above number of threads, a liner or flange must be applied.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ½ PIPE SIZE FOR ATTACHING Inspector's Test Gauge.

~~10 A FUSIBLE PLUG MUST BE APPLIED. THE [illegible] AND THE LEAST DIAMETER OF THE PLUG AT THE [illegible] NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE [illegible] WITH SIDE THE LEAST DIAM. SHALL BE [illegible] No. 6, ONE FUSIBLE PLUG SHALL BE [illegible] AND FUSIBLE PLUG SHALL BE [illegible]~~

5 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST MEET THE REQUIRE[illegible] OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. "MARKING CARD 6050."
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 ~~THERE SHALL BE NOT LESS THAN SIX STAYS AND FIVE RIVETS NOT SMALLER THAN 1" PITCH [illegible] IN FRONT TUBE SHEET BELOW THE TUBES. ONE STAY HEAD OF OR NEAR THE LINE OF THE CROWN SHEET. FOUR IN THE LOWER PART OF THE WATER LEG. ALSO SIDE STAYING ONE NEAR THE FIRING SHEET.~~

18 SHOP PRACTICE:- Rivet holes, ~~[illegible] IN BOILER PLATE SHALL BE DRILLED FIVE SIXTEENTHS SMALLER THAN THE NOMINAL DIAMETER OF THE RIVET. BUTT STRAPS, AND SIDES SHEETS OF FIRE BOX PLATES, BUTT STRAPS, AND SIDES SHEETS OF IN PLACE. OR THEY MAY BE PUNCHED SOLID NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER ⅝" IN THICKNESS, AND ¼" LESS THAN FULL SIZE FOR PLATES ⅝" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND SIDES BOLTED UP IN POSITION.~~
~~THE RIVET HOLES IN THE [illegible] SHALL BE [illegible] ¼" LESS THAN FULL SIZE FOR PLATES [illegible] AND [illegible] AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND SIDES BOLTED UP IN POSITION.~~

19 UPON COMPLETION EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE INSPECTOR BY THE MANUFACTURER, WITH THE WORDS AS REQUIRED BELOW. THE NUMBER OF THE DIVISION OF FIGURES WHICH ARE TO BE USED WITH A THE LOCATION OF THE STAMP SHALL BE ON THE SHOP HEAD NEXT A PLUG HOLE.

	New York
	No. 2
	The Baldwin Locomotive Works
	(Leave blank) (Leave blank)
	200 Lbs.

SPECIFICATION FOR LOCOMOTIVES 6 50 0 1 110

FOR THE EASTMAN KODAK COMPANY 109

HW

21 LOCOMOTIVE TO BE OPERATED IN THE STATE OF NEW YORK, AND IS TO MEET THE REQUIREMENTS OF THE STATE DEPARTMENT OF LABOR AND THE I. C. C.

22 STEAM RESERVOIR TO MEET THE A.S.M.E. CODE (SEE SUP. 1 TO 19)

23 STEAM RESERVOIR TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

24 CURVES 39 DEGREES, ON LEVEL.
GRADES 2%, COMBINED WITH 18 DEGREES CURVES.

25 LOCOMOTIVE TO HANDLE FIVE OR SIX LOADED BOX CARS UP A 2% GRADE IN CONJUNCTION WITH AN 18 DEGREE CURVE.

26 LONGITUDINAL SEAMS, BUTT JOINTED, DOUBLE COVERING STRIPS, TEXTUPLE RIVETED, 90% SEAMS.

27 RESERVOIR TO HAVE LONGITUDINAL BASH PLATES TO PREVENT SURGING OF WATER.

28 THROTTLE VALVE IN VERTICAL ARM OF STEAM PIPE.

29 STEAM PIPES OF IRON, WITH REDUCING VALVE BETWEEN RESERVOIR AND THROTTLE. REDUCING VALVE SET TO 50 POUNDS.

30 FILLING PLUG 3" DIAM. IN TOP OF STEAM RESERVOIR.

~~31 REDUCING VALVE TO BE SUPPLIED IN STEAM SUPPLY TO CYLINDERS.~~ (SEE SUP 29)

32 WATER GAUGE TO BE LOCATED SO THAT CENTRE OF GLASS WILL BE ON THE LEVEL WITH WATER WHEN RESERVOIR IS THREE QUARTERS FULL.

~~33 GAUGE COCKS - ONE LOCATED ON HORIZONTAL CENTRE OF RESERVOIR TO BE THREE QUARTERS FULL WHEN THE WATER IS AT THE LEVEL OF THE UPPER GAUGE COCK~~ (SEE SUP. 44)

34 STEPS, HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

35 ~~BELL RINGER TO BE MECHANICALLY OPERATED. (NOT STEAM OPERATED)~~ BELL OPERATED BY CORD AND ALSO BY STEAM WITH A CONVENIENT CUT-OUT COCK.

36 SAND BOXES LOCATED UNDER RUNNING BOARD.

37 STEAM PIPES TO BE LAGGED AND JACKETED.

38 PARTICULAR ATTENTION TO BE GIVEN TO BRACING OF FRAMES AND TO CROSSTIES TO AVOID A POSSIBLE BUCKLING OF FRAMES.

39 INSIDE FACES OF CYLINDER HEADS AND OUTSIDE FACES OF PISTONS TO BE FINISHED SMOOTH.

40 DRIVING WHEELS TO HAVE HUB LINERS OF BRASS.

41 STEAM PIPE FROM ENGINEER'S VALVE TO BRAKE CYLINDER TO BE AS SHORT AS POSSIBLE, AND TO BE PROPERLY LAGGED TO AVOID EXCESSIVE CONDENSATION.

42 LETTERING IN ALUMINUM LEAF WITH INITIAL LETTERS 6" HIGH AND OTHER LETTERS 3" HIGH AS SHOWN ON CO'S PHOTO (HEREWITH)

43 HAND BRAKE TO BE OPERATED BY A LEVER HAVING AMPLE BRAKING POWER.

44 ONE GAUGE COCK PLACED ON HORIZONTAL CENTER OF RESERVOIR AND ONE SO LOCATED THAT THE RESERVOIR WILL BE THREE-QUARTERS FULL WHEN THE WATER IS AT THE LEVEL OF THE UPPER GAUGE COCK.

THE BALDWIN LOCOMOTIVE WORKS As spec'n. C-6566

Memorandum Spec'n 20085

SPECIFICATION FOR LOCOMOTIVES 8 34 D 550

FOR Empire Steel and Iron Company

WKS

Gen. as Photo. 2744

Engine Drawing No. 48

4.3.20.

Gauge of Road 4' 8½" Play ⅜"

Wheelbase, Rigid 11' 2" Driving 11' 2" Total 19' 9"

Total wheelbase, eng. and tend. Actual 49' 7½" Limited to ----

Curves 30 degree Grades : 3%

Rails 70 and 80 pounds.

Limits, Height 13' 3" Width 11' 1"

Weight (approximate) in working order, Total 166,500 pounds

On F. tr'k 22,000 lbs., Drivers 144,500 lbs., B. tr'k ---- lbs.

Tractive power 32860 lbs. Ratio of adhesion 4.39

Work'g St'm Pres. 190 lbs., Service Switching

Fuel Soft Coal

Boiler to conform to A. S. M. E. Code.

Boiler Steel Thick ⅞" Bill 9102

Front Tube Sheet ½" Thick

Boiler, Diam. 72" Plan Straight Top

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 5.2 300 lbs. water pres.

Longitud. seams Butt jointed, double covering strips.

Main Dome : One-piece Type Auxiliary Dome : None

Dome, diam. 33" Pos. Central

Firebox Steel Combustion chamb. None

Firebox, length 108" Width 96¼" Depth F. 73⅛" B. 69⅜"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 18" diam.

Water space, Front 4½" Sides 4" Back 4"

Water space frame Double Riveted

Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O. S.

Radial stays 1" diam. Sling stays front Three rows B.L.W. Expansion Stays

Button heads below crown on Ten central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues ----

Tubes No. 12 B.W.G. Charcoal Iron or Steel (B.L.W. Option)

Tube ends Swaged for copper ferrules, fire box ends.

Number 308 Diam. 2" Length 11' 0"

Heating Surface Flues ---- Combus. Chamb. ---- Total 1938⁰

Tubes 1761⁰ Fire Box 177⁰ Fire Brick Tubes ----

Grate area 30.2⁰ Ratio to Heating Surface 1 : 64.1

Superheater ----

Fire Brick Arch on studs

Grates Rocking Bars and Drop Plate

Ash Pan, Dampers Front and Back

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater None

Smokebox extension With Cleaning hole and cap L.S. only

Spark-arresting hopper With

Netting and deflect. plates With

Exhaust nozzles Double, High

Stack Straight Dia. 17"

(Not spec) **Safety Valves** Two Coale 3" Open

Safety valves Both with relief lever, Set to 190 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Maker: Ashcroft

Steam gauge stand Iron **Clock** None

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3¼" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front

Cleaning Plugs One Plug above firedoor

Firebox, Corners diagonal and back and L. S.

Crown, Two R. S., Three L. S., and Five Back

Waist, Two Under: one front and one back

Front tube sheet, One Of fusible plug One

Locomotive to operate over line of Mount Hope Mineral RR., and at Oxford, N. J. Plant of Company.

Locomotive to operate in Penna. and New Jersey.

* Locomotive to be operated under I. C. C. jurisdiction by Mt. Hope Mineral R. R. Furnish regular I. C. C. forms made out to Mt. Hope Mineral R. R.

Injectors to be placed outside of cab.

Injectors Two Sellers, Class "N" (spec) No. 9½

Injectors, Pos. Right and Left Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B. L. W. with stop valve Pos. R. and L.

Steam Heat None

Cab Steel

Cab boards Wood Nosing None

Running boards Wood Nosing None

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 32½"

Pilot None

Front Bumper Oak Bumper plate With

Steps across front with hand rails.

* Steps hand holds, etc. to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Automatic

Signal fixtures Iron on Bumper

Headlight equipment to be Sun Beam Type RE-3 Electric, with incandescent headlights.

Headlight Two round case 18" Reflector,

Headlight, Nos. on sides With H'dl't step With

Lamp shelf None Nosing ----

Bell 92 pounds

Sand Box Two Diam. 38" Body Iron Painted Pipes Iron

Sander (Not spec) Leach Air, Trap A-1, in each box, to sand front and back.

Dome casing Iron Painted

Boiler Jacket #18 Soft Steel Ptd. Bands Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

Jos. Wolf Aug 1920

SPECIFICATION FOR LOCOMOTIVES 8 34 D 550

FOR Empire Steel and Iron Company

Frames Cast Steel

Cylinders, Diam. 20" Stroke 26"

St'm ports, Length 16" Width 1½" Bridges 1"

Exh. ports, Length 16" Width 2½" Valve head 1 1/16"

Valve travel 5¼" Steam lap ⅞" Exhaust clearance ----

Eccentric throw 5" By-pass valve None

(Not spec) S. P. Lubr. Nathan Triple Bulls Eye

Cyl'r heads Cast Iron Lubr. Pipes of iron under jacket

Cyl'r casings Iron Painted Head covers Steel Painted

St'm chest casings Iron Painted Covers Steel Painted

St'm chest valves Balanced, with vacuum valves

(Not spec) Met. pkg. piston rod valve stems U. S. King Type

Piston rods to be keyed to crossheads.

Pistons heads of cast iron with rings of cast iron sprung in.

Guides Alligator Type, Steel Oil cups Needle

Crossheads Cast Steel with bearings of cast iron, tinned

Wrist Pins Steel Rod caps Plunger

Parallel rods to have solid ends.

Valve Motion Stephenson

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Bronze, for main wheels only.

Drivers, O. S. Diam. 51" Cen. diam. 44"

Driving wheels centres: Main of Cast Steel: Others of Cast Iron

Tires Steel Held by Shrinkage and Shoulder

Tires, Flanged, Pos. All Size 3½" x 5½"

Tires, Plain, Pos. --- Size ----

Lateral play between driving boxes and wheel hubs 3/16" total

Driving Boxes Steeled Cast Iron

Journals, Diam. 9" Length 12"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing Bolster

To swing 5¼" each side of cen., Cen. pin liners None

Journals, Diam. 5" Length 10" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 30" Tread 1¼" Kind Chilled Cast Iron Plate

Tires None Cen. diam. --- Size ----

Tires held by ----

Back Engine Truck None Wheeled ----

To swing --- each side of cen., Cen. pin liners ----

Journals, Diam. ---- Length ---- Boxes ----

Wheel hub liners ----

Wheels, Diam. ---- Tread ---- Kind ----

Tires ---- Cen. diam. ---- Size ----

Tires held by ----

Brake, position On all driving and tender wheels

Operating Parts: Engine, sch. No. 6-ET Westg. Combined Auto. and Straight Air.

Parts: Eng. Trk, sch ---

Foundation Parts: Drivers, sch. WA-2 American Outside Equalized

Parts: Eng. Trk, sch ----

Air pump One 9½" Pos. Left Side

Train connections Front and Back

Train signal, sch. None

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1576

Weight, with fuel and water, about 83,900 pounds

Tender to be weighed : Yes

Tank 4000 Gallons, Bill 4832

Tank "U" shape, sloping back. Fuel capacity: 6 tons.

Tool Boxes Hard wood, top

Frame 8" and 10" steel channels with bumpers of wood and steel plate.

Front Drawbar height 30"

Pilot None

Back drawhead, center above rail 33½"

Coupler M. C. B. Automatic

* Steps hand holds etc. to conform to I. C. C. requirements.

Steps across rear with hand rails.

Steps and hand rails on sloping back of tank.

Trucks Arch bar type, with bolsters of cast steel.

Springs Elliptic, B. L. W. make.

Journals, Diam. 4½" Length 8"

Wheels, Diam. 33" Tread 1¼" Kind Chilled Cast Iron Plate

Tires None Cen. diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET Westg. Automatic and Straight Air with 10" x 12" tender brake cylinder.

* Boiler to be inspected by the Hartford Steam Boiler Inspection and Insurance Company.

List of tools, sch. 29

Photo sch. No. 2 Inspection B. L. W. (except see * and sup. inc. 19)

To be weighed Yes Material specns B. L. W. (except see sup. 4)

Certificate of boiler test Three copies B.L.W. form 1036.

Junior laws to 7.30.20. Shipment On own wheels.

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W.

Patents Feed Water Strainer, Pat'd. Sept. 1, 1903 (cast on).

Property plates B. L. W. for engine and tender

Painting, style 291, Olive Green and Aluminum

Marking to be same as for 10 32 E 127.

Mark on tank sides: Mount Hope Mineral

Road Nos. Pos. Road Nos. Name None

F. No. Plate 4

F. Sand Box

Cab Sides

Back of Tank

Actual Dimensions of Loco. Width over dampers 10' 0"

Extreme Width: Cab boards 10' 1" Cylinders or valve motion 9' 3½"

Length outside face front bumper of engine to face of tender wedge 23' 8½"

Length face of tender wedge to outside face back bumper of tender 23' 7"

Total length outside face front bumper of engine to outside face back bumper of tender 47' 3½"

SPECIFICATION FOR LOCOMOTIVES 8 34 D 550

FOR EMPIRE STEEL AND IRON COMPANY

P

113
112

1 BOILER TO BE OPERATED IN THE STATE OF PENNA. & NEW JERSEY
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND -ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

10% VARIATION WILL BE ALLOWED IN THICKNESS OF BOILER TUBES.

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	⅞"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I. E., USE FUSIBLE PLUG CARD 4114 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER,

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6858.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG: ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(MANUFACTURER'S SERIAL NUMBER)	PENNSYLVANIA & NEW JERSEY (STATE IN WHICH BOILER IS TO BE USED)
	No. 31 & No. 4 (MANUFACTURER'S STATE STANDARD NUMBER)
	THE BALDWIN LOCOMOTIVE WORKS (NAME OF MANUFACTURER)
	(LEAVE BLANK) (STATE'S NUMBER) (LEAVE BLANK) (YEAR PUT IN SERVICE)
	200 LBS. (MAXIMUM WORKING PRESSURE WHEN BUILT)

THE BALDWIN LOCOMOTIVE WORKS As Spec'n C-9373

Memorandum Spec'n 20035

SPECIFICATION FOR LOCOMOTIVES 12 3½ ¼ E 56

EP/ **FOR** ENGLISH LUMBER COMPANY

HE

Gen'l as PHOTO. 3815

Engine Drawing No. 6

2.16.20 (NOT SPEC)

Gauge of Road 4'8½" Play ¾"

Wheelbase, Rigid 13'1" Driving 13'1" Total 27'0"

Total wheelbase, eng. and tend. {Actual 54'1¾" / Limited to ---

Curves ———

Limits, Height --- Width ---

Weight (aproximate) in working order Total 175,500 POUNDS.

On F. tr'k 15,500 lbs., Drivers 136,500 lbs., B. tr'k 23,500 lbs.

Tractive power 35,400 lbs., Ratio of adhesion 3.8

Work'g St'm Pres. 170 lbs., Service LOGGING

Fuel COAL

Boiler STEEL Thick ⅜" B/R 6952

Front Tube Sheet ½" Thick

Boiler, Diam. 74" Plan STRAIGHT TOP.

{Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

{With Factor of Safety of 4.59 267 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

AUXILIARY DOME-NONE

Dome, diam. 33" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 90-3/16" Width 66⅛" Depth F. 68½" B 64"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

Firedoor opening ~~16" DIAM.~~ OVAL 13" x 18"

Water space, Front 4" Sides 3½" Back 3½"

Water space frame SINGLE Riveted

2 Water space stays ⅝" DIAM. WITH 3/16" HOLES, 12" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front {THREE ROWS B.L.W. EXPANSION STAYS

Button heads below crown on ~~EACH~~ TEN CENTRAL contral rows

Crown bars NONE Placed --- above crown

Crown bolts ---

Flues ~~2"~~ (NOT USE STOCK)

3 **Tubes** ~~2"~~ W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 350 Diam. 2" Length 16'6"

Heating {Flues --- Combus. Chamb. --- Total 3162 sq.ft.

Surface {Tubes 3009 sq.ft. Fire Box 149 sq.ft. Fire Brick Tubes 25 sq.ft.

Grate area 41.3 sq.ft. Ratio to Heating Surface 1 : 77

Superheater ---

Fire Brick ARCH, SECURITY ARCH FROM AMERICAN ARCH CO. ON FOUR TUBES, 3" DIA. x 3'0" THICK.

Grates ROCKING BARS AND DROP PLATE

Ash Pan, Dampers FRONT AND BACK

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L.S. ONLY

Spark ~~arrester~~ hopper WITH

Netting and deflect. plates WITH

Exhaust nozzles DOUBLE, HIGH

14 **Stack** CAST IRON, STRAIGHT Dia. 18"

Safety Valves TWO CONSOLIDATED 3½" OPEN

Safety valves NONE with roller lever Set to 170 POUNDS

4 **Whistle** ONE B. L. W. LARGE CHIME

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (NOT SPEC)

Steam gauge stem IRON **Clock** NONE

Water Gauge ONE KLINGER REFLEX 12 **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve TO HAVE, separate dry pipe to same

5 **Blower Valve** B. L. W.

Blow off Cock ONE B. L. W. POS: FRONT

Cleaning Plugs

Firebox, CORNERS, DIAGONAL SIDES AND BACK

Crown, TWO EACH SIDE AND FOUR BACK

Waist, ONE UNDER FRONT

Front tube sheet, TWO Fusible plug ONE

Pump NONE

Injectors TWO SELLERS, CLASS "N" (SPEC) No. 11½

Injectors, Pos. R. AND L. Steam pipes COPPER

6 Pipes, Check IRON Exh. IRON Overflow IRON

Check B. L. W. (SEE SUP. 6+) Pos. R. AND L.

Steam Heat NONE

9 **Cab** STEEL

11 Cab boards STEEL Posts T-IRON

Running boards STEEL Roofing T-IRON

Hand rail IRON Supports BOILER

Back Bumper BAR STEEL Back Drawbar height 32½"

Pilot WOOD Pilot knees NONE

Front Bumper OAK Buffer plates WITH

1 **Steps** HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Height of centre 33½"

Coupler M.C.B. AUTOMATIC COUPLER, WITH SLOTTED KNUCKLE

Signal fixtures IRON ON BUMPERS

12 **Headlight** TWO ROUND CASE 16" Reflector

Headlight, Nos. on cases WITH Hinged door WITH

Lamp shelf NONE Mounting ---

Bell 92 POUNDS

Sand Box (NOT SPEC) Two Diam. 31" Body IRON PAINTED Plates IRON.

Sander LEACH AIR, TRAP A-1, IN CAB BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED.

Boiler Jacket #22 PLAN. STEEL Bands IRON Sq. 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

Geo. P. Frick MAY 1920

SPECIFICATION FOR LOCOMOTIVES 12 3½ 2 E 56

FOR ENGLISH LUMBER COMPANY

HE

115

114

Frames CAST STEEL

Cylinders, Diam. 20½" Stroke 26"

Steam ports, Length 16" Width 18" Bridges 1⅞"

Exhaust ports, Length 16" Width 3" Valve rod 3 3/32"

Valve Bars 5¼" Steam Pipe ⅞" Exhaust Clearance ---

Eccentric straps 4¼" By-pass valve NONE

(NOT SPEC) S.V. Lubr. MICHIGAN TRIPLE BULL'S EYE

Cylinders CAST IRON Lubr. PIPES OF IRON UNDER JACKET

Cylinder saddle IRON PTD. Head covers STEEL PAINTED

Steam chest cover IRON PTD. Covers STEEL PAINTED

Slide valves RICHARDSON BALANCED, WITH VACUUM VALVES

(NOT SPEC) Motion Valve Gear UNITED STATES, KING TYPE

Pistons HEADS OF CAST IRON, WITH RINGS OF CAST IRON SPRUNG IN

Guides LAIRD TYPE, STEEL Oil cups NEEDLE

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, BABBITTED Strips ACROSS REAR, WITH HAND RAILS.

Wrist Pins STEEL Roller cups GREASE CUPS, FORGED ON

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be of case-hardened steel to have hardened bushings.

ALL VALVE MOTION WORK TO BE BUSHED

All threads on bolts (except staybolts) to be United States Standard.

All finished hexagon nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel axle liners BRASS ON MAIN WHEELS ONLY

Drivers, Material S. Diam. 48" Centre diam. 42"

WHEEL CENTRES;- MAIN CAST STEEL, OTHERS CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"

Tires, Plain, Pos. INTERMEDIATE Size 3" x 6½"

Lateral play between driving boxes and wheel hubs 3/8" TOTAL

Driving Boxes STEELED CAST IRON

Journals, Diam. {MAIN 9" Length 10"

{OTHERS 8"

25 **Springs.** Make B. L. W.

Front Engine Truck TWO Wheels SWING BOLSTER, CENTRE BEARING

To swing 2½" each side of centre, Centre plate liners NONE

Journals, Diam. 5" Length 10" Boxes CAST IRON

Wheel hub liners NONE B. L. W. NONE

Wheels, Diam. 28" Tread --- Kind CAST IRON SPOKE CENTRE Patents

Tires STEEL Centre diam. 23" Size 2" x 5½" Property marks NONE

Tires held by BOLTED TYPE FASTENING

Back Engine Truck TWO Wheels RUSHTON INSIDE BEARING

To swing 2½" each side of centre, Centre plate liners NONE

Journals, Diam. 6" Length 10" Boxes CAST IRON steel

Wheel hub liners NONE

Wheels, Diam. 36" Tread --- Kind CAST IRON SPOKE CENTRE

Tires STEEL Centre diam. 31" Size 2½" x 5½"

Tires held by BOLTED TYPE FASTENING

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Engine arch No. 6 ET WESTG. COMBINED AUTO AND STRAIGHT AIR

Rigging, End Tie, etc. ---

Foundation Drivers size 14-2 AMERICAN OUTSIDE EQUALIZED

Pins, Eccentric Trucks ---

Air pump ONE 8½" Type L. S. (CROSS COMPOUND PUMP)

Air connections FRONT AND BACK

Hose coupling, style NONE

AIR RESERVOIRS TO HAVE EXTRA LARGE CAPACITY, AND TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT WHEEL 1325

Weight, with coal and water 130,000 POUNDS

TENDER TO BE WEIGHED: YES

Tank 4,000 Gallons Bbl. 4811

TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 9 TONS.

Top Boards OF HARD WOOD, TBR.

Frame STEEL, 8" AND 10" CHANNELS, WITH BUMPERS OF WOOD AND STEEL PLATE.

Front Drawbar height 32½"

Pilot NONE Pushing shoes NONE

Back drawhead centre above R. 33½"

28 **Coupler** M.C.B. AUTOMATIC COUPLER, WITH SLOTTED KNUCKLE

STEPS, HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks B. L. W. EQUALIZED WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, B. L. W.

Journals, Diam. 4½" Length 8"

Wheels, Diam. 28" Tread --- Kind CHILLED CAST IRON PLATE

Tires NONE Centre diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake Position ON ALL WHEELS

Brake gear NOW O.T. ESTINGHOUSE AUTOMATIC AND STRAIGHT AIR, WITH 10" x 12" TENDER BRAKE CYLINDER.

List of tools sup. by 29 ONE PAIR PRESSED STEEL FROGS

Photo size NONE Inspected B. L. W.

To be weighed NO Material specified B. L. W.

Certificate of test THREE COPIES B.L.W. FORM 1035

Junior laws to 11-1-20 Shipment ON OWN WHEELS (SEE SUP. 14)

Brass shop liners 1

Machine spot faces 3-135

Painting, style 251, OLIVE GREEN AND ALUMINUM

Monogram TANK SIDES: ENGLISH LUMBER COMPANY

Road Nos. Pos. Road Nos. Name NONE

F. No. PLATE 10

DOME

CAB SIDES

BACK OF TANK

Actual Dimensions of Loco. Extreme Height from rail 14'11½"

Extreme Width, Cab fronts 10'3" Cylinders or valve motion 9'4"

Length over all, engine and tender, from front of bumper beam to face of tender 36'0⅜"

Length from front of engine to back bumper of tender 23'6½"

Total length of engine from front bumper of 53'½"

Length from front face of engine to back face of tender

SPECIFICATION FOR LOCOMOTIVES 12 34 ½ E 56

FOR ENGLISH LUMBER COMPANY

116
115

1 LOCOMOTIVE FOR OPERATION IN THE STATE OF WASHINGTON. ALL DETAILS TO CONFORM TO I.C.C. REQUIREMENTS.

2 FLEXIBLE STAYS TO BE TATE, ABOUT 400 IN NUMBER, LOCATED IN BREAKING ZONE.

3 TUBES TO BE SPACED 4" AND TO BE APPLIED WITH PROSSER EXPANDER.

4 WHISTLE TO SCREW INTO SIDE OF DOME.

5 BLOWER PIPES TO BE PROVIDED WITH SUITABLE VALVES FOR ROUND HOUSE CONNECTION.

6 PLUG STOP VALVE TO BE PROVIDED BETWEEN INJECTOR CHECK AND BOILER.

7 WATER DEFLECTOR, C. B. & Q. STYLE, TO BE APPLIED INSIDE OF BOILER AT INJECTOR CHECKS.

8 ONE FIRE EXTINGUISHER "A" WITH STOP VALVES, TO BE APPLIED TO INJECTOR CHECK PIPE, OF RIGHT SIDE OF LOCOMOTIVE.

9 CAB TO BE LINED WITH WOOD.
VENTILATOR IN CAB ROOF.

10 DROP SEAT FOR ENGINEER ON RIGHT SIDE OF CAB, AND TOOL BOX FOR FIRE MAN ON LEFT SIDE.

11 CAB BOARDS TO BE DOWELED WITH WOOD IN CAB.

12 HEADLIGHT EQUIPMENT TO BE PYLE-NATIONAL ELECTRIC TYPE K-2 COMPLETE WITH GENERATOR AND INCANDESCENT HEADLIGHTS AND WITH SWITCH IN CAB FOR CUTTING OUT HEADLIGHTS.
HEADLIGHT CASES TO HAVE LONG FRONT EXTENSION, TO PREVENT BREAKING OF GLASS.

13 SPRING RIGGING TO BE BUSHED.

14 ONE SUPERIOR IMPROVED WOOD BURNING STACK 18" DIAMETER, ORDERED THROUGH EXTRA WORK DEPARTMENT ON ORDER NO. 13797 DATED 4-7-30, TO BE SHIPPED WITH LOCOMOTIVE (NO CHARGE)

TENDER

2b TANK COLLAR TO BE ABOUT 3" HIGH IN BACK TO PROVIDE GOOD REST FOR ENGINEMAN WHILE BACKING UP.

2f DRAIN PIPES 2" DIAMETER ON EACH SIDE OF TANK RUNNEL TO CARRY WASTE WATER TO TRACK.

2h ABOUT 12" TO BE ALLOWED BETWEEN BACK OF TANK AND REAR OF TENDER BUMPER FOR CARRYING MATERIALS.

THE BALDWIN LOCOMOTIVE WORKS | Dup. of 8 30 D 704, ~~High Duty Cylinders~~, Except where otherwise specified. As Specn. F-2103.

Memorandum Spec'n ~~21002~~ ~~F-20177~~

SPECIFICATION FOR LOCOMOTIVES 8 30 D 727 ~~to 729~~

FOR ~~Stock~~ H. T. FARRELL - PLANO & EAGLE FORD, TEXAS.

Gen. as PHOTO. 723

Engine Drawing No. 85

H.W. ~~(Oval)~~

~~7-28-20~~ 1-28-21.

(Not Spec)

Gauge of Road 4'8½" Play ⅜"

Wheelbase, Rigid 11' 6" Driving 11' 6" Total 19'4"

Total wheelbase, eng. and tend. Actual 46'3½" / Limited to ---

~~Gauge 60 and 65 pounds.~~

Curves ~~42 degrees.~~ ~~Main line engs., No. 8 (603 ft. rad.)~~ ~~Gauge against long rig.~~ ~~Outer engs., No. 6 (339 ft. rad.)~~

Limits, Height --- Width ~~112,500~~

Weight (approximate) in working order. Total ~~112,000~~ pounds.

On F. tr'k ~~15,500~~ Lbs. Drivers ~~97,000~~ lbs. B. tr'k --- lbs.

WEIGHT OF ENGINE, EMPTY, ABOUT 99,500 POUNDS.

Tractive power ~~22660~~ lbs. Ratio of adhesion ~~4.1~~ 4.2

Work'g St'm Pres. 180 lbs. Service ~~Plantation~~ FREIGHT.

Fuel ~~Standard~~ OIL ~~with gravity of 14 degrees Baumé with 135 to 180 flash points~~

Boiler STEEL Thick ¾" Rivets 3205

Front Tube Sheet ½" Thick ~~Boiler for Export~~

Boiler, Diam. 94" Plan EXTENDED WAGON TOP

Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.

With Factor of Safety of 5.22 240 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

DOME TO BE ONE-PIECE TYPE.

Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL Combustion chamb. NONE

Firebox, length 74 3/16" Width 41½" Depth F. 59½" B. 57½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame DOUBLE Riveted

Water space stays ⅞" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front TWO ROWS B.L.W. EXPANSION STAYS

Button heads below crown on SIX central rows

Crown bars NONE Placed --- above crown

~~Crown bolts~~ ---

INSIDE AND OUTSIDE SHEETS OF FIRE BOX TO BE WELDED TO MUD RING.

~~Flues ---~~

Tubes #12 W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 219 Diam. 2" Length 11'0"

TUBES TO BE ELECTRICALLY WELDED IN FIRE BOX TUBE SHEET.

Heating Surface: Flues --- Combus. Chamb. --- Total 1355

Tubes 1252 Fire Box 103 Fire Brick Tubes NONE

Grate area 21.3 Ratio to Heating Surface 1: 63

Superheater ~~NONE~~

Fire Brick ARCH, NONE

FIRE BOX LINED WITH FIRE BRICK FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

Grates NONE

Ash Pan, Dampers FRONT AND BACK

OIL BURNING ARRANGEMENT B. L. W. STANDARD WITH BURNER IN FRONT END OF FIRE BOX. ROYALTY, IF ANY, PAYABLE BY B.L.W.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

OIL BURNING DETAILS ARRANGED FOR FUEL OIL, WITH GRAVITY 11 TO 14 DEGREES BAUMÉ, WITH 135 TO 180 FLASH POINT.

Smokebox Extension WITH Cleaning hole and cap L.S.ONLY

Spark ~~arrester~~ hopper WITH

Netting and deflect. plates NONE

Exhaust nozzles DOUBLE-LOW

CLEANING PIPE - WITH

Stack STRAIGHT Dia. 16"

Safety Valves TWO COALE 2½" PLAIN

Safety valves NONE with relief lever, Set to 180 POUNDS

Whistle ONE B.L.W. PLAIN

Steam Gauge ONE BRASS 7" MAKER: ASHCROFT (Not Spec)

Steam gauge stand BRASS **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock ⅜" above highest part of crown

Lubricator steam valve WITHOUT separate dry pipe to dome

Blower Valve B.L.W.

Blow off Cock ONE EVERLASTING POS: FRONT

Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER.

Firebox, CORNERS DIAGONAL AND BACK

Crown, THREE EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT

Front tube sheet, ONE Fusible plug ONE

~~ENAMELLED~~ PRESSED STEEL COLLAR RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE

DETAILS TO BE ARRANGED SO THAT LOCO. CAN BE EASILY CHANGED TO BURN COAL FUEL. LOCO. TO OPERATE IN GRAVEL PIT NEAR DALLAS, TEXAS AND MUST MEET ALL REQUIREMENTS OF THE I.C.C. AND THE U.S. SAFETY APPLIANCE STANDARDS.

INJECTORS FOR USE WITH HOT WATER.

Injectors TWO SIMPLEX TYPE "R" (Not Spec) No. 8

Injectors, Pos. R. AND L. Steam pipes COPPER

Pipes, Check COPPER Feed COPPER Overflow IRON

Check B. L. W. Pos. TOP OF BOILER

THIS LOCO. WAS ORIGINALLY ORDERED FOR STOCK ON FOREIGN SALES DEPT. MEMO. SPEC'N. NO. F-20177.

Steam Heat NONE

Cab STEEL, LINED WITH WOOD.

CRYSTAL PLATE GLASS CAB WINDOWS.

Cab boards STEEL Nosing T-IRON

Running boards STEEL Nosing T-IRON

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 33¾"

Pilot WOOD Pushing shoes NONE

Front Bumper MELLOW PINE Bumper plate WITH

Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 34½"

Coupler M.C.B. AUTO. WITH SLOTTED KNUCKLE.

Signal fixtures IRON ON BUMPER

HEADLIGHT EQUIPMENT TO BE SUNBEAM ELECTRIC WITH INCANDESCENT HEADLIGHTS.

Headlight TWO ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH Hand step WITH

Lamp shelf NONE Nosing ---

Bell 92 POUNDS GOLLMAR AIR BELL RINGER.

Sand Box TWO Diam. 28" Body HIGH, IRON PTD. Pipes IRON

Sander HAND, IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED, PRESSED STEEL TOP AND BOTTOM RINGS.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON Style 9 AND 14

Boiler Lagging MAGNESIA SECTIONAL

BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

H.S.LICHATTI

SPECIFICATION FOR LOCOMOTIVES 8 30 D 727 ~~to 729~~ FEB. 1921.

FOR ~~Stock~~ H. T. FARRELL.

H.W.

Frames CAST STEEL

Cylinders, Diam 19" Stroke 24"

St'm ports, Length 16" Width 1½" Bridges 1"

Exh. ports, Length 16" Width 2½" Valve lead ¼"

Valve travel 5½" Steam lap ¾" Exhaust clearance ---

Eccentric crank throw 9 3/16" By-pass valve NONE

S. P. Lubr. (Not Spec) NATHAN No. 9 TRIPLE BULLS EYE.

Cyl'r heads CAST IRON LUBR. PIPES OF COPPER O.S. OF JACKET.

Cyl'r casings IRON PTD. Head covers STEEL PAINTED

St'm chest casings IRON PTD. Covers STEEL PAINTED

St'm chest valves BALANCED, WITH VACUUM VALVES.

Mot. pkg. (Not Spec) PISTON RODS PISTON VALVE STEMS UNITED STATES, KING TYPE.

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons CAST IRON RINGS SPRUNG INTO SOLID HEAD.

Guides STEEL Oil cups NEEDLE

Crossheads CAST STEEL WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL Rod cups PLUNGER, FORGED ON RODS.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboltS) to be United States Standard.

All finished nuts and lock nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.

Driving wheel hub liners NONE

Drivers, O. S. Diam. 52" Con. diam. 46" CENTRES CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"

Tires, Plain, Pos. MIDDLE Size 3" x 6½"

Lateral play between driving boxes and wheel hubs - 3/16" TOTAL

Driving Boxes STEELED CAST IRON.

Journals, Diam. 7½" Length 9"

ALL SPRINGS TO BE ONE PLATE HEAVIER THAN USUAL.

Springs. Make B.L.W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING

To swing 4" each side of cen., Cen. pin liners NONE

Journals, Diam. 5" Length 10" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam 28" Tread --- Kind CAST IRON SPOKE CENTER

Tires STEEL Cen. diam. 23" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE

~~BELL, WHISTLE, OIL CUPS, TOOLS, CAB LAMPS AND ELECTRIC LIGHT FIXTURES, TO BE PACKED IN A BOX AND PLACED IN SMOKE BOX FOR SAFE KEEPING DURING TRANSIT.~~

~~SPARE PARTS COVERED ON EXTRA ORDER NO. 1116 DATED 9-22-20 TO BE SHIPPED WITH LOCOMOTIVES.~~

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating Parts: Engine, sch. NO. 6 ET WESTG. COMBINED AUTO. AND STRAIGHT AIR

Eng. Trk, sch. ---

Foundation Parts: Drivers, sch. M-1 AMERICAN O. S. EQUALIZED

Eng. Trk, sch. ---

Air pump ONE 9½" Pos. LEFT SIDE

Train connections FRONT AND BACK

Train signal, sch. NONE

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

AIR DRUM TO BE PLACED ABOVE FRONT DRIVING WHEELS (INSTEAD OF BACK DRIVERS)

Tender EIGHT Wheeled, Drawing No. 1429 **Weight,** with fuel and water, about 85,000 LBS. (WEIGHT EMPTY ABOUT 38,000 LBS.)

TENDER TO BE WEIGHED: ~~Yes~~ No.

Tank OIL 1800 / WATER 4000 Gallons, Bill 4975 4952

TANK "U" SHAPE, STRAIGHT TOP.

Tool Boxes OF STEEL, TOP.

TENDER FLOOR OF STEEL.

Frame STEEL 8" AND 10" CHANNELS, WITH BUMPERS OF STEEL PLATE.

Front Drawbar height 32"

Pilot WOOD, AT REAR Pushing shoes NONE

Back drawbar height under above rail 34½"

Coupler M. C.B. AUTOMATIC, WITH SLOTTED KNUCKLE.

Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, B.L.W.

Journals, Diam. 4½" Length 8"

Wheels, Diam, 33" Tread --- Kind CAST IRON, PLATE CENTRES

Tires STEEL Cen. diam. 28" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER

Safety chains SINGLE

Brake Position ON ALL WHEELS

Brake sch. No. 6 ET WESTINGHOUSE AUTOMATIC AND STRAIGHT AIR, WITH 10" x12" TENDER CYLINDERS.

List of tools, sch. 37 TWO TRAVERSING JACKS.

Photo sch. NONE Inspection B.L.W.

To be weighed YES Material specns. B.L.W.

Certificate of boiler test DUPLICATE

Junior laws to 7-28-20 Shipment ~~ERECTED~~, ON OWN WHEELS ~~(Spec'd)~~

Brass shop finish, No. 3, EXCEPT INJECTOR CHECKS TO BE PAINTED.

Machine shop finish D-158, EXCEPT CYLINDER HEAD COVERS AND STEAM CHEST COVERS TO BE PAINTED.

B. L. W. Patents NONE

Property plates NONE

Painting, style 231, OLIVE GREEN AND ALUMINUM

Mark on TANK SIDES:- H. T. FARRELL

Road Nos. Pos. Road Nos. Name NONE.

F. No. PLATE. 1

F. SAND BOX.

CAB SIDES.

BACK OF TANK.

Actual Dimensions of Loco. Extreme height over all 13' 8½"

Extreme Width Cab boards 9' 7" Cylinders ~~engine centers~~ 9' 9½"

Length outside face front bumper of engine to face of tender wedge - 28' 7½"

Length face of tender wedge to outside face back bumper of tender - 23' 3½"

Total length outside face front bumper of engine to outside face back bumper of tender 51' 11"

THE BALDWIN LOCOMOTIVE WORKS {DUP. OF 12 38½ E 127 AND 128 WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20078

SPECIFICATION FOR LOCOMOTIVES 12 38 ½ E 155

WG

FOR FORT SMITH & WESTERN R. R.

HB

Gen. as PHOTO. 6591

Engine Drawing No. 26

3.26.20

Gauge of Road 4' 8½" Play ½" EXCEPT ⅞" FOR F. & B. DRIVERS

Wheelbase, Rigid 15'0" Driving 15'0" Total 31' 8"

Total wheelbase, eng. and tend. {Actual ~~63'8½"~~ 63'7" / Limited to ---

Rails 75 POUNDS

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 199,000 POUNDS

On F. tr'k 18,500 lbs., Drivers 154,000 lbs., B. tr'k 26,500 lbs.

Tractive power 37,370 lbs., Ratio of adhesion 4.1

Work'g St'm Pres. 185 lbs., Service FREIGHT

Fuel SOFT COAL

Boiler STEEL Thick 1 1/16" Bill 9012

Front Tube Sheet ½" Thick

Boiler, Diam. 66" Plan STRAIGHT TOP.

Tested to {Allowable st'm pres. 220 lbs. (240 lbs. steam pres.) / With Factor of Safety of 5.26 (294 lbs. water pres.)

Longitud. seams (SEE SUP. 2)

Dome, diam. 29" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 102⅝" Width 65⅞" Depth F. 67½" B. 56½"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

Firedoor opening OVAL 13½" x 18" (SEE SUP. 4)

Water space, Front 4" Sides 3½" Back 3½"

Water space frame DOUBLE Riveted

Water space stays 1" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O. S.

Radial stays 1⅛" DIAM. Sling stays front {TWO ROWS B. L. W. EXPANSION STAYS

Button heads below crown on TEN central rows

Crown bars NONE Placed --- above crown

Crown bolts ---

Flues #9 B. W. G. SEAMLESS STEEL

Tubes #12 W. G. SEAMLESS STEEL

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 24/172 Diam. 5⅜" Length 19'3"

Heating Surface	Flues 647	Combus. Chamb. ---	Total 2566.5
	Tubes 1726	Fire Box 165	Fire Brick Tubes 28.5
Grate area 46.8	Ratio to Heating Surface 1: 54.8		
Superheater 562			

Fire Brick ARCH SECURITY ON FOUR TUBES 3" O. S. DIAMETER

No. 7 W. G. STEEL

Grates ROCKING BARS AND DROP PLATE

Ash Pan, Dampers FRONT AND BACK (SEE SUP. 8)

THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.

Throttle BALANCE Pos. DOME

Dry pipe STEEL (7⅞" DIAMETER - A/C TIME)

Superheater SCHMIDT TYPE (SEE SUP. 9 &c)

Smokebox extenstion WITH Cleaning hole and cap L. S. ONLY

Spark ejector ~~on hopper~~ WITH TO DELIVER TO RIGHT SIDE

Netting and deflect. plates WITH (SEE SUP. 12)

Exhaust nozzles SINGLE HIGH

Stack STRAIGHT Dia. 15"

Safety Valves TWO ASHTON 3½" ONE MUFFLED (SPEC)

Safety valves NONE with relief lever, Set to {185 LBS. MUFFLED / 188 LBS. OPEN

Whistle CROSBY CHIME (SUP. 3)

Steam Gauge ONE IRON 7" MAKER:- ASHCROFT (NOT SPEC)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE REFLEX **Cab Lamps** ELECTRIC

Gauge Cocks THREE - BACK Surface valve NONE

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve NONE

Blower Valve B. L. W.

Blow off Cock THREE OKADEE Pos:- (SEE SUP. 15)

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.

Firebox, COVERS DIAGONAL, SIDES AND BACK

Crown, TWO EACH SIDE AND FOUR BACK

Waist, TWO UNDER, ONE IN FIRST AND ONE IN THIRD COURSE

Front tube sheet, TWO Fusible plug ONE

Pump NONE

Injectors TWO SELLERS (SPEC) No. 9½

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON (SUP. 16)

Check SELLERS (SEE SUP. 17) Pos. TOP OF BOILER

Steam Heat NONE

Cab STEEL

Cab boards STEEL Nosing T-IRON

Running boards STEEL Nosing T-IRON

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL (SUP. 18) Back drawbar height 32½"

Pilot WOOD Pushing shoes CAST IN BUMPER

Front Bumper CAST STEEL Bumper plate WITH

Steps HAND HOLDS, ETC. TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler SIMPLEX M. C. B. AUTOMATIC

Signal fixtures IRON ON BUMPER

Headlight ONE ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH Half step WITH

Lamp shelf NONE Nosing ---

Bell 92 POUNDS GOLLMAR AIR BELL RINGER

Sand Box ONE Diam. 33" Body IRON PAINTED Pipes IRON

Sander (NOT SPEC) LEACH AIR TRAP A-10 TO SAND AHEAD OF FORWARD AND IN BACK OF THIRD PAIR OF DRIVING WHEELS

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9 AND 14

Boiler Lagging MAGNESIA SECTIONAL

BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

P. W. STOUDT. JUNE 1920

SPECIFICATION FOR LOCOMOTIVES 12 38 ½ E 155

FOR FORT SMITH & WESTERN R. R.

HW

120

119

Frames CAST STEEL

Cylinders, Diam. 22" Stroke 28"

St'm ports, Length 30⅜" Width 1½" Bridges ---

Exh. ports, Length --- Width --- Valve lead ⅛"

Valve travel 5½" Steam lap 1" Exhaust clearance ---

Eccentric crank throw 22" By-pass valve NONE

S. F. Lubr. (SEE SUP. 26 &c)

Cyl'r heads FRONT CAST IRON, BACK CAST STEEL

Cyl'r castings IRON PTD. Head covers STEEL PAINTED

St'm chest casings --- Covers ---

St'm chest valves 13" DIAM. PISTON TYPE, INSIDE ADMISSION

Mot. pkg. U. S. KING TYPE

Pistons CAST IRON RINGS SPRUNG INTO SOLID HEAD

Guides STEEL Oil cups NEEDLE

Crossheads CAST STEEL

Wrist Pins STEEL Rod cups GREASE CUPS (SEE SUP. 29)

Valve Motion SOUTHERN, ROYALTY PAYABLE BY THE B. L. W.

Links, sliding blocks, pins, lifting links and eccentric rod laws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboltsto be United States Standard.

All finished movable nuts of steel or of iron case hardened

Wearing Bearings B. L. W.

Driving wheel hub liners BRASS

Drivers, O. S. Diam. 57" Cen. diam. 50" CENTRES CAST STEEL

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. ALL Size 3½" x 5½"

Tires, Plain, Pos. --- Size ---

Lateral play between driving boxes and wheel hubs = 3/16" TOTAL

Driving Boxes CAST STEEL WITH ELVIN LUBRICATORS

Journals, Diam. {MAIN 9" Length 12" / OTHERS 8½"

DRIVING SPRING STAPLES, CAST STEEL

Springs. Make STANDARD STEEL WORKS

Front Engine Truck TWO Wheeled SWING BOLSTER

To swing 4" each side of cen. Cen. pin liners NONE

Journals, Diam. 5½" Length 10" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 33" Tread --- Kind CAST IRON SPOKE CENTRE

Tires STEEL Cen. diam. 28" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER

Back Engine Truck TWO Wheeled HODGES O. S. BEARING TYPE

To swing 3" each side of cen. Cen. pin liners NONE

Journals, Diam. 7½" Length 12" Boxes CAST STEEL

Wheel hub liners (SEE SUP. 38)

Wheels, Diam. 40" Tread --- Kind CAST IRON SPOKE CENTRE

Tires STEEL Cen. diam. 34" Size 3" x 5½"

Tires held by SHRINKAGE AND SHOULDER

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Parts | Engine, sch. No. 6 ET WESTG. COMBINED AUTO. AND STRAIGHT AIR

Eng. Trk. sch. ---

Foundation Parts | Drivers, sch. WN-2 AMERICAN O. S. EQUALIZED

Eng. Trk. sch. ---

Air pump ONE Pos. LEFT SIDE (SEE SUP. 39)

Train connections FRONT AND BACK

Train signal, sch. NONE

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 LBS.

Tender EIGHT Wheeled, Drawing No. 1208

Weight, with fuel and water, about 130,000 POUNDS

TENDER TO BE WEIGHED:- YES

Tank 7,000 Gallons, Bill 5330

TANK WATER BOTTOM TYPE. FUEL CAPACITY, 14 TONS.

Tool Boxes BUILT INTO FRONT OF TANK.

Frame STEEL, 10" CHANNELS, WITH BUMPERS OF WOOD AND STEEL PLATE

Front Drawbar height 32" (SEE SUP. 48)

Pilot NONE Pushing shoes NONE

Back (drawbar) ~~height above rail~~ 33½"

Coupler SIMPLEX M. C. B. AUTO. WITH WESTG. FRICTION DRAFT GEAR, AT REAR.

Steps, HAND HOLDS, ETC, TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks (SEE SUP. 50 &c)

Springs ELLIPTIC, STANDARD STEEL WORKS

Journals, Diam. 5½" Length 10"

Wheels, Diam. 33" Tread 4½" Kind (SEE SUP. 52)

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake Pos. ON ALL WHEELS

Brake No. 6 ET WESTG. AUTOMATIC AND STRAIGHT AIR, WITH 12" x 12" TENDER BRAKE CYLINDER. (SEE SUP. 53)

List of tools, sch. 29

Photo sch. No. 2 Inspection B. L. W. EXCEPT (SEE SUP. 1, 41)

To be weighed YES Material specifns. B. L. W.

Certificate of boiler test THREE COPIES OF B. L. W. FORM 1036

Jointer lines to 4.28.20. Shipment ON OWN WHEELS

Brass shop finish No. 1

Machine shop finish D-165

Patents B. L. W. FEED WATER STRAINER, 738088, PAT'D. SEPT. 1, 1903 (CAST ON)

Property plates B. L. W. FOR ENGINE AND TENDER.

Painting, style ----- OLIVE GREEN, WITHOUT STRIPING.

LETTERING, ETC. IN ALUMINUM LEAF AS SHOWN ON RY. CO'S TWO BLUE PRINTS, WITHOUT NUMBERS, SAME AS FOR 12 38 ½ E 127 AND 128.

Mark on CAB SIDES. F S & W

MARK ON SIDES OF TANK COLLARS: FORT SMITH & WESTERN

Road Nos. Pos	Road Nos.	Name NONE
F. No. PLATE	28	-
SAND BOX		
CAB SIDES		
SIDES OF TANK		
BACK OF TANK		

Actual Dimensions of Loco. Extreme height over all 14' 5"

Extreme Width: Cab boards 10' 3" Cylinders or valve motion 10' 1"

Length outside face front bumper of engine to face of tender wedge 41' 4"

Length face of tender wedge to outside face back bumper of tender 28' 6½"

Total length outside face front bumper of engine to outside face back bumper of tender 69' 2½"

SPECIFICATION FOR LOCOMOTIVES 12 38 ½ E 155

FOR FORT SMITH & WESTERN R. R.

HB

1 Ry. Co's master Mechanic will come here to make inspection of Locomotives when they are in the Erecting Shop. Advise F. Woollven, one week in advance of the time Co's representative should be here for this purpose.

2 Longitudinal seams, butt jointed, double covering strips, sextuple riveted, 90% seam.

3 Auxiliary dome for safety valves and whistle.

4 Fire door to be Franklin.

5 Tate flexible staybolts of Ewald Iron, 300 in number, located in breaking zone.

6 Coal Pusher to be Locomotive Stoker Co's Ryan Johnson Latest Improved plunger type. (See Sup. 47)

7 Grates to be operated by Franklin Shaker.
Grate bars, drop plate, and side frames to be made as shown on Ry. Co's unnumbered print.

8 Ash Pan, Anderson type, as shown on B.L.W. print 34162 marked in red to show front, back, and sides of pan made of cast iron or cast steel plates ⅜" thick.

9 Superheater as Locomotive Superheater Co's specification O-13815 dated May 8, 1920. (copy attached).
Superheater, to connect with top header in smoke box, and to have outside steam pipe connections to valve chamber.
Superheater units to have welded ends.
Royalty payable by The B. L. W.

10 Additional hand hole and cap in each side of smoke box for inspection of superheater.

11 Smoke box arrangement to be as shown on Ry. Co's print 156, as regards height of draft plate, i.e. 17½" from bottom of smoke box.

12 Smoke box netting to be of perforated steel plate, No. 12 gauge, perforations 3/16" x ¾" long diameter perforations arranged vertically.

13 Exhaust nozzles to have bushing applied as shown on Ry. Co's print 157.

14 Smoke stack to have inside extension of sheet steel, applied as shown on Ry. Co's print 156, omitting petticoat pipe.

15 Blow-off cock:- One located in throat sheet and one in each side of fire box.

16 Injector overflow pipes to be arranged for draining into the ash pan. This connection to be threaded in the injector.

17 Injector check to be Sellers Duplex 2" with stop valve, style GH.

18 Economy Devices radial buffer to be applied between engine and tender. (Sup. 48)

19 Headlight Equipment to be Pyle-National Electric, type "E" the generator and lighting mechanism to be furnished free and applied by Ry. Co. after delivery of locomotives. Cab lamps and Pyle National headlight case including the wiring to be furnished and applied by B.L.W.

25 Pedestal wedges to be Franklin Automatic adjustable.

26 Schlack Force Feed Lubricator to be furnished and applied by Ry. Co. after delivery of loco.

27 Single feed lubricator for air pump, with iron pipes under jacket.

28 Crosshead gibs to be secured with three square dowells as shown in red on print of B.L.W. crosshead card No. 3610

29 Parallel rods to have solid ends.
Side rod main connection to be made as shown in red on blue print of B.L.W. stub tracing 34112.
Side rod stub ends at main pins to be 4" wide, as shown on red on print of B.L.W. stub card 10830.
Main side rod connection to have rod body 4½" wide, and brass ⅞" thick.
Knuckle pins to have taper of 1" in 12".

30 Southern Locomotive Valve Gear license plates to be applied to the rear end of the link support on each side of locomotive.

31 Valve Gear and running gear to be fitted with castellated nuts, throughout.

32 Nagonnet power reverse gear to be type "B" as covered on Extra Order No. 19505 dated 5-25-20.

33 All driving tires with flanges arranged to negotiate curves readily.

34 Flange oilers, Chicago, to be provided with pipes to front driving wheel tires, and to be located on back head so that engineer can see both feeds.

35 Driving and trailing truck equalizers to be provided with steel blocks, using the knife edge method of support instead of pin construction, as shown on blue print of Co's sketch 255.

36 Front engine truck to be Franklin Economy truck.

37 Ample clearance to be provided between engine truck frame and main engine frame.

38 Back engine truck box to have face babbitted next to hub of wheel.

39 Air Pump One Westg. 8½" Cross Compound Air Compressor, complete, Piece No. 39668.
Air pumps to have U.S. King type metallic packing.

40 Brake hanger brackets back of rear drivers to be stronger.

41 Engine to be weighed both on individual scales and on platform scales: these weights to be witnessed by a representative of the Drawing Room and also by a representative of Mr. Wille's Office. Affidavits to be made as to weights.

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SPECIFICATION FOR LOCOMOTIVES - 12 38½ E 155

FOR FORT SMITH & WESTERN RAIL ROAD

Specification for Type A Double Loop Superheater SPECN. NO. O-13815 DATED MAY 8TH, 1920.

BOILER TUBES	172 in number 2 o.d. 19 ft 3 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	24 in number 5½ o.d. #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card	1409-S
BOILER FLUE SETTING	¼ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and pressured except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card	1136
TUBE SHEET LAYOUT	Card	553-A
UNITS	24 units 1½ o.d. #9 B.W.G. Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card	10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on. Card	1052
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A. Card	1061-L
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in bell joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card	10502
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card	1323
STEAM PIPE JOINT RINGS	Should be of cast iron.	
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with. Card.	10598
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	11313
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer. Card.	1067
S. H. ARRANGEMENT	To be in accordance with. Card	457-B
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 1106-L	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 1113	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 1114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. PIPE BAND	Card 1068
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1068-A	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 1102
DAMPER SHAFT BEARING (O.S.)	Card 1145	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 1072-E	DEFLECTING PLATE HANDLE	Card 10487
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A
PYROMETER	NONE		

SPECIFICATION FOR LOCOMOTIVES 12 38 ½ E 155

FOR FORT SMITH & WESTERN R. R.

MP

123

—TENDER—

46 TANK OF STEEL, NOT LESS THAN ¼" WELL BRACED AND PROVIDED WITH SPLASH PLATES FIRMLY SECURED WITH ⅝" RIVETS, TO T-BARS, TOP AND BOTTOM, AND BRACES TO PREVENT BUCKLING AND GETTING LOOSE.

47 COAL PUSHER TO BE LOCOMOTIVE STOKER COMPANY'S RYAN-JOHNSTON LATEST IMPROVED PLUNGER TYPE. (SUP. 6)

48 ECONOMY DEVICES RADIAL BUFFER TO BE APPLIED BETWEEN ENGINE AND TENDER. (SUP. 18)

49 STEPS AND HAND RAILS ON ALL FOUR CORNERS OF TENDER.

50 TENDER TRUCKS OF THE EQUALIZED PEDESTAL TYPE WITH SWING BOLSTER AND WITH LINEX GRAVITY SIDE BEARING ON BOTH TRUCKS. SIDE BEARINGS TO BE 36" DIAMETER, CENTRE TO CENTRE WITH ¼" CLEARANCE FOR FRONT TRUCK. SIDE BEARINGS TO BE 48" CENTRE TO CENTRE WITH ⅝" CLEARANCE FOR BACK TRUCK. COMPANY WILL NOT USE AMERICAN STEEL FOUNDRIES CAST STEEL BOLSTER.

51 TENDER TRUCK CROSS FRAME TO BE STRENGTHENED BY MAKING THEM 6" DEEP IN CORNERS AND PLACING HEAVY FILLETS IN CORNERS, AS SHOWN IN RED ON B. L. W. TENDER TRUCK CARD No. 3624.

52 TENDER WHEELS TO BE FURNISHED BY THE B. L. W. TENDER WHEELS TO BE CHILLED CAST IRON, 850 POUNDS, MADE BY SOUTHERN CAR WHEELS COMPANY OR ANY OTHER MANUFACTURER GIVING AS GOOD A GUARANTEE.

53 TENDER BRAKE BEAMS TO BE AJAX TRUSSED TYPE.

THE BALDWIN LOCOMOTIVE WORKS

Memorandum Spec'n 20124

SPECIFICATION FOR LOCOMOTIVES

FOR FROST-JOHNSON LUMBER COMPANY

P

DUP. 10 26½ D 155, WITH SAME EXTRAS, EXCEPT WHERE OTHERWISE SPECIFIED.

10 26 ½ D 185

Gen. as PHOTO. 7196

Engine Drawing No. 35

8-7-20

Gauge of Road 4' 8½" Play ⅜"

Wheelbase, Rigid 10' 0" Driving 10' 0" Total 25' 7"

Total wheelbase, eng. and tend., Actual 47' 3½" Limited to —

RAILS, 35 LBS. PER YARD

Curves ABOUT 200' 0" RADIUS

Limits, Height — Width —

Weight (approximate) in working order, Total 107,800 POUNDS

On F. tr'k 14,500 lbs., Drivers 80,000 lbs., B. tr'k 13,300 lbs.

Tractive power 21,350 lbs., Ratio of adhesion 3.75

Work'g St'm Pres. 180 lbs., Service LOGGING

Fuel WOOD

Boiler STEEL Thick ⅜" Bill 8654

Front Tube Sheet ½" Thick

Boiler, Diam. 56" Plan STRAIGHT TOP

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 5.05 267 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS

Dome, diam. 29" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 60-7/16" Width 33⅜" Depth F. 66" B. 62½"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

Firedoor opening 16" DIAM.

Water space, Front 4" Sides 3" Back 3"

Water space frame SINGLE Riveted

Water space stays 1" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O. S.

Radial stays 1⅛" DIAM. Sling stays front TWO ROWS B.L.W. EXPANSION STAYS

Button heads below crown on EIGHT central rows

Crown bars NONE Placed — above crown

Crown bolts —

Flues NONE

Tubes #12 W. G. CHARCOAL IRON

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS

Number 215 Diam. 2" Length 13' 6½"

Heating Surface Flues — Combus. Chamb. — Total 1608.5

Tubes 1514.5 Fire Box 94 Fire Brick Tubes —

Grate area 14 Ratio to Heating Surface 1: 112

Superheater —

Fire Brick ARCH — NONE

GRATES TO BE IN CROSS SECTIONS SAME AS FOR 10 26½ D 144

Grates PLAIN BARS AND DEAD PLATES

Ash Pan, Dampers FRONT AND BACK

ASH PAN TO COMPLY WITH STATE LAWS OF LOUISIANA.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension NONE Cleaning hole and cap NONE

Spark ejector or hopper NONE

Netting and deflect. plates NONE

SPARK ARRESTER TO COMPLY WITH STATE LAWS OF LOUISIANA

Exhaust nozzles DOUBLE, LOW

CLEANING PIPE - WITH

Stack RUSHTON IMPROVED Dia. 16"

Safety Valves (NOT SPEC.) TWO CONSOLIDATED 2½" OPEN

Safety valves NONE with relief lever, Set to 180 POUNDS

Whistle B. L. W. PLAIN

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (NOT SPEC.)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** TO BURN OIL

Gauge Cocks THREE - BACK Surface valve NONE

Lowest gauge cock 4" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE B. L. W. Pos: LEFT SIDE

Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER

Firebox, CORNERS, RIGHT SIDE, FRONT AND BACK

Crown, TWO EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT

Front tube sheet, ONE Fusible plug ONE

LOCOMOTIVE FOR OPERATION AT CO'S. PLANT, MONTROSE, LOUISIANA, BUT TO MEET THE REQUIREMENTS (IF ANY) OF THE STATE OF TEXAS.

LIMA 5" SYPHON UNDER CAB BOARD ON LEFT SIDE WITH PIPE CONNECTION TO TANK AND WITH 25 FT. OF SUCTION HOSE. STEAM PIPE FROM BOILER TO SYPHON TO HAVE TWO VALVES, ONE IN CAB AND ONE NEAR SYPHON SO IT CAN BE OPERATED FROM CAB OR FROM THE GROUND, SAME AS FOR 10 24½ D 133.

Injectors TWO (NOT SPEC.) SELLERS CLASS "N" IMPROVED No. 7½

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B. L. W. Pos. RIGHT AND LEFT

Steam Heat NONE

Cab STEEL

DROP SEAT ON ENGINEER'S SIDE OF CAB

Cab boards WOOD Nosing NONE

Running boards WOOD Nosing NONE

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 34⅛"

Pilot WOOD Pushing shoes NONE

Front Bumper OAK Bumper plate WITH

Steps HAND HOLDS ETC. TO CONFORM TO I.C.C. REQUIREMENTS

COUPLER TO BE SAME STYLE AND HEIGHT AS FOR 10 26½ D 135, I.E. THREE POCKET DRAWHEAD, WITH LOWEST POCKET 25½" CENTER ABOVE RAIL, AND WITH UPPER POCKET ARRANGED TO TAKE M.C.B. AUTOMATIC COUPLER AT M. C. B. HEIGHT, I. E. 33½".

SIGNAL FIXTURES, IRON ON BUMPER.

Headlight TWO ROUND CASE 18" Reflector, To burn KEROSENE

Headlight, Nos. on sides WITH H'dl't step NONE

Lamp shelf IRON Nosing ANGLE IRON

Bell 85 POUNDS

Sand Box TWO Diam. 28" Body IRON PAINTED Pipes IRON

Sander (NOT SPEC.) LEACH AIR, TRAP A-1, IN EACH BOX

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

L. G. TANDY Nov. 1920

SPECIFICATION FOR LOCOMOTIVES 10 26 ½ D 185

FOR FROST-JOHNSON LUMBER COMPANY

P

125

124

Frames CAST STEEL

Cylinders, Diam. 16" Stroke 24"

St'm ports, Length 15" Width 1½" Bridges 1"

Exh. ports, Length 15" Width 2½" Valve lead ¼"

Valve travel 4½" Steam lap ¾" Exhaust clearance —

Eccentric crank throw 9-7/16" By-pass valve NONE

S. F. Lubr. (NOT SPEC.) DETROIT TRIPLE No. 22 BULL'S EYE, THREE PINTS CAPACITY. HEADLIGHT ON REAR TO BE WELL PROTECTED FROM INJURY.

Cyl'r heads CAST IRON LUBRICATOR PIPES OF IRON UNDER JACKET.

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED

St'm chest casings IRON PAINTED Covers STEEL PAINTED

St'm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES

Met. pkg. (NOT SPEC.) (PISTON RODS / VALVE STEMS) UNITED STATES, KING TYPE

PISTON RODS TO BE KEYED TO CROSSHEADS

Pistons HEADS OF FOLLOWER TYPE - NOT SOLID

Guides LAIRD TYPE, STEEL Oil cups ADJUSTABLE NEEDLE

Crossheads CAST STEEL

Wrist Pins STEEL Rod cups HARD GREASE CUPS, FORGED ON

PARALLEL RODS TO HAVE SOLID ENDS

Valve Motion WALSCHAERTS

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE

Drivers, O. S. Diam. 44" Cen. diam. 38" CENTERS CAST IRON

RAIL WASHERS TO BE APPLIED, TO WASH BACK OF REAR DRIVERS

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"

Tires, Plain, Pos. MIDDLE Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = 3/16" TOTAL

Driving Boxes CAST IRON

Journals, Diam. 7" Length 8"

EQUAL BEAMS OF WROUGHT IRON.

Springs. Make B. L. W.

ENGINE TRUCK FRAME OF CAST STEEL.

Front Engine Truck TWO Wheels SWING BOLSTER, CENTER BEARING

To swing 4" each side of cen., Cen. pin liners NONE

Journals, Diam. 4½" Length 7½" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 28" Tread 1½" Kind CHILLED CAST IRON (PLATE / SPOKE)

Tires — Cen. diam. — Size —

Tires held by —

ENGINE TRUCK FRAME OF CAST STEEL

Back Engine Truck TWO Wheels SWING BOLSTER, SIDE BEARING

To swing 4" each side of cen., Cen. pin liners NONE

Journals, Diam. 4½" Length 7½" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 28" Tread 1½" Kind CHILLED CAST IRON SPOKE

Tires — Cen. diam. — Size —

Tires held by —

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Parts: Engine, sch. No. 6-ET WESTG. COMBINED AUTO. AND STRAIGHT AIR; Eng. Tr'k, sch. —

Foundation Parts: Drivers, sch. WM-1 AMERICAN O. S. EQUALIZED; Eng. Tr'k, sch. —

Air pump ONE 9½" Pos. LEFT SIDE

Train connections FRONT AND BACK

Train signal, sch. NONE

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1624

Weight, with fuel and water, about 60,000 POUNDS

TENDER TO BE WEIGHED: YES

Tank 3,000 Gallons, Bill 5225

TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY, 3 CORDS.

WOOD RACK ON THE TANK ABOUT ONE HALF THE HEIGHT SHOWN ON PHOTO. 7196.

Tool Boxes HARD WOOD, TOP

Frame STEEL 6" AND 8" CHANNELS, WITH BUMPERS OF WOOD AND STEEL PLATE.

Front Drawbar height, 29⅞"

Pilot NONE Pushing shoes NONE

COUPLER, SAME STYLE AND HEIGHT AS FOR 10 26½ D 135, I.E., THREE POCKET DRAWHEAD WITH LOWEST POCKET 25½" CENTER ABOVE RAIL, AND WITH UPPER POCKET ARRANGED TO TAKE M.C.B. AUTO. COUPLER AT M. C. B. HEIGHT, I. E., 33½".

Steps HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS

FOOT BOARDS ACROSS REAR FULL WIDTH WITH HAND RAIL

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTER

TRUCKS TO HAVE STEEL SIDE BARS. TRUCK CENTER BEARINGS OF CAST STEEL.

Springs ELLIPTIC, B.L.W. MAKE

Journals, Diam. 3½" Length 7"

Wheels, Diam. 33" Tread 1½" Kind CHILLED CAST IRON PLATE

Tires — Cen. diam. — Size —

Tires held by —

Safety chains SINGLE

SYPHON CONNECTION TO LEFT SIDE OF TANK SAME AS FOR 10-24½ D 133.

SYPHON HOSE CARRIER TO BE SAME AS FOR 10-24½ D 133.

Brake Position ON ALL WHEELS

Brake sch. NO. 6-ET WESTINGHOUSE AUTOMATIC AND STRAIGHT AIR WITH 10" x 12" TENDER CYLINDER.

BACK TENDER TRUCK TO BE LOCATED AS FAR BACK UNDER TENDER AS POSSIBLE.

List of tools, sch. 27 ONE PAIR WRECKING FROGS

Photo sch. NONE Inspection B. L. W.

To be weighed No Material specs B. L. W.

Certificate of boiler test THREE COPIES B. L. W. FORM 1036

Junior laws to 10-1-20 Shipment ON OWN WHEELS

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents: REAR SUSPENSION 1095929 PATD. MAY 5, 1914 (BRASS PLATE)

Property plates NONE

Painting, style 291, OLIVE GREEN AND ALUMINUM

LETTERING ETC. TO BE SAME AS FOR 10 26 ½ D 135

Mark on TANK SIDES: FROST-JOHNSON LUMBER CO.

Road Nos. Pos.	Road Nos.	Name
F. No. PLATE	105	NONE
F. SAND BOX		
CAB PANELS		
BACK OF TANK		

Actual Dimensions of Loco. Extreme height over all 13' 11½"

Extreme Width: Cab boards 9' 9½"; Cylinders or valve motion 8' 9½"

Length outside face front bumper of engine to face of tender wedge 30' 10⅞"

Length face of tender wedge to outside face back bumper of tender 21' 7½"

Total length outside face front bumper of engine to outside face back bumper of tender 52' 6¼"

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7949.

Memorandum Spec'n 23017.

SPECIFICATION FOR LOCOMOTIVES 12 32 ½ E 38.

FOR (was) FROST-JOHNSON LUMBER COMPANY.

HNW.

Gen. as PHOTO. 8439 {EXCEPT TO HAVE ALLIGATOR TYPE CROSSHEADS.

Engine Drawing No. 15

2-1-23.

Gauge of Road 4' 8½" Play ¾", EXCEPT ⅞" FOR F.& B.DRIVERS.
Wheelbase, Rigid 13' 6" Driving 13' 6" Total 29' 0"
Total wheelbase, eng. and tend. {Actual 54' 9½" / Limited to ----

Curves 16 DEGREES.

Limits, Height --- Width ----
Weight (approximate) in working order, Total 149,000 POUNDS.
On F. tr'k 17,000 lbs., Drivers 118,000 lbs., B. tr'k 14,000 lbs.

Tractive power 28,800 lbs., Ratio of adhesion 4.1
Work'g St'm Pres. 180 lbs., Service LOGGING.
Fuel OIL, WITH GRAVITY OF 22 TO 24 DEGREES. (SEE SUP. 4)

1st **Boiler** STEEL. Thick ¾" Bill 9786.
Front Tube Sheet ½" Thick
Boiler, Diams. 72" Plan STRAIGHT TOP.
{Allowable st'm pres. 200 lbs. / With Factor of Safety of 4.65 **Tested to** {220 lbs. steam pres. / 267 lbs. water pres.
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

5 **Dome,** diam. 33" Pos. CENTRAL.

36 **Firebox** STEEL. Combustion chamb. NONE.
Firebox, length 101-15/16" Width 41" Depth F. 67½" B 62½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.
Water space, Front 4" Sides 3" Back 3"
Water space frame DOUBLE Riveted
Water space stays ⅞" DIAM., (SEE SUP. 6)

Radial stays 1" DIAM. Sling stays front {THREE ROWS B. L. W. EXPANSION STAYS.
~~Roof~~ Heads below crown on EIGHT central rows TO SUIT FUEL OIL.
Crown bars NONE. Placed --- above crown
Crown bolts ---

Flues No. 9 B. W. G. STEEL.
Tubes No. 12 B.W.G. CHARCOAL IRON OR STEEL, (B.L.W. OPTION).
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number {26 / 170 Diam. {5⅜" / 2" Length 12' 0"

Heating Surface Flues 436 Combus. Chamb. --- Total 1651
Tubes 1061 Fire Box 154 Fire Brick Tubes ---
Grate area 29 Ratio to Heating Surface 1: 56.9
Superheater 373

Fire Brick ARCH, NONE.
4 FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING
FIRE BRICK PAVEMENT IN PAN.
Grates NONE.
Ash Pan, Dampers FRONT ONLY

Throttle BALANCE. Pos. DOME.
Dry pipe STEEL.

Superheater SCHMIDT TYPE, (SEE SUP. 7)

Smokebox extension WITH. 8 Cleaning hole and cap L. S. ONLY.
Spark ~~arrester~~ hopper WITH.
SUPERHEATER deflect. plates WITH.

Exhaust nozzles DOUBLE, LOW.
CLEANING PIPE, WITH.
10 **Stack** CAST IRON, TAPER. Dia. 14½" AT SMALLEST POINT.
STACK TO BE NOT OVER 40" HIGH, (SEE SUP. 10)

(NOT SPEC) **Safety Valves** TWO CROSBY 3" OPEN, STYLE HA-110.
Safety valves NONE with relief lever, Set to 180 POUNDS.
Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: JAS. P. MARSCH & CO. (NOT SPEC)
Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE KLINGER REFLEX **Cab Lamps** ELECTRIC.
Gauge Cocks THREE BACK. Surface valve NONE.
Lowest gauge cock 3" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock ONE B.L.W. POS: FRONT.
Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER.
Firebox, CORNERS DIAGONAL, AND SIDES.
Crown, TWO EACH SIDE AND TWO BACK.
Waist, ONE UNDER FRONT. ONE PLUG ABOVE FIRE DOOR.
Front tube sheet, ONE. Fusible plug ONE.

Pump NONE.

Injectors TWO NATHAN, (SUP. 11) (SPEC) No. (SUP. 11)
Injectors, Pos. (SEE SUP. Steam pipes COPPER.
Pipes, Check STEEL. Feed STEEL Overflow STEEL.
Check B. L. W. Pos. RIGHT AND LEFT.

Steam Heat NONE.

Cab STEEL. (SEE SUP. 12)

CAB BOARDS TO BE COVERED WITH WOOD.
Cab boards STEEL. Nosing T-IRON.
Running boards STEEL. Nosing T-IRON.
Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. (SUP. 13) Back drawbar height 35¼"
TENDER WEDGE TO BE ADJUSTABLE.

Pilot WOOD.
Front Bumper CAST STEEL. (SUP. 14) Bumper plate WITH
Steps HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"
Coupler M. C. B. AUTOMATIC, WITH SLOTTED KNUCKLE.

Signal fixtures IRON ON BUMPER.

15 **Headlight** ONE ROUND CASE 18" Reflector,
Headlight, Nos. on sides WITH. H'd'l't step WITH.
Lamp shelf NONE. Nosing ---

Bell 92 POUNDS.
Sand Box ONE Diam. 31" Body IRON PAINTED. Pipes IRON.
Sander (NOT SPEC) LEACH AIR, TRAP A-10, AND HAND, (SEE SUP. 16)

Dome casing STEEL PAINTED, WITH PRESSED STEEL TOP AND BOTTOM RINGS.

Boiler Jacket #18 SOFT STEEL PTD Bands STEEL. Style 9 AND 14.
Boiler Lagging MAGNESIA SECTIONAL.
BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

G.P. FRICK JUNE 1923

SPECIFICATION FOR LOCOMOTIVES 12 32 ½ E 38.

FOR FROST-JOHNSON LUMBER COMPANY.

HNW.

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Frames CAST STEEL. (SEE SUP. 17)

Cylinders, Diam. 19" Stroke 24"
St'm ports, Length 23.16" Width 1⅝" Bridges ---
Exh. ports, Length --- Width --- Valve lead 3/16"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 14¼" By-pass valve NONE.
18 **Lubr.** (SPEC) F. F. Lubr. NATHAN SIX-FEED No. 41 BULL'S EYE, 1918 TYPE.
Cyl'r heads CAST IRON. LUBR. PIPES OF IRON UNDER JACKET.
Cyl'r casings STEEL PAINTED. Head covers STEEL PAINTED.
St'm chest casings ---- Covers ----
St'm chest valves 10" DIAM., PISTON TYPE.
Met. pkg. (NOT SPEC) PISTON ROD TWELVE STEMS UNITED STATES, KING TYPE.

19 **Pistons** HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.
Guides ALLIGATOR TYPE, STEEL. Oil cups NEEDLE.
20 **Crossheads** CAST STEEL, WITH BEARINGS OF BRONZE.
21 **Wrist Pins** STEEL. Rod cups PLUNGER, FORGED ON.

Valve Motion WALSCHAERTS.
{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard
All finished movable nuts of steel or of iron case-hardened.

Wearing Bearings MAKE: B. L. W.
Driving wheel hub liners BRONZE, FOR ALL WHEELS.
36 **Drivers,** O. S. Diam. 46" Cen. diam. 40"
WHEEL CENTERS: MAIN CAST STEEL; OTHERS CAST IRON.
Tires STEEL. Held by SHRINKAGE AND SHOULDER.
Tires, Flanged, Pos. ALL. Size 3" x 5½"
Tires, Plain, Pos. NONE. Size ----
Lateral play between driving boxes and wheel hubs (SEE SUP. 26)
Driving Boxes CAST STEEL.
Journals, Diam. 8" Length 9"

27 **Springs.** Make B. L. W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING.
28 To swing 34" each side of cen., Cen. pin liners NONE.
Journals, Diam. 5" Length 10" Boxes CAST STEEL.
Wheel hub liners BRASS.
Wheels, Diam. 28" Tread ---- Kind CAST IRON, SPOKE CENTER.
Tires STEEL. Cen. diam. 23" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck TWO Wheeled SWING BOLSTER, SIDE BEARING.
29 To swing 32" each side of cen., Cen. pin liners NONE.
Journals, Diam. 5" Length 10" Boxes CAST STEEL.
Wheel hub liners BRASS.
Wheels, Diam. 28" Tread --- Kind CAST IRON SPOKE CENTER.
Tires STEEL. Cen. diam. 23" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

Brake, position ON ALL DRIVING WHEELS, (SEE SUP. 30 ETC)
33 Operating {Engine, sch. "S" AMERICAN STEAM.
Parts {Eng. Tr'k, sch. ---
34 Foundation {Drivers, sch. WN-1-BC, AMERICAN OUTSIDE EQUALIZED.
Parts {Eng. Tr'k, sch. ---
Air pump ONE 9½" Pos. LEFT SIDE, (SEE SUP. 33)
Train connections FRONT AND BACK, FOR WESTG. AIR BRAKE.
Train signal, sch. NONE.

51 **Tender** EIGHT Wheeled, Drawing No. 1781. {TENDER TO BE W
Weight, with fuel and water, about 98,000 LBS. {WEIGHED: YES.
52 **Tank** {OIL, 1800 6059 / WATER 4500 Gallons. Bill 6056
TANK "U" SHAPE, STRAIGHT TOP.

Tool Boxes OF STEEL, TOP.

Frame STEEL, 8" AND 10" CHANNELS, WITH BUMPERS OF CAST STEEL.

54 Front Drawbar height 30½"
Pilot NONE.
Back drawhead, center above rail 33½"
Coupler M. C. B. AUTOMATIC, WITH SLOTTED KNUCKLE.

Steps HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B. L. W. MAKE.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4¼" Kind CHILLED CAST IRON PLATE.
Tires NONE. Cen. diam. ---- Size ----
Tires held by ----
Safety chains SINGLE.

56 **Brake** Position ON ALL WHEELS.
Brake sch. FL-1012 WESTINGHOUSE AUTOMATIC AIR.

B. L. W. {
Patents {NONE.

Property plates NONE.

Painting, style 291, OLIVE GREEN AND ALUMINUM.
PAINTING, ETC., TO BE SIMILAR TO PHOTO. 7097, 12 30 ¼ E 45.

{Mark on TANK SIDES:- FROST - JOHNSON LUMBER COMPANY
{MARK IN BLOCK LETTERS, MIDWAY ON EACH SIDE OF TANK.
ROAD NUMBER ON CAB TO BE IN 12" FIGURES.
Road Nos. Pos. Road Nos. Name NONE.
F. NO. PLATE. 45
SAND BOX.
CAB PANELS.
BACK OF TANK.

Actual Dimensions of Loco. Extreme height over all 14' 2½"
Extreme Width: Cab boards 10' 0"; Cylinders or valve motion 9' 9"
Length outside face front bumper of engine to face of tender wedge 33' 11"
Length face of tender wedge to outside face back bumper of tender 26' 8½"
Total length outside face front bumper of engine to outside face back bumper of tender 60' 7½"

List of tools, sch. 160. ONE PAIR WRECKING FROGS.
Photo sch. No. 2. Inspection B. L. W.
To be weighed YES. Material specfns B. L. W.
Certificate of boiler test (SEE SUP. 3)
Junior lays to 3.10.23 Shipment ON OWN WHEELS.

Brass shop finish, No. 1.
Machine shop finish D-165.

SPECIFICATION FOR LOCOMOTIVES:- 12 32 ½ E 38.

FOR:- FROST-JOHNSON LUMBER COMPANY.

HNW.

1 LOCOMOTIVE TO OPERATE IN THE STATE OF TEXAS.

2 ENGINE AND TENDER TO MEET I. C. C. REQUIREMENTS.

3 BOILER TEST CERTIFICATES:- THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

4 OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX. FIRE PAN TO BE SOUTHERN PACIFIC STANDARD.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.
HEATER TO BE APPLIED IN OIL TANK.
McLAUGHLIN METALLIC FLEXIBLE CONNECTIONS FOR STEAM AND OIL CONNECTIONS BETWEEN ENGINE AND TENDER.

5 MAIN DOME, ONE-PIECE TYPE.
AUXILIARY DOME, LARGE ENOUGH TO ADMIT MAN INTO BOILER.

6 ALL WATER SPACE STAYS TO BE HOLLOW.

7 SUPERHEATER AS THE SUPERHEATER CO'S SPECN. NO. O-20718, DATED FEBRUARY 20TH, 1923, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

8 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

9 PYROMETER TO BE PROVIDED.

10 STACK AS FURNISHED ON EXTRA ORDER No. 10545, DATED 10-2-22, FOR TEXAS & SOUTHEASTERN R. R., EXCEPT TO BE 14½" AT SMALLEST DIAMETER.

11 INJECTORS TO BE ONE NATHAN LIFTING No. 10 SIMPLEX, TYPE "R" ON RIGHT SIDE, AND ONE NATHAN NON-LIFTING No. 10 SIMPLEX TYPE "HW" WITH SCREWED CONNECTIONS ON LEFT SIDE.

12 CAB TO HAVE ONE WINDOW SIMILAR TO PHOTO. 8439, B. L. W. CLASS 12 32 ½ E 36.

13 BACK FOOT PLATE OF CAST STEEL.

14 FRONT FOOT PLATE OF CAST STEEL.

15 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2 WITH INCANDESCENT HEADLIGHT. GENERATOR TO BE APPLIED JUST FORWARD OF CAB.

16 SAND PIPES TO DELIVER FRONT OF FRONT DRIVERS AND BACK OF MAIN DRIVERS.

17 FRAME RAILS TO BE SINGLE, AS B. L. W. PRINT No. 9006.

18 CYLINDER LUBRICATOR TO HAVE FOUR FEEDS FOR STEAM CHEST VALVES AND CYLINDERS, ONE FOR AIR PUMP, AND ONE FOR STEAM BRAKE.

19 PISTON RODS TO BE BOLTED TO CROSSHEADS.

20 CROSSHEAD AND PISTON ROD CONNECTION TO CROSSHEAD TO BE SAME AS ON A. & V. ENGINES, B.L.W. CLASS: 12 38 ½ E 163.

21 MAIN RODS TO BE "I" SECTION.
MAIN ROD BACK END TO HAVE STRAPS AND KEYS.

22 PARALLEL RODS TO HAVE SOLID ENDS.

26 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

27 SPRINGS AND SPRING RIGGING TO BE EXTRA HEAVY.

28 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

29 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

30 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

31 McLAUGHLIN METALLIC FLEXIBLE CONNECTION FOR AIR CONNECTION BETWEEN ENGINE AND TENDER.

32 BRAKE CYLINDERS TO BE LOCATED BETWEEN FRAMES.

33 AMERICAN STEAM BRAKE SCHEDULE "S" FOR DRIVING WHEELS.
AUTOMATIC AIR BRAKE FOR TENDER AND TRAIN OPERATED BY WESTINGHOUSE FIXTURES, SCH. A-1, EXCEPT TO OMIT FOLLOWING:-

1 TRIPLE VALVE.	
1 ¾" COCK, FOR TRIPLE VALVE,	PIECE 2233
1 AUXILIARY RESERVOIR.	
2 DRIVING BRAKE CYLINDERS.	
1 DRAIN COCK.	PIECE 7716
1 NIPPLE, FOR TRIPLE VALVE.	PIECE 7743
1 ¾" CENTRIFUGAL DIRT COLLECTOR,	PIECE 36452.

34 DRIVER BRAKE AS AMERICAN BRAKE CO'S DESIGN 99681, IS APPROVED.

36. AMPLE CLEARANCE TO BE PROVIDED BETWEEN FIREBOX AND DRIVERS.

TENDER

51 TENDER TO BE OF LONG, LOW DESIGN.

52 OIL TANK TO BE READILY REMOVABLE, AND TO BE NOT HIGHER THAN COPING ON WATER TANK.

53 HEATER TO BE APPLIED IN OIL TANK.

54 TENDER WEDGE TO BE ADJUSTABLE.

55 McLAUGHLIN METALLIC FLEXIBLE CONNECTIONS FOR STEAM AND OIL CONNECTIONS BETWEEN ENGINE AND TENDER.

56 McLAUGHLIN METALLIC FLEXIBLE CONNECTIONS FOR AIR CONNECTIONS BETWEEN ENGINE AND TENDER.

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SPECIFICATION FOR LOCOMOTIVES:- 12 32 ½ E 38.

FOR:- FROST-JOHNSON LUMBER COMPANY.

Specification for Type A Double Loop Superheater SPECN. NO. O-20718, DATED FEB. 20, 1923.-

BOILER TUBES	170 in number 2" o. d. 12 ft 0 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials SPECIFICATIONS.
BOILER FLUES	26 in number 5½" o. d. #9 B.W.G. AV. cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials SPECIFICATIONS. Card 1906
BOILER FLUE SETTING	⅛ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end not with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card 1136
TUBE SHEET LAYOUT	Card 3L-51070
UNITS	26 units. 1½" o. d. #9 B.W.G. AV. Pipes in accordance with the American Society for Testing Materials SPECIFICATIONS. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card 2L-10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card 1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A. Card 1061-L
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. A H M 4m7-2 Card 11123-D
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units. Card 3L-11733
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 4L-11436-A
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card
PYROMETER	Model No. Pyrometer W.I.Th. Card
PYROMETER ARRANGEMENT	Generally in accordance with. Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration. Card
S. H. ARRANGEMENT	In accordance with. Card 4L-40984.
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 2L-11618-T	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1384
DAMPER CYCL. PIPE CONNECTION	Card 1L-11437	S. H. PIPE BAND	Card 1988
DAMPER CYL. PIPING DIAGRAM	Card 3L-11440	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card	RETURN BENDS	Card 2L-11623
DAMPER SHAFT ARM	Card	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O. S.)	Card	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT BEARING (I.S.)	Card	DEFLECTING PLATE STUDS	Card 10809
DAMPER SHAFT LINK	Card	DEFLECTING PLATE CLAMP	Card 10809-A.
PATENT PLATE	Card 3L-3367-A.		
DAMPER RIGGING	CARD		

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6655

Memorandum Spec'n 21020

SPECIFICATION FOR LOCOMOTIVES 10 28 ½ D 153

FOR Fruit Growers' Supply Co., California

Gen. as Photo. 7388

Engine Drawing No. 35

5-14-21

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 9' 6" Driving 9' 6" Total 24' 6"
Total wheelbase, eng. and tend. {Actual 46' 6" / Limited to ---

Rails 56 pounds.
Curves 30 degrees. Grades 3% compensated.
Limits, Height 14' 0" Width {10' 0", except across bumpers may be 10' 3".
Weight (approximate) in working order: Total 123,200 pounds
On F. tr'k 13,200 lbs., Drivers 95,900 lbs., B. tr'k 14,100 lbs.

Tractive power 23,400 lbs., Ratio of adhesion 4.1
Work'g St'm Pres. 175 lbs., Service Logging
Fuel Oil (See sup. 30)

Boiler roof and sides 9/16", back sheet ½"
Boiler Steel Thick 21/32" Bilt 9-12
Front Tube Sheet ½" Thick Throat sheet 11/16"
Boiler, Diam. 62" Plan Wagon top
Allowable st'm pres. 200 lbs. **Tested to** 225 lbs. steam pres.
With Factor of Safety of 5.07 300 lbs. water pres.
Longitud. seams (See sup. 25)
Main dome, One-piece type. Auxiliary dome, None
Dome, diam. 29" Pos. Forward of fire box

Firebox Steel Combustion chamb. None
Firebox, length 72" Width 42" Depth F. 62¾" B. 55½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening (Sup. 26) Crown and sides in one sheet.
Water space, Front 4" Sides 3" Back 3"
Water space frame Double Riveted
Water space stays 1" diam. with 3/16" holes 1¼" deep from O.S.
Radial stays (Sup. 27) Sling stays front {Two rows B. L. W. Expansion stays
Button heads below crown on ——— central rows (See Sup 27)
Crown bars None Placed --- above crown
Crown bolts —

Flues ---
Tubes No. 12 B.W.G. Seamless Steel (See sup.
Tube ends Swaged for copper ferrules, fire box ends
Number 240 Diam. 2" Length 12' 6"

Heating Surface Flues --- Combus. Chamb. --- Total 1664
Tubes 1550 Fire Box 104 Fire Brick Tubes ---
Grate area 21 Ratio to Heating Surface 1: 79.3
Superheater ---

Fire Brick Arch, None
Fire box lined with fire brick, for oil burning.
Fire brick pavement in pan.
Grates None
Ash Pan, Dampers Front only.
Fire pan of steel.

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

Smoke box to have short extension.
Smokebox extension Short Cleaning hole and cap None
Spark ejector or hopper None
Netting and deflect. plates None

Exhaust nozzles Double, Low
Cleaning pipe, With
Stack Cast iron, straight Dia. 16"

Safety Valves Two Consolidated 2½" Open
Safety valves Both with relief lever, Set to 175 pounds
Whistle One B. L. W. Plain

Steam Gauge One Iron 6½" Maker: Ashcroft
Steam gauge stand Iron Clock None

Water Gauge One Reflex Cab Lamps Electric
Gauge Cocks Three back Surface valve None
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve without separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One Crane 2" Pos: In throat
Cleaning Plugs One filling plug in top of boiler
Firebox, corners, back ones diagonal.
Crown, Two each side and two back
Waist, One under front. One plug above fire door.
Front tube sheet, One Fusible plug One

Pump None

Injectors Two Nathan Monitor (Spec) No. 9
Injectors, Pos. R. and L. Steam pipes Copper
Pipes, Check Iron Feed Iron Overflow Iron
Check B. L. W., with stop valve Pos. R. and L.

Steam Heat None

Cab Steel, not lined.

Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 34½"

Pilot None
Front Bumper Cast Steel Bumper plate With
Steps Hand holds, etc. to conform to I.C.C. requirements.

Front Drawhead, Center above rail 34"
Coupler Sharon M. C. B. Auto., with slotted knuckle.

Signal fixtures Iron on bumper

Headlight Two round case 18" Reflector.
Headlight, Nos. on sides With Hdl't step With
Lamp shelf None Nosing ———

Bell 92 pounds Gollmar air bell ringer.
Sand Box Two Diam. 38" Body Iron painted Pipes Iron
Sander (Spec) Leach Air, Trap A-1, also hand, in each box, to sand front and back.
Dome casing Iron painted.

Boiler Jacket #18 Soft steel pto. Bands Iron Style 9
Boiler Lagging Asbestos Cement.

THE BALDWIN LOCOMOTIVE WORKS

E. H. Roberts July 1921

SPECIFICATION FOR LOCOMOTIVES 10 28 ½ D 153

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FOR Fruit Growers Supply Co.

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TAB

Frames Cast Steel, 4" wide
Frame pedestal caps of forged steel.
Cylinders, Diam. 17" Stroke 24"
St'm ports, Length 16" Width 1½" Bridges 1"
Exh. ports, Length 16" Width 2½" Valve lead 1/16"
Valve travel 5½" Steam lap ¾" Exhaust clearance ---
Eccentric ~~cards~~ throw 4⅜" By-pass valve None
(Spec) F. Lubr. Nathan Triple #9 Bull's Eye, three-pint capacity.
Cyl'r heads Cast Iron. Lubr. pipes of copper under jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings Iron painted Covers Steel painted.
St'm chest valves Richardson balanced, with vacuum valves.
(Spec) Met. pkg. (piston rods / valve stems) United States, King type.
Piston rods to be keyed to crossheads.
Pistons Heads cast iron with rings of cast iron sprung in.
Guides Laird type, forged steel Oil cups Needle
Crossheads Cast steel with bearings of bronze.
Wrist Pins Steel Rod cups (See sup. 39)
Parallel rods to have solid ends.

Valve Motion Stephenson
~~Links, sliding blocks, pins, lifting links and eccentric rod gains to be wall case hardened or to have hardened bushings.~~ (See Sup. 40)

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners of brass, cast on hub faces of boxes.
Drivers, O. S. Diam. 44" Cen. diam. 38" Centers Cast Iron
Tire section to have M.M. standard tread and flange.
Tires Steel Held by Shrinkage only.
Tires, Flanged, Pos. Front and Back Size 3" x 5½"
Tires, Plain, Pos. Middle Size 3" x 6½"
Lateral play between driving boxes and wheel hubs (See sup. 43)
Driving Boxes Cast steel with hard grease cellars.
Journals, Diam. 8" Length 10"

Springs. Make B. L. W.
Front engine truck frame of cast steel.
Front Engine Truck Two Wheeled Swing bolster, center bearing.
To swing 2½" each side of cen., Cen. pin liners None
Journals, Diam. 5" Length 9" Boxes Cast Iron
Wheel hub liners Brass, cast on hub faces of boxes
Wheels, Diam. 28" Tread —— Kind Rolled steel
Tires None Cen. diam. --- Size ---
Tires held by --- Wheel rims 2½" thick

Back Engine Truck Two Wheeled B.L.W. inside bearing
To swing 3" each side of cen., Cen. pin liners None
Journals, Diam. 5" Length 9" Boxes Cast Iron
Wheel hub liners Brass, cast on hub faces of boxes,
Wheels, Diam. 28" Tread —— Kind Rolled steel
Tires ---- Cen. diam. ---- Size ----
Tires held by --- Wheel rims 2½" thick

Brake, position On all driving and tender wheels
Operating {Engine, sch. No. 6-ET West'g combined auto. and straight air.
Parts {Eng. Tr'k, sch. ———
Foundation {Drivers, sch. W-1 American O.S. Equalized.
Parts {Eng. Tr'k, sch. ———
Air pump Two 9½" Pos. Both L. S.
Train connections Front and Back
Train signal, sch. None
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 16714
Weight, with fuel and water, about 76,500 pounds {Tender to be weighed: Yes.
Tank {Oil 1500 / Water 3500 Gauge Bd. {5671 / 4838
Tank "U" shape, straight top.

Tool Boxes Hard Wood, Top.

Frame Steel, 6" and 8" channels, with bumpers (See sup. 63)
Frame bolster to be trussed type.
Front Drawbar height 31¼"
Pilot None
Back drawhead, center above rail 34"
Coupler Sharon M.C.B. Auto., with slotted knuckle.

Steps Hand holds, etc., to conform to I.C.C. requirements.

Trucks Arch bar type with channel spring planks and bolsters of cast steel.
Springs Elliptic, B. L. W. make
Journals, Diam. 4½" Length 8"
Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate
Tires None Cen. diam. —— Size ——
Tires held by ----
Safety chains Single

Brake Position On all wheels
Brake sch. No. 6-ET Westinghouse Auto. and Straight Air with 10" x 12" tender brake cylinders.

List of tools, sch. 157 (See Sup. 48)
Photo sch. No. 2 Inspection B.L.W. (Except See Sup. 24)
To be weighed Yes Material specifications B.L.W. except see A.S.M.E. Code
Certificate of boiler test {Three copies of B.L.W. form 1036 and / Five copies of B.L.W. form 1915
Junior laws to 6-20-21 Shipment On own wheels

Brass shop finish, No. 1
Machine shop finish D-165

B. L. W.
Patents None

Property plates None

Painting, style 291, Olive Green and Aluminum

Mark on Tank Sides: {Fruit Growers Supply Co. / Lassen Operation
The lower line in mark to be in smaller letters than in upper line.
Road Nos. Pos. Road Nos. Name None
F. No. Plate 33
F. Sand Box
Cab Sides
Back of Tank

Actual Dimensions of Loco. Extreme height over all 13' 8½"
Extreme Width: Cab boards 9' 11" Cylinders or valve motion 8' 10"
Length outside face front bumper of engine to face of tender wedge 30' 5"
Length face of tender wedge to outside face back bumper of tender 21' 5½"
Total length outside face front bumper of engine to outside face back bumper of tender 51' 10½"

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 153

FOR FRUIT GROWERS' SUPPLY CO.,

RTL CALIFORNIA.

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF CALIFORNIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝", (I.E., USE FUSIBLE PLUG CARD 4141 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6850. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

CALIFORNIA
(State in which boiler is to be used)
6
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (Manufacturer's Serial number)
(LEAVE BLANK) (State's number)
(LEAVE BLANK) (Year put in service)
200 POUNDS.
(Maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVE: 10 28 ¼ D 153.

FOR: FRUIT GROWERS SUPPLY COMPANY.

HNW.

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21 LOCOMOTIVE TO OPERATE IN CALIFORNIA, UNDER THE JURISDICTION OF THE CALIFORNIA INDUSTRIAL ACCIDENT COMMISSION, AND MUST MEET ALL REQUIREMENTS OF THE STATE OF CALIFORNIA. (SEE THE A. S. M. E. CODE (1918) ATTACHED).

22 LOCOMOTIVE TO BE USED AT THE PLANT OF THE LASSEN LUMBER MILL AT SUSANVILLE, CALIFORNIA.

23 BOILER TO CONFORM TO THE REQUIREMENTS OF THE BOILER LAWS OF THE STATE OF CALIFORNIA.

24 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

25 LONGITUDINAL SEAMS BUTT JOINTED WITH DOUBLE COVERING STRIPS, SEXTUPLE RIVETED, 90% BEAMS.
CIRCUMFERENTIAL SEAMS, DOUBLE RIVETED LAP JOINTS.

26 FIRE DOOR OPENING, OVAL, 13" x 18".
FIRE DOOR, B. L. W. STANDARD, FOR OIL BURNING.

27 CROWN STAYS TO BE 15/16" DIAM. IN BODY, AND 1⅛" DIAM. AT ENDS TO HAVE TAPER FIT THROUGH CROWN SHEET AND TO BE RIVETED OVER.

28 ~~STAYBOLTS IN SIDES, THROAT AND BACK HEAD TO BE 1" DIAMETER.~~
HOLLOW STAYBOLTS BEHIND BRICK WORK IN FIRE BOX.

29 BOILER TUBES TO BE SPACED IN VERTICAL ROWS AND SET WITH COPPER FERRULES, AND SWAGED, ROLLED AND BEADED ON FIRE BOX END, AND ROLLED IN FRONT TUBE SHEET.

30 OIL BURNING ARRANGEMENT TUBE HEINTZELMAN SYSTEM WITH BURNER IN FRONT OF FIRE BOX.
OIL CONTROL ON LEFT SIDE OF BACK HEAD IN CAB.
ROYALTY, ~~IF ANY~~, PAYABLE BY THE B. L. W.

31 FUEL OIL:
GRAVITY, 19. FIRE TEST, 218 DEG. F.
FLASH, 172. COLD TEST BELOW 0 DEG. F.
(DEGREES GIVEN ARE FAHRENEHIT SCALE) SAME AS FOR 10 28 ¼ D 145.

32 SMOKE BOX TO BE ¼" THICK AND TO BE MADE SEPARATE FOR EASY RENEWAL.

33 INJECTORS, LUBRICATOR, SANDER, SAFETY VALVES AND METALLIC PACKING TO BE SAME AS FOR OCEAN SHORE LOCOMOTIVE 8 34 D 542.

34 CAB ROOF TO BE LINED WITH WOOD, AND TO HAVE VENTILATOR.
CAB SASH OF HARD WOOD WITH DOUBLE STRENGTH GLASS.

35 CAB TO HAVE CONVENIENT SEATS, WITH CUSHION, AND TOOL BOX FOR ENGINEER AND FIREMAN.

36 FOOT BOARDS OF WOOD ACROSS FRONT OF ENGINE, WITH WROT IRON SUPPORTS.

37 HEADLIGHT AND EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHTS.

38 FRAME TO HAVE DOUBLE FRONT ENDS SECURELY BOLTED AND KEYED TO MAIN FRAME.

39 MAIN AND SIDE ROD CUPS TO BE ARRANGED FOR HARD GREASE, AND TO BE FORGED ON RODS.

40 LINKS, SLIDING BLOCK AND ALL WEARING SURFACES TO BE CASE HARDENED.
ALL PIN BEARINGS TO HAVE CASE HARDENED PINS AND BUSHINGS.

41 FLANGE LUBRICATOR, NONE.

42 DRIVING BOXES TO HAVE BRONZE BEARINGS PLATES CAST ON THE SHOE AND WEDGE FACES.

43 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

44 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

45 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

46 AIR PUMPS TO BE REGULATED BY A 1½" GOVERNOR, SO ARRANGED THAT ONE OR BOTH PUMPS CAN BE OPERATED BY SAME GOVERNOR.

47 DRIVER BRAKE CUTOUT TO BE PLACED IN CAB WITHIN REACH OF ENGINEER.

48 TOOLS TO INCLUDE ALL NECESSARY WRENCHES AND SPANNERS, ONE HARD AND ONE SOFT HAMMER, MONKEY WRENCH, A COLD CHISEL, THREE OIL CANS, TWO JACK SCREWS AND TWO CAMEL BACK FROGS.

TENDER

61 TANK, STEEL; TOP, BOTTOM AND INSIDE TO BE ¼" THICK, OUTSIDE TO BE 3/16" THICK.

62 TANK TO BE PROVIDED WITH TANK VALVES AND STRAINER AND CLEANING HOLES.

63 BUMPERS FRONT AND BACK OF TENDER TO BE OF CAST STEEL.

64 FOOT BOARDS OF WOOD ACROSS BACK, WITH WROT IRON SUPPORTS.

THE BALDWIN LOCOMOTIVE WORKS DUP. 6 34 D 94-95 SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20072

SPECIFICATION FOR LOCOMOTIVES 6 34 D 974

Gen. as PHOTO. 2212

FOR GORDON MINING COMPANY

Engine Drawing No. 8

MW

3.22.20

Gauge of Road 4'8½" Play 3"

Wheelbase, Rigid 11' 2" Driving 11'2" Total 11'2"

Total wheelbase, eng. and tend. (Actual 41'5" / Limited to ---

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 126,000 POUNDS

On F. tr'k --- lbs., Drivers 126,000 lbs., B. tr'k --- lbs.

Tractive power 29,380 lbs., Ratio of adhesion 4.3

Work'g St'm Pres. 180 lbs., Service SWITCHING (SEE SUP. 21)

Fuel SOFT COAL

Boiler STEEL (See sup. 5) Thick 11/16" Bill 8977

Front Tube Sheet ½" Thick

Boiler, Diam. 64" Plan STRAIGHT TOP

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 5. 330 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS

Dome, diam. 29" Pos. CENTRAL

Firebox STEEL (See sup. 5) Combustion chamb. NONE

Firebox, length 103⅛" Width 33¾" Depth F. 6 ½" B. 6 2½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" DIA. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame DOUBLE Riveted

Water space stays ⅜" DIA. WITH 3 6" HOLES 1½" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front {TWO ROWS B.L.W. EXPANSION STAYS

Button heads below crown on TEN central rows

Crown bars NONE Placed --- above crown

Crown bolts ---

Flues ---

Tubes #12 W. G. CHARCOAL IRON OR STEEL

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS

Number 270 Diam. 2" Length 10'11¾"

Heating Surface Flues --- Combus. Chamb. --- Total 1684.0

Tubes 1540.3 Fire Box 143.7 Fire Brick Tubes ---

Grate area 23.8 Ratio to Heating Surface 1:71

Superheater ---

Fire Brick ARCH ON STUDS

Grates ROCKING BARS AND DROP PLATE

Ash Pan, Dampers FRONT AND BACK

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L.S. ONLY

Spark hopper WITH

Netting and deflect. plates WITH

Exhaust nozzles DOUBLE HIGH

Stack STRAIGHT Dia. 18"

Safety Valves TWO COALE 2½" OPEN (Not Spec.)

Safety valves BOTH with relief lever, Set to 180 POUNDS

Whistle ONE B. L. W. PLAIN

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (Not Spec.)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE B.L.W. Pos: FRONT

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR

Firebox, CORNERS DIAGONAL, SIDES AND BACK

Crown, TWO EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT

Front tube sheet, ONE 19 fusible plug ONE

Pump NONE

Injectors TWO SELLERS, CLASS "N" (Spec.) No. 8½

Injectors, Pos. RIGHT AND LEFT Steam pipes M COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B.L.W. WITH STOP VALVE Pos. RIGHT AND LEFT

Steam Heat NONE

Cab WOOD

Cab boards WOOD Nosing NONE

Running boards WOOD Nosing NONE

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 31¾"

Pilot NONE Pushing shoes AT FRONT

Front Bumper CAST IRON Bumper plate NONE

Steps ACROSS FRONT WITH HANDRAILS.

STEPS, HAND HOLDS ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler M.C.B. AUTOMATIC

Signal fixtures NONE

Headlight TWO ROUND CASE 14" Reflector,

Headlight, Nos. on sides WITH H'dl't step WITH

Lamp shelf NONE Nosing ---

Bell 92 POUNDS

Sand Box TWO Diam. 28" Body IRON PAINTED Pipes IRON

Sander (Not Spec.) LEACH AIR, TRAP A-1, IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

E. E. Roberts May-1920.

SPECIFICATION FOR LOCOMOTIVES 6 34 D 974

135

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FOR GORDON MINING COMPANY

MW

Frames CAST STEEL

Cylinders, Diam. 20" Stroke 24"

St'm ports, Length 16" Width 12" Bridges 1"

Exh. ports, Length 16" Width 24" Valve lead 1/16"

Valve travel 5½" Steam lap 1" Exhaust clearance ---

Eccentric ~~cranks~~ throw 5½" By-pass valve NONE

S. F. Lubr. MICHIGAN TRIPLE BULLS EYE (Not Spec.)

Cyl'r heads CAST IRON, LUBR. PIPES OF IRON UNDER JACKET.

Cyl'r casings IRON PTD. Head covers STEEL PAINTED

St'm chest casings IRON PTD. Covers STEEL PAINTED

St'm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES

Met. pkg. (PISTON ROD / VALVE STEM) UNITED STATES (Not Spec.)

Pistons CAST IRON RINGS SPRUNG INTO SOLID HEAD

Guides LAIRD TYPE, STEEL Oil cups NEEDLE

Crossheads CAST STEEL

Wrist Pins STEEL Rod cups PLUNGER

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners BRASS FOR MAIN WHEELS ONLY

Drivers, O. S. Diam. 50" Cen. diam. 44"

DRIVING WHEEL CENTERS, MAIN CAST STEEL, OTHERS CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"

Tires, Plain, Pos. MIDDLE Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = 3/16" TOTAL

Driving Boxes STEELED CAST IRON

Journals, Diam. 8½" Length 8½"

Springs. Make B.L.W.

Front Engine Truck NONE Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck NONE Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating Parts: Engine, sch. A-1 AND SHA WESTG. AUTOMATIC AND STRAIGHT AIR

Eng. Tr'k, sch. ---

Foundation Parts: Drivers, sch. MA-2 BC AMERICAN OUTSIDE EQUALIZED

Eng. Tr'k. sch. ---

Air pump AND Pos. (SEE SUP. 28)

Train connections FRONT AND BACK

Train signal, sch. NONE

Tender EIGHT Wheeled, Drawing No. 956

Weight, with fuel and water, about 72,000 POUNDS

TENDER TO BE WEIGHED: NO

Tank 3,500 Gallons, Bill 5292

TANK "U" SHAPE, SLOPING BACK. FUEL CAPACTY 6 TONS.

Tool Boxes HARD WOOD, TOP.

Frame OAK AND YELLOW PINE

Front Drawbar height 31"

Pilot NONE Pushing shoes AT REAR

Back drawhead, center above rail 33½"

Coupler M.C.B. AUTOMATIC

STEPS, HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

STEPS ACROSS REAR OF TENDER, WITH HAND RAILS.

Steps AND HAND RAIL ON SLOPING BACK OF TANK.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTER.

Springs ELLIPTIC, B.L.W. MAKE

Journals, Diam. 4½" Length 8"

Wheels, Diam. 30" Tread 1½" Kind CHILLED CAST IRON PLATE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake Position ON ALL WHEELS

Brake sch. FL-1012 AND SHB. WESTG. AUTO. AND STRAIGHT AIR.

List of tools, sch. 29

Photo sch. NONE Inspection B.L.W. (SEE SUP. 23 & 19) AND SUP 1 & 2

To be weighed No Material specifications B.L.W. (SEE SUP. 4)

Certificate of boiler test THREE COPIES B.L.W. FORM 1036.

Junior laws to 4-30-20 Shipment ON OWN WHEELS

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents: FEED PIPE STRAINER, PAT'D SEPT. 1, 1903 (CAST ON)

Property plates NONE

Painting, style 29 OLIVE GREEN AND ALUMINUM

Mark on TANK SIDES, GORDON MINING CO.

	Road Nos.	Name
Pos.		
F. No. PLATE	3	
F. SAND BOX		
BACK OF TANK		

Actual Dimensions of Loco. Extreme height over all 13' 9"

Extreme Width: Cab boards 10' 4"; Cylinders or valve motion 9' 1½"

Length outside face front bumper of engine to face of tender wedge 30' 1"

Length face of tender wedge to outside face back bumper of tender 22' 7½"

Total length outside face front bumper of engine to outside face back bumper of tender 52' 8½"

SPECIFICATION FOR LOCOMOTIVES 6 34 D 974

FOR GORDON MINING COMPANY

P

1 BOILER TO BE OPERATED IN THE STATE OF MINNESOTA
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND-ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL / MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

TUBES MAY HAVE VARIATION IN GAUGE OF 10% EITHER WAY.

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	7/8"	7/10"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝". (I. E., USE FUSIBLE PLUG CARD 1414 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6858.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG: ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE, OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER ⅝" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES ⅝" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(S)	MINNESOTA (State in which boiler is to be used)
	No. 8 (Manufacturer's State Standard Number)
	THE BALDWIN LOCOMOTIVE WORKS (Name of Manufacturer)
(Manufacturer's Serial Number)	(LEAVE BLANK) (State's Number) (LEAVE BLANK) (Year put in service)
	200 LBS. (Maximum working pressure when built)

21 LOCOMOTIVE TO BE USED IN IRON ORE STRIPPING WORK.

22 LOCOMOTIVE FOR OPERATION IN MINNESOTA.

23 BOILER TO CONFORM TO THE A.S.M.E. CODE

24 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY

25 TUBES TO BE ARRANGED IN STAGGERED ROWS.

26 BACK FOOT PLATE TO BE HEAVY TO BUILD UP WEIGHT, ACCOUNT USE OF CAST IRON FRONT BUMPER.

27 HEADLIGHT EQUIPMENT TO BE PYLE-NATIONAL ELECTRIC TYPE K-2 WITH INCANDESCENT HEADLIGHTS.

28 ONE 8½" CROSS COMPOUND AIR PUMP, LOCATED ON LEFT SIDE OF ENGINE.
DUPLEX GOVERNOR TO BE PROVIDED FOR AIR PUMP.

29 WESTINGHOUSE ENAMELED AIR RESERVOIRS OF SUITABLE CAPACITY.
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.
AIR DRUMS PLACED AHEAD OF FIRE BOX.

30 SINGEE POINTER GAUGE FOR USE WITH STRAIGHT AIR SCHEDULE SWA AND SWB, SO ATTACHED TO DRIVING BRAKE CYLINDER PIPE TO SHOW DRIVING BRAKE CYLINDER PRESSURE WHETHER AUTOMATIC OR STRAIGHT AIR IS APPLIED.

31 AIR HOSE COUPLING AT FRONT AND REAR OF ENGINE TO BE REGULAR M.C.B. STANDARD. AIR BRAKE HOSE CONNECTION AT FRONT OF ENGINE AND REAR OF TENDER TO BE LOCATED SAME AS FOR STANDARD MAIN LINE WORK.

32 ENGINEER'S VALVE LOCATED AS HIGH AS POSSIBLE, I.E., JUST SO AS TO CLEAR THE BOTTOM GAUGE COCK.
WESTERN WHEELED SCRAPER CO'S SPECIAL AIR VALVES FOR OPERATING DUMP CARS.

33 BRAKE EQUIPMENT AS LETTER DATED ST. PAUL, MINN, DEC. 22, 1915 FROM THE WESTINGHOUSE AIR BRAKE CO., GIVING DETAILED LIST OF BRAKE EQUIPMENT REQUIRED, TOGETHER WITH "INSTRUCTIONS FOR INSTALLATION", BOTH OF WHICH ARE TO BE FOLLOWED. COMPANY REQUEST THAT WE CONSULT WITH MR. NAGLE, THE WESTINGHOUSE CO'S REPRESENTATIVE, IN PLANNING THE PIPING AND INSTALLATION OF THIS EQUIPMENT.

SPECIFICATIONS FOR LOCOMOTIVE 6 34 D 974

GORDON MINING COMPANY

AIR BRAKE EQUIPMENT :-

1 - Set Schedules 6-1, FL-3112, CMA and DTB, including the following detailed

1 - 8½" D.T. Compressor, ---------- 39868

1 - 1¼" Steam Valve ---------- 17402

1 - SI-B Governor, ---------- 23067

1 - 6-B.. Straight Air Brake Valve, ---------- 17824

1 - Single-pointer 8½" air Gage for brake cyl. ---------- 19100

1 - ¾" Cut-out Cock (to go for Tender) ---------- 2233

1 - Special tender cylinder hose, instead of std, ---------- 30426

2 - Westinghouse Tanmelet Main Reservoirs, having a combined capacity of approximately 5,000 cu.in. Dimensions to be specified by Locomotive Builder, ----------

2 - Reservoir Drain Cocks ----------

1 - Set American Brake Co.'s Schedules [illegible] Driver Brakes. Brake 50% on 90# brake cylinder pressure.

All brake cylinders to have 2k type expander rings

¾" pipe bracket for Straight-air Brake Valve.

As these engines are to operate Western Wheeled Scrubber Co.'s pneumatic tools, the following material is for the operating line:

Pc.No.

3 - ¾" Cut-out Cocks ----------

2 - ¾" x 12" S.T. Angle Cocks, ---------- (3825)

4 - (Extra) 3½" x 22" Hose with (3-4 Couplings) for Angles, ---------- (3827)

4 - ¾" x 1½" Angle Fittings, ---------- 3819

The above material to be installed in accordance with Westinghouse Air Brake Co.'s instructions attached.

INSTRUCTIONS FOR INSTALLATION.

Air Pump: Set pump directly to one side of 8½" D.T. compressor on left side and forward of steamchest, low enough not to be struck by them, so it can be removed without lifting over any obstructions and so that air cylinder cap bolts and lower frame can be easily removed, through by fitting cast bracket, fitting to boiler and with long lengths for compressor [illegible] to have necessary [illegible] lugs to engage lower [illegible] compressor, to remove weight of compressor weight.

Piping: Pipe as horizontally as [illegible] convenient for manipulation, extending [illegible] as necessary without unnecessary bends, [illegible] substantially close to handle.

Governor: Connect SI-B governor to 8½" D.T. compressor in most convenient position and governor as per [illegible] as directed under "PIPING"

Main Reservoirs: Locate [illegible] of [illegible] on one side of engine [illegible] of driving wheels. Attach to boiler by substantial cast brackets with [illegible] to keep running boards to [illegible] of these brackets.

Brake Valves: Locate in convenient position for use [illegible] of engineer when [illegible]. For arrangement shown, locate [illegible] brake valve [illegible] side of cab, sand valve [illegible], and automatic brake valve in corner of boiler head. [illegible] to convenience of user.

Gages: Locate a short distance forward of the [illegible] valves, [illegible] side of boiler [illegible] enough to enable engineer to read them easily from [illegible] without [illegible] actually losing sight of the track ahead. Provide separate [illegible] for these gages so that the [illegible] rays will not be reflected in the engineer's eyes.

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7263

Memorandum Spec'n 21036

SPECIFICATION FOR LOCOMOTIVES 12 40 ¼ E 13

ER/
FOR Greenbrier & Eastern R. R. Co.

Gen. as Photo. 7190 {Except with two sand boxes and omit oil tank on tender and with tender boxes water cooled

Engine Drawing No. 6

11-16-21 (Not Spec)

Gauge of Road 4' 8½" Play (See Sup. 27)

Wheelbase, Rigid 14' 6" Driving 14' 6" Total 31' 9"

Total wheelbase, eng. and tend. {Actual 62' 10½" / Limited to ---

Curves 25 degrees Grades 5.3%

Limits, Height (See Sup. 2) Width (See Sup. 2)

Weight (approximate) in working order, Total 241,000 pounds

On F. tr'k 19,500 lbs., Drivers 185,000 lbs., B. tr'k 36,500 lbs.

Tractive power 45750 lbs. Ratio of adhesion 4.04

Work'g St'm Pres. 185 lbs. Service Freight

Fuel Soft Coal

3 **Boiler** Steel Thick 13/16" Bill 9513

Front Tube Sheet ½" Thick

Boiler, Diam. 80" Plate Straight top

{Allowable st'm pres. 200 lbs. / With Factor of Safety of 4.67 **Tested to** 220 lbs. steam pres. / 267 lbs. water pres.

Longitud. seams Butt jointed, double covering strips, sextuple riveted.

5 **Dome,** diam. 33" Pos. Forward of fire box

Firebox Steel Combustion chamb. None

Firebox, length 108⅛" Width 84" Depth F. 79½" B. 59¼"

10 Firebox Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

11 Firedoor opening Oval 16" x 20"

Water space, Front 5" Sides 4" Back 4"

Water space frame Double Riveted

Water space stays ⅜" diam. with 3/16" holes 1¼" deep from O. S.

Radial stays 1" diam. Sling stays front {Three rows B. L. W. Expansion Stays

Button heads below crown on Eight central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G. Steel

Tubes No. 12 B. W. G. Charcoal Iron or Steel (B.L.W. Option)

Tube ends Swaged for copper ferrules, fire box ends

Number {40 / 238 Diam. {5⅜" / 2" Length 18' 0"

Heating Surface Flues 1009⁰ Combus. Chamb. --- Total 3452⁰

Tubes 2232⁰ Fire Box 186⁰ Fire Brick Tubes 25⁰

Grate area 63⁰ Ratio to Heating Surface 1: 54.8

Superheater 995⁰

Fire Brick Arch American Security Arch on four tubes, 3" O.S. diam.

8 **Grates** Rocking bars and drop plates (See Sup. 9)

Ash Pan, Dampers (See Sup. 10-15)

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater Schmidt type (See Sup. 11 rev.)

14 **Smokebox** extension With 12 cleaning hole and cap L.S. only

Spark ~~ejector~~ hopper With

Netting and deflect. plates With

Exhaust nozzles Single, high.

Stack Straight Dia. 18"

6 **Safety Valves** Three Coale 3½" Open (Not Spec)

Safety valves None with relief lever, Set to 185 pounds

6 **Whistle** One loud chime

Steam Gauge One Iron 6½" Maker: U. S. Gauge Co.

Steam gauge stand Iron **Clock** None

Water Gauge One Klinger **Cab Lamps** Electric

Gauge Cocks Three back Surface valve None

Lowest gauge cock 4½" above highest part of crown

Lubricator steam valve To have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock Two B. L. W. Pos: R. and L.

Cleaning Plugs One plug above fire door

Firebox Corners, diagonal, sides and back

Crown, Two R. S., three L. S., and four back

Waist, Two under, one front and one back

Front tube sheet, One Fusible plug One

Pump None

Injectors (Not Spec) Two Sellers type "K" non lifting No. 13-8/10

Injectors, Pos. Right and Left Steam pipes Copper

Pipes, Check Iron Feed Iron 15 Overflow Iron

Check Sellers, combined with stop valve Pos. R. and L.

Steam Heat None

16 **Cab** Steel, lined with wood

Cab boards to be covered with wood.

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 26½"

Pilot (See Sup. 17)

Front Bumper Cast Steel Bumper plate With

3 **Steps** Hand holds etc. to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M.C.B. Automatic with spring draft gear.

Signal fixtures Iron on bumper

18 **Headlight** Two Round Case 18" Reflector

Headlight, Nos. on sides With Headlight stay With

Lamp shelf None Nosing ---

Bell 92 pounds

Sand Box Two Diam. 38" Body Iron painted Pipes Iron

Sander (Not Spec) Leach Air, Trap A-1, in each box, to sand front and back.

Dome casing Iron painted, with pressed steel top and bottom rings.

Boiler Jacket #18 Soft Steel ptd. Sand Iron Style 9 and 14

Boiler Lagging Magnesia Sectional

Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

C. Wagner Jan-1922

SPECIFICATION FOR LOCOMOTIVES 12-40 ¼ E 13

FOR Greenbrier & Eastern R. R. Co.

P

Frames Cast Steel

19 **Cylinders,** Diam. 23" Stroke 28"

St'm ports, Length 26.70" Width 1- 1/16" Bridges ---

Exh. ports, Length --- Width --- Valve liner 3/16"

Valve travel 5¾" Steam lap 1 15/16" Exhaust clearance ---

Eccentric crank throw 15½" Bridge valve None

S. P. Lubr. (Not Spec) Detroit Five Feed No. 42 Bulls Eye

Cyl'r heads Cast Iron Lubr. pipes of iron under jacket.

Cyl'r casings Iron painted Head covers Steel painted

St'm chest castings --- Covers ---

St'm chest valves 12" diam., Piston type

Met. pkg. (Not Spec) (Piston rods and valve stems) United States, King type.

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron with rings of cast iron sprung in.

Guides Steel (See Sup. 20) Oil cups Needle

Crossheads Cast Steel, with bearings of brass.

Wrist Pins Steel Rod cups (See Sup. 21 rev)

Parallel rods to have solid ends.

23 **Valve Motion** Walschaerts

Links, sliding blocks, pins, fitting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboltS) to be United States Standard

All finished movable nuts of steel or of iron case hardened

Wearing Bearings B. L. W.

Driving wheel hub liners (See Sup. 24)

Drivers, O. S. Diam. 51" Cen. diam. 44" Centers Cast Steel

28 28½ **Tires** Steel Held by Shrinkage and shoulder

Tires, Flanged, Pos. All Size 3½" x 5½"

Tires, Plain, Pos. None Size ---

Lateral play between driving boxes and wheel hubs (See Sup. 26)

Driving Boxes Cast Steel (See Sup. 25)

Journals, Diam. {Main 10" Length 12" / Others 9"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing

30 To swing 5" each side of cen. Cen. pin liners None

Journals, Diam. 6" Length 10" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 28" Tread --- Kind Cast Iron Spoke Center

Tires Steel Cen. diam. 23" Size 2½" x 5½"

Tires held by Shrinkage and shoulder

Back Engine Truck Two Wheeled Hodges O.S. Bearing type

32 To swing 5" each side of cen. Cen. pin liners None

Journals, Diam. 8" Length 14" Boxes Cast Steel

Wheel hub liners (See Sup. 31)

Wheels, Diam. 36" Tread --- Kind Cast Iron Spoke Center

Tires Steel Cen. diam. 31" Size 2½" x 5½"

Tires held by Shrinkage and shoulder

34 **Brake,** position On all driving and tender wheels

Operating {Engine, sch. No. 6-ET Westinghouse Combined Auto. and Straight Air / Eng. Trk. sch. ---

Parts {Foundation / Drivers, sch. WN-3-BC American O. S. Equalized / Eng. Trk. sch. ---

Air pump Two 11" Pos. Both L. S. (See Sup. 33)

Train connections Front and back

Train signal, sch. None

43 **Tender** Eight Wheeled Drawing No. 1696

Weight, with fuel and water, about 124,000 pounds

Tender to be weighed, Yes

44 **Tank** 6,000 Gallons S 5735

Tank "U" shape, straight top. Fuel capacity 10 tons.

Tool Boxes Wood, Top

Frame Steel, 12" channels with bumpers of wood reinforced with steel channels.

Front Drawbar height 25⅜"

Pilot None

Back drawbar height, (Not Spec) (Tender and valve gear) 33½"

Coupler M.C.B. Automatic with spring draft gear.

3 Steps, hand holds etc. to conform to I. C. C. requirements

43 **Trucks** Arch Bar Type, with bolsters of Cast Steel.

Springs Elliptic B. L. W.

44 Journals, Diam. 5" Length 9"

Wheels, Diam. 30" Tread --- Kind Cast Iron Plate Center

Tires Steel Cen. diam. 25" Size 2½" x 5½"

Tires held by Shrinkage and shoulder

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET Westg. Auto. and Straight Air, with 12" x 12" tender brake cylinder.

List of tools, sch. No. 158 One pair wrecking frogs

Photo sch. No. 2 Inspection B. L. W. (See Sup. 1.)

To be weighed Yes Material specs. B. L. W.

Certificate of boiler test (See Sup. 44)

Junior laws to 12-13-21 Shipment On own wheels (See Sup.

Brass shop finish, No. 1

Machine shop finish D-165

Front Engine Truck B. L. W., Spring Clip, #1013774, Jan. 3, 1912 (Cast on)

Patents Rear Truck, #1060499, April 20, 1913 (Brass plate)

Property plates B. L. W. for engine and tender.

Painting, style --- Olive Green, no striping

Mark on tank sides, Greenbrier & Eastern

Lettering etc. to be same style as for 12 34 ¼ E 55.

Road Nos. Pos. Road Nos. Name None

F. No. Plate

F. Sand Box

Cab Panel

Back of Tank

Actual Dimensions of Loco. Extreme height over all 14' 11"

Extreme Width: Cab boards 10' 5"; Cylinders ~~or valve motion~~ 10' 2⅜"

Length outside face front bumper of engine to face of tender wedge 42' 8⅜"

Length face of tender wedge to outside face back bumper of tender 26' 4½"

Total length outside face front bumper of engine to outside face back bumper of tender 69' 0⅜"

SPECIFICATION FOR LOCOMOTIVES:- 12 40 ¼ E 13.

FOR: GREENBRIER & EASTERN R. R. Co.

HNW.

1 MR. J. B. LAING, PRESIDENT, TO BE ADVISED THROUGH OUR PITTSBURG OFFICE, THREE OR FOUR DAYS IN ADVANCE OF THE COMPLETION OF THIS LOCOMOTIVE, SO HE MAY ARRANGE TO BE HERE TO INSPECT IT BEFORE IT IS SHIPPED.

2 HEIGHT AND WIDTH TO SUIT CLEARANCE LIMITS OF ALLEGHENY TUNNEL OF THE C. & O. AS SHOWN ON PRINT HEREWITH.

3 LOCOMOTIVE FOR I. C. C. SERVICE.

4 CERTIFICATE OF BOILER TEST:— THREE COPES B.L.W. FORM 1036, AND TWO COPIES B.L.W. FORM 491.

5 MAIN DOME TO BE ONE-PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

6 FIRE BOX CROWN AND SIDES IN ONE SHEET.

7 FIRE DOOR TO BE FRANKLIN BUTTERFLY TYPE.

8 PROVISION TO BE MADE FOR FUTURE APPLICATION OF STANDARD STOKER.

9 GRATES TO BE SAME TYPE AS FOR 12 34 ¼ E 58.

10 ASH PAN TO HAVE AIR SPACES SUITABLY LOCATED.
HOLE TO BE LOCATED IN EACH SIDE HIGH UP FOR LEVELING ASHES.

11 SUPERHEATER AS THE SUPERHEATER Co's. SPECN. No. C-17217, DATED NOVEMBER 25, 1921, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

12 PATENT PLATES (HEREWITH) FROM THE SUPERHEATER Co., COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

13 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

14 SMOKE BOX TO HAVE SELF CLEANING FRONT END ARRANGEMENT.

15 INJECTOR OVERFLOW ON LEFT SIDE TO BE PIPED INTO ASHPAN.

16 CANVAS CURTAIN TO BE PROVIDED FOR REAR OF CAB. IF NECESSARY, THIS CURTAIN MAY BE SHIPPED SEPARATE FROM LOCOMOTIVE IN ORDER TO AVOID DELAY IN SHIPPING LOCOMOTIVE.

17 PILOT OF STEEL (WITH STEPS) SAME AS FOR 12 34 ¼ E 58.
PILOT TO BE SET BACK SUFFICIENCLY FOR DOUBLE HEADING.

18 HEADLIGHT EQUIPMENT TO BE SUNBEAM TYPE RE-3 WITH INCANDESCENT HEADLIGHTS.

19 CYLINDERS AND VALVE CHAMBERS TO HAVE HUNT-SPILLER BUSHINGS.

20 GUIDE YOKES TO BE OF CAST STEEL.

21 MAIN ROD TO HAVE WEDGE BLOCK TERMINATING IN A BOLT, TOP AND BOTTOM, SAME AS FOR 12 34 ¼ E 58.

22 MAIN AND SIDE RODS TO HAVE COMPRESSION GREASE CUPS.

23 RAGONNET POWER REVERSE GEAR, TYPE "B", COVERED ON EXTRA ORDER No. 12556, DATED 12-5-21.

24 DRIVING WHEELS TO HAVE BRONZE WEARING PLATES PRESSED INTO WHEEL HUBS.

25 DRIVING BOXES TO HAVE ELVIN GREASE LUBRICATORS.

26 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS,- 7/32" TOTAL.

27 TRACK PLAY ¾", EXCEPT ⅞" FOR MAIN AND INTERMEDIATE DRIVERS.

28 TWO SETS OF COLLINGS FLANGE LUBRICATORS TO BE APPLIED, ONE SET FOR FRONT AND ONE SET FOR BACK DRIVERS. GRAPHITE STICKS TO BE FURNISHED WITH LUBRICATORS.

29 RAIL WASHERS TO BE APPLIED FRONT AND BACK OF DRIVERS.

30 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN PEDESTAL FITS,- 5/16" TOTAL.

31 BACK ENGINE TRUCK WHEELS TO HAVE BRONZE WEARING PLATES PRESSED INTO WHEEL HUBS.

32 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN PEDESTAL FITS,- ¼" TOTAL.

33 AIR PUMPS TO BE ARRANGED SO THAT EITHER PUMP MAY BE OPERATED INDEPENDENTLY.
AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.

34 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

TENDER

41 PROVISION TO BE MADE FOR FUTURE APPLICATION OF STANDARD STOKER.

42 TENDER TO HAVE HOSE TO EACH TENDER JOURNAL BOX, WITH VALVES ON OUTSIDE OF TANK.

43 ADDITIONAL BEARINGS AT SIDES OF BOTH TRUCKS.

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SPECIFICATION FOR LOCOMOTIVES:- 12 40 ¼ E 13.

ROAD: GREENBRIER & EASTERN R. R. Co.

Specification for Type A Double Loop Superheater SPEC. No. C-17217, DATED Nov. 25, 1921.

BOILER TUBES	238 in number 2" o. d. 18 ft. 0 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	40 in number 5½" o. d. #9 of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card	1033-P
BOILER FLUE SETTING	⅛ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card	1136
TUBE SHEET LAYOUT	Card	SL-50879
UNITS	40 units 1½" o. d. #9 Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card	10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card	1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A. Card	1064-N
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card	AHM (5x8) 11118-C
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card	1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units. Card	SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card	1067
PYROMETER	Model No. Pyrometer NONE Card	
PYROMETER ARRANGEMENT	Generally in accordance with. Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration. Card	
S. H. ARRANGEMENT	In accordance with. Card	4L-40055
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 2L-11528-D	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10805
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYCL. PIPE CONNECTION	Card 1L11437	S. H. PIPE BAND	Card 1388
DAMPER CYL. PIPING DIAGRAM	Card 2L11442	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card 1068M	RETURN BENDS	Card 11022
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O. S.	Card 11438	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT BEARING (U.S.)	Card 10386M R&L	DEFLECTING PLATE STUDS	Card 10809
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE CLAMP	Card 10809-A
PATENT PLATE	Card 3L-3367		
DAMPER RIGGING	11394-B		

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7338, Duplicate 12 40 ½ E 13.
Memorandum Spec'n 23086. Same extras, except where otherwise specified.
SPECIFICATION FOR LOCOMOTIVES 12 40 ½ E 16.
FOR Greenbrier & Eastern R. R. Co. Gen. as Photo. 8219.
Engine Drawing No. 6.
9-1-23.

Gauge of Road 4' 8½" Play (See sup. 26)
Wheelbase, Rigid 14' 6" Driving 14' 6" Total 31' 9"
Total wheelbase, eng. and tend. {Actual 61' 8½" / Limited to ----

Curves 25 degrees. Grades 5.3%

Limits, Height (See sup. 1) Width - (See sup. 1)
Weight (approximate) in working order, Total 237,220 pounds.
On F. tr'k 20,100 lbs., Drivers 180,970 lbs., B. tr'k 36,150 lbs.

Tractive power 45,750 lbs., Ratio of adhesion 3.95
Work'g St'm Pres. 185 lbs., Service Freight.
Fuel Soft Coal.

2. **Boiler** Steel. Thick 13/16" Bill 9513
Front Tube Sheet ½" Thick
Boiler, Diam. 80" Plan Straight Top.
{Allowable st'm pres. 200 lbs. / With Factor of Safety of 4.67} **Tested to** {220 lbs. steam pres. / 267 lbs. water pres.}
Longitud. seams Butt jointed, double covering strips, sextuple riveted.

4. **Dome,** diam. 33" Pos. Forward of fire box.

Firebox Steel. Combustion chamb. None.
5. Firebox, length 108⅛" Width 84" Depth F. 79½" B. 58½"
6. Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening Oval 16" x 20"
Water space, Front 5" Sides 4" Back 4"
Water space frame Double Riveted
7. Water space stays ⅞" diam. with 3/16" holes 1½" deep from O.S.
Radial stays 1" diam. Sling stays front {Three rows B. L. W. / Expansion Stays.}
Button heads below crown on Eight central rows
Crown bars None. Placed --- above crown
Crown bolts ---

Flues No. 9 B. W. G. Steel.
Tubes No. 12 B. W. G. Steel.
Tube ends Swaged for copper ferrules, fire box ends.
Number {40 / 238} Diam. {2⅝" / 2"} Length 18' 0"

Heating Surface	Flues 1009⅝	Combus. Chamb. ---	Total 3452⅝	
	Tubes 2232⅝	Fire Box 186⅝	Fire Brick Tubes 25⅝	
Grate area 63⅝	Ratio to Heating Surface 1: 54.8			
Superheater 895⅝				

Fire Brick Arch, American Security Arch on four tubes, 3" O.S. diam. 3/16" thick.
Grates to be same type as for 12 40 ½ E 13.
Grates Rocking bars and drop plates.
Ash Pan, Dampers (See sup. 8)

Throttle Balance. Pos. Dome.
Dry pipe Steel.

Superheater Schmidt type. (See sup. 9 etc)

Smokebox extension With. 10. Cleaning hole and cap L. S. Only.
Spark ejector or hopper With.
Netting and deflect. plates With.
Smokebox to have self cleaning front end arrangement.
Exhaust nozzles Single, High.

Stack Straight. Dia. 18"

Safety Valves Three Coale 3½" Open. (Not Spec)
Safety valves None with relief lever, Set to 185 pounds.
Whistle One Loud Chime.

Steam Gauge One Iron 6½" Maker: U. S. Gauge Co. (Spec)
Steam gauge stand Iron. **Clock** None.

Water Gauge One Klinger. **Cab Lamps** Electric.
Gauge Cocks Three Back. Surface valve None.
Lowest gauge cock 4½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock Two B. L. W. Pos: R. and L.
Cleaning Plugs One plug above fire door.
Firebox, Corners, diagonal, sides and back.
Crown, Two R. S., three L. S. and four back.
Waist, Two under, one front and one back.
Front tube sheet. One. Fusible plug One.
One fusible plug extra.
Pump None.

11. **Injectors** (Not Spec) to be non lifting type.
Injectors Two Hancock, Type H-NL, 5000 Gals. Cap.
Injectors, Pos. Right and Left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check Hancock. (See sup. 12) Pos. R. and L.

Steam Heat With. (for passenger service.)

15. **Cab** Steel, lined with wood. (See sup. 14)
Cab to have canvas curtain at rear.
Cab boards to be covered with wood.
Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler.

16. **Back Bumper** Bar Steel. Back drawbar height 26¼"

Pilot Steel. (See sup. 17.)
Front Bumper Cast Steel. Bumper plate With.
2. **Steps** Hand holds, etc. to conform to I. C. C. Requirements.

Front Drawhead, Center above rail 33½"
2. **Coupler** A. R. A. Automatic with 11" knuckle, and with B.L.W. Twin-Spring Draft Gear.

18. Signal fixtures Iron on bumper.

19. **Headlight** Two Round Case 18". Reflector.
Headlight, Nos. on sides With. H'd'l't step With.
Lamp shelf None. Nosing ---

Bell 92 pounds. Golmar Air Bell Ringer.
Sand Box Two. Diam. 38" Body Iron Painted. Pipes Iron.
Sander (Not Spec) Leach Air, Trap A-1, in each box, to sand front and back.

Dome casing Steel Painted; pressed steel top and bottom rings.

Boiler Jacket #18 Soft Steel Ptd. Bands Steel. Style 9 and 14.
Boiler Lagging Magnesia Sectional.
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS
C. Wagner Dec 1923
SPECIFICATION FOR LOCOMOTIVES 12 40 ½ E 16.
FOR Greenbrier & Eastern R. R. Co.
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Frames Cast Steel.

20. **Cylinders,** Diam. 23" Stroke 28"
St'm ports, Length 26.70" Width 1-11/16" Bridges ---
Exh. ports, Length --- Width --- Valve lead 3/16"
Valve travel 5½" Steam lap 1⅝" Exhaust clearance None.
Eccentric crank throw 1⅝" By-pass valve None.
(Not Spec) S. P. Lubr. Detroit Five-Feed No. 42 Bull's Eye.
Cyl'r heads Cast Iron. Lubr. pipes of iron under jacket.
Cyl'r casings Steel Painted. Head covers Steel Painted.
20. St'm chest casings --- Covers ---
St'm chest valves 12" diam., Piston Type.
(Not Spec) Met. pkg. {Piston rods / Valve stems} United States, King Type.
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron with rings of cast iron sprung in. Twin-Spring Draft Gear.
Guides Steel. (See sup. 21) Oil cups Needle.
Crossheads Cast Steel, with bearings of brass.
Wrist Pins Steel. Rod cups (See sup. 23)
22. Parallel rods to have solid ends.

Valve Motion Walschaerts.
{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be / well case hardened or to have hardened bushings.
Reverse gear: (See sup. 24)

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings Make, B. L. W.
Driving wheel hub liners Bronze, pressed into hubs of wheels.
2. **Drivers,** O. S. Diam. 51" Cen. diam. 44" Centers Cast Steel.

Tires Steel. Held by Shrinkage and Shoulder.
Tires, Flanged, Pos. All. Size 3½" x 5½".
Tires, Plain, Pos. None. Size ---
Lateral play between driving boxes and wheel hubs - (See sup. 29)
Driving Boxes Cast Steel, with Elvin Grease Cellars.
Journals, Diam {Main 10" Length 12" / Others 9"}

Springs. Make B. L. W.

Front Engine Truck Two. Wheeled Swing Bolster, Center Bearing.
30. To swing 5" each side of cen., Cen. pin liners None.
Journals, Diam. 6" Length 10" Boxes Cast Iron.
Wheel hub liners None.
Wheels, Diam. 28" Tread --- Kind Cast Iron Spoke Center.
Tires Steel. Cen. diam. 23" Size 2½" x 5½"
Tires held by Shrinkage and Shoulder.

Back Engine Truck Two. Wheeled Horses O. S. Bearing Type.
31. To swing 5" each side of cen., Cen. pin liners None.
Journals, Diam. 8" Length 14" Boxes Cast Steel.
Wheel hub liners Bronze, pressed into hubs of wheels.
Wheels, Diam. 36" Tread --- Kind Cast Iron Spoke Center.
Tires Steel. Cen. diam. 31" Size 2½" x 5½"
Tires held by Shrinkage and Shoulder.

Brake, position One all driving and tender wheels.
Operating {Engine, sch. No. 6 ET. Westg. Combined Auto. and / Parts {Eng. Tr'k, sch. ---} Straight Air.
Foundation {Drivers, sch. MW-3-BC American O. S. Equalized. / Parts {Eng. Tr'k, sch. ---}
32. Air pump Two 11" Pos. Both L. S. (See sup. 32)
Train connections Front and Back.
Train signal, sch. None.

Tender Eight Wheeled, Drawing No. 1818
Weight, with fuel and water, about 124,000 pounds.
Tender to be weighed: Yes.
44. **Tank** 6,000 Gallons, Bill 5735
Tank "U" shape, straight top. Fuel capacity 10 Tons.

Tool Boxes (See sup. 42)

46. **Frame** Steel, 12" channels with front and back bumpers of Cast Steel.
44. Front Drawbar height 25⅝"
Pilot None.
Back drawhead, center above rail 33½"
Coupler A. R. A. Automatic with 11" knuckle and with B.L.W. Twin-Spring Draft Gear.
Steps hand holds etc. to conform to I. C. C. Requirements.
Steps at front corners and across back for switching service.

Trucks Arch Bar Type, with bolsters of Cast Steel.
Both trucks to have side bearings.
Springs Elliptic, B. L. W. Make.
47. Journals, Diam. 5" Length 9"
Wheels, Diam. 30" Tread --- Kind Cast Iron Plate Center.
Tires Steel. Cen. diam. 25" Size 2½" x 5½"
Tires held by Shrinkage and Shoulder.
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6 ET Westg. Auto. and Straight Air, with 12" x 12" tender brake cylinder.

List of tools, sch 158 One pair wrecking frogs. (See sup. 46)
Photo sch. No. 2. Inspection B. L. W.
To be weighed Yes. Material specifications B. L. W.
Certificate of boiler test (See sup. 3)
Junior laws to 10-1-23. Shipment On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

B. L. W., Rear Truck 1060499, Patented Apr. 29, 1913. (Brass Plate.)
Patents {Spring Clip 1031744 Patented Jan. 3, 1912. (Cast On.)

Property plates B. L. W. for engine and tender.

Painting, style --- Olive Green, no striping.

Lettering, etc. to be same as for 12 40 ½ E 13.
Mark on tank sides:- Greenbrier & Eastern

Road Nos. Pos. Road Nos. Name None.
F. No. Plate. 3
F. Sand Box.
Cab Panel.
Back of Tank.

Actual Dimensions of Loco. Extreme height over all 14' 11"
Extreme Width: Cab boards 10' 5", Cylinders ~~or valve motion~~ 10' 2⅝"
Length outside face front bumper of engine to face of tender wedge - 41' 10½"
Length face of tender wedge to outside face back bumper of tender - 26' 0½"
Total length outside face front bumper of engine to outside face back bumper of tender - 67' 10½"

SPECIFICATION FOR LOCOMOTIVE 12 40 ½ E 16.

FOR GREENBRIER & EASTERN R. R. Co.

JEK.

1 HEIGHT AND WIDTH TO SUIT CLEARANCE LIMITS OF ALLEGHENY TUNNEL OF THE C. & O. AS SHOWN ON PRINT.

2 LOCOMOTIVE FOR I. C. C. SERVICE.

3 CERTIFICATE OF BOILER TEST: THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

4 MAIN DOME TO BE ONE-PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

5 FIRE BOX CROWN AND SIDES IN ONE SHEET.

6 FIRE DOOR TO BE FRANKLIN, BUTTERFLY-TYPE.

7 FLEXIBLE STAYS, TATE, ABOUT 375 IN BREAKING ZONE.

8 ASH PAN TO HAVE AIR SPACES SUITABLY LOCATED.
HOLE TO BE LOCATED IN EACH SIDE, HIGH UP, FOR LEVELING ASHES.

9 SUPERHEATER AS THE SUPERHEATER CO'S. SPECN. NO. O-23105, DATED OCT. 1, 1923 (COPY ATTACHED.)
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY, PAYABLE BY THE B. L. W.

10 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

11 INJECTOR OVERFLOW ON LEFT SIDE TO BE PIPED INTO ASH PAN.

12 INJECTOR CHECK TO BE HANCOCK OF SAME TYPE AS SELLERS CHECK NOW ON 12 40 ½ E 13, I.E., HANCOCK COMBINED CHECK WITH STOP VALVE, FIG. 22, No. 6.

13 SPRINKLER HOSE, ½" DIAM., 30 FEET LONG, TO BE PROVIDED.

14 CAB TO BE MADE 10" SHORTER THAN FOR 12 40 ½ E 13.
CAB TO HAVE CLEAR VISION WINDOWS.

15 DISTANCE BETWEEN COAL SPACE AND FIRE DOOR TO BE SHORTENED BY 26", AS FIREMAN HAS DIFFICULTY IN FIRING FOR 12 40 ½ E 13.

16 FRANKLIN RADIAL BUFFER, WEDGE TYPE, BETWEEN ENG. AND TEND.

17 PILOT TO BE CUT AWAY ON EACH SIDE AND STEPS TO BE APPLIED, AT FRONT OF ENGINE.
PILOT TO BE SET BACK SUFFICIENTLY FOR DOUBLE HEADING.

18 CLASSIFICATION LAMPS, ELECTRIC, TO BE PROVIDED AT FRONT OF ENGINE AND AT REAR OF TENDER. (SEE SUP. 45)

19 HEADLIGHT EQUIPMENT TO INCLUDE WESTINGHOUSE GENERATOR AND SUNBEAM CASES FOR INCANDESCENT LIGHTS.

20 CYLINDERS AND VALVE CHAMBERS TO HAVE HUNT SPILLER BUSHINGS.

21 GUIDE YOKE TO BE OF CAST STEEL.

22 MAIN ROD TO HAVE WEDGE BLOCK TERMINATING IN A BOLT, TOP AND BOTTOM, SAME AS FOR 12 40 ½ E 13.

23 MAIN AND SIDE RODS TO HAVE COMPRESSION GREASE CUPS.

24 RAGONNET POWER REVERSE GEAR, TYPE "B", COVERED ON EXTRA ORDER No. 12561, DATED 9-25-23.

25 TRACK PLAY ¾", EXCEPT 7/8" FOR MAIN AND INTERMEDIATE DRIVERS.

26 TWO SETS OF COLLINS FLANGE LUBRICATORS TO BE APPLIED, ONE SET FOR FRONT AND ONE SET FOR BACK DRIVERS.
GRAPHITE STICKS TO BE FURNISHED WITH LUBRICATORS.

27 RAIL WASHERS TO BE APPLIED FRONT AND BACK OF DRIVERS.

28 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

29 LATERAL PLAY BETWEEN FRONT TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN PEDESTAL FITS, 5/16" TOTAL.

30 LATERAL PLAY BETWEEN BACK TRUCK BOXES AND WHEEL HUBS, ½" TOTAL. THERE IS NO LATERAL PLAY IN PEDESTAL FITS.

31 AIR PUMPS TO BE ARRANGED SO THAT EITHER PUMP MAY BE OPERATED INDEPENDENTLY.

32 AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.

33 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

TENDER

41 STEEL COAL GATES TO BE APPLIED; EACH GATE TO BE HINGED IN CENTER SO AS TO SWING OUTWARD.

42 ONE STEEL TOOL BOX ON TOP OF TANK AT REAR ON RIGHT HAND SIDE.

43 DISTANCE BETWEEN COAL SPACE AND FIRE DOOR TO BE SHORTENED BY 26", AS FIREMAN HAS DIFFICULTY IN FIRING FOR 12 40 ½ E 13.

44 FRANKLIN RADIAL BUFFER, WEDGE TYPE, BETWEEN ENG. AND TEND.

45 MARKER LAMPS, ELECTRIC, TO BE PROVIDED AT REAR OF TENDER.

46 WRECKING FROGS TO BE SUSPENDED BY HOOKS ON R AND L. OF TENDER FRAME.

47 TENDER TO HAVE JOURNAL COOLING HOSE TO EACH TENDER JOURNAL BOX, WITH VALVES ON OUTSIDE OF TANK.

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SPECIFICATION FOR LOCOMOTIVE: 12 40 ½ E 16.

FOR GREENBRIER AND EASTERN R. R.

Specification for Type A Double Loop Superheater SPECN. O-23105, DATED OCT. 1, 1923.

BOILER TUBES	238 in number 2" o.d. 18 ft. 0 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification ~~A-226-16~~	
BOILER FLUES	40 in number 5½" o.d. #9 B.W.G. cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification ~~A-226-16~~	Card 1033-P
BOILER FLUE SETTING	... in radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled beaded and prosserred except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections	Card 1136
TUBE SHEET LAYOUT		Card 3-50879
UNITS	40 units 1½" o.d. #9 B.W.G. AV. Pipes in accordance with the American Society for Testing Materials Specification ~~A-226-16~~. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 300 lb per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 2-11754
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 2-11752
UNIT CLAMP BOLT	In accordance with The Superheater Company Material Specification No. 12-A	Card 2-10644-M
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls	A. H. M. 5 x 8 Card 11118-C
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card (SEE ARRGT)
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	Card 4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card 1067
PYROMETER	Model No. Pyrometer NONE	Card
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 4L-40856-B
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 2-11528-D	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 2-1074	S. H. UNIT CLAMP	Card 2-1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 2-10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPE CONNECTION	Card 1L-11437	S. H. PIPE BAND	Card 2-1988
DAMPER CYL. PIPING DIAGRAM	Card 2-11142	SPACING OF BANDS AND SUPPORTS	Card 10739
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED.
DAMPER SHAFT	Card 1068	RETURN BENDS	Card 2-11623
DAMPER SHAFT ARM	Card 2L-1065	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O.S.)	Card 2-11732	DEFLECTING PLATE HANDLE	Card 1L-1487
DAMPER SHAFT BEARING (I.S.)	Card 10386-M	DEFLECTING PLATE STUDS	Card 2-10809
DAMPER SHAFT LINK	Card 2-1070	DEFLECTING PLATE CLAMP	Card 2-10809-A
PATENT PLATE	Card 3L-3367	UNIT CLAMP BOLT NUT	CARD 1P-1107-A
DAMPER RIGGING	CARD 3L-11626-Z		

THE BALDWIN LOCOMOTIVE WORKS As Spec'n C-6755

Memorandum Spec'n 20129

SPECIFICATION FOR LOCOMOTIVES 4 24 C 93

FOR The Albert Hanson Lumber Co., Ltd.

RTL

P-24-20

Gen. as Photo 2594 } Except with straight cast iron stack and solid end studs.

Engine Drawing No. 26

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 7' 0" Driving 7' 0" Total 7' 0"

Total wheelbase, eng. and tend. Actual 34' 7" Limited to ---

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 70,000 pounds

On F. tr'k --- lbs. Drivers 70,000 lbs. B. tr'k --- lbs.

Tractive power 17,200 lbs. Ratio of adhesion 4.1

Work'g St'm Pres. 165 lbs. Service Switching

Fuel Soft Coal

★ Water the Company uses is very bad.

✳ **Boiler** Steel Thick 9/16" Bil 9292

Front Tube Sheet ½" Thick

Boiler, Diam. 52" Plan Straight Top

Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres

With Factor of Safety of 5.42 270 lbs. water pres

Longitud. seams Butt jointed, double covering strips.

Auxiliary Dome - None. Main Dome : One piece Type

Dome, diam. 25" Pos. Forward of fire box.

Firebox Steel Combustion chamber None

Firebox, length 51⅛" Width 42" Depth F. 56" B. 55"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 3½" Sides 3" Back 3"

Water space frame Double Riveted

Water space stays ⅞" diam., with 3/16" holes 1¼" deep from O.S.

Radial stays 1" diam. Sling stays front } Two rows B. L. W. Expansion Stays

Button heads below crown sheet on six central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues ---

Tubes #12 B. W. G. Charcoal Iron

Tube ends Swaged for copper ferrules, fire box ends.

Number 154 Diam. 2" Length 11' 8"

Heating Surface Flues --- Combus. Chamb. --- Total 1003⁰

Tubes 934⁰ Fire Box 69⁰ Fire Brick Tubes ---

Grate area 14.9⁰ Ratio to Heating Surface 1 : 67.1

Superheater ---

Fire Brick Arch - None

Grates Rocking bars and drop plate.

Ash Pan, Dampers Front and Back

Throttle Balance Pos. Dome

Dry pipe Steel of extra heavy material.

Superheater None

Smokebox extension With cleaning hole and cap L. S. only

Spark ~~arrester~~ hopper With

Netting and deflect plates With

Exhaust nozzles Double, high

Stack Cast iron, straight Dia. 15"

(Not Spec) **Safety Valves** Two Coale 2" Open

Safety valves Both with relief lever, Set to 165 pounds

Whistle One B. L. W. plain

Steam Gauge One Iron 7" Maker - Ashcroft

Steam gauge stand Iron **Clock** None

Water Gauge One B.L.W. Ironclad **Cab Lamps** To burn oil

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3¼" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos. - Front

★ **Cleaning Plugs** } Plugs located as shown on B.L.W. (Not Spec) drawing, approved by Customer

Firebox, Corners diagonal

Crown, Three each side and two back

Waist Two under, one near front and one near throat.

Front tube sheet One 10 One

} The forward plug each side above crown to be located just forward of back tube sheet, so water may be applied directly to back end of flues.

Pump None

} Locomotive for operation in Louisiana and must meet the laws of the State of Louisiana.

Locomotive to meet all requirements of the I. C. C.

✳ Boiler to be built to the A. S. M. E. Code, (See Sup 1 par.)

Injectors Two Monitor (Not Spec) No. 7

Injectors, Pos. Right and Left Steam pipes Copper

Pipes, Check Iron Overflow Iron

Check B.L.W., with stop valve. R. and L.

Steam Heat None

Cab Wood

Cab boards Wood Nosing None

Running boards Wood Nosing None

Hand rail Iron Located on Boiler

Back Bumper Bar steel Back drawbar height 29¼"

Back footplate light cast steel design.

Pilot None

Front Bumper Oak

Steps and hand holds across front.

Steps, hand holds, etc., to conform to I.C.C. Requirements.

Front Drawhead. 33½"

Coupler M. C. B. Automatic

Face of coupler to be at least 13" wide.

Signal fixtures None

Headlight Two Round Case 14" Reflector Tyburg Oil

Headlight Non-automatic With Headlight stem With

Cab shelf None Pos. ---

Bell 85 pounds

Sand Box Two 23" Iron painted Pipe Iron

(Not Spec) Leach Air, Trap Valve, single in each box, to sand front and back.

Dome casing Iron painted, with pressed steel top and bottom hinge.

Boiler Jacket #22 Soft Steel, Ptd. Iron Sta. 9

Boiler Lagging Magnesia sectional

THE BALDWIN LOCOMOTIVE WORKS

G. P. Frick Jan-1921

SPECIFICATION FOR LOCOMOTIVES 4 24 C 93

FOR The Albert Hanson Lumber Co., Ltd.

148

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Frames Cast Steel

Cylinders, Diam. 15" Stroke 24"

St'm ports, Length 13" Width 1¼" Bridges 1"

Exh. ports, Length 13" Width 2½" Valve lead 1/16"

Valve travel 4¾" Steam lap ¾" Exhaust clearance ---

Eccentric throw 4" By-pass valve None

(Not Spec) S. P. Lubr. Nathan Triple No. 9 Bull's Eye

Cyl'r heads Cast Iron **Lubr.** pipes of iron under jacket.

Cyl'r casings Iron painted Head covers Steel painted

St'm chest casings Iron painted Covers Steel painted

St'm chest valves Richardson balanced, with vacuum valves.

(Not Spec) Met. pkg. Piston rods U. S. King type

Piston rods keyed to crosshead.

Pistons heads of cast iron, with rings of cast iron spring in.

Guides Steel Oil cups Needle

Crossheads Cast steel, with bearings of cast iron, tinned.

Wrist Pins Steel Rod cups Plunger

Parallel rods to have solid ends.

Valve Motion Stephenson

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboits) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners None

Drivers, O. S. Diam. 44" Cen. diam. 38" Centres: Cast Iron

Tires Steel Held by Shrinkage and shoulder.

Tires, Flanged, Pos. All Size 3" x 5½"

Tires, Plain, Pos. --- Size ---

Lateral play between driving boxes and wheel hubs 3/16" total

Driving Boxes Cast Iron

Journals, Diam. 7" Length 8"

Springs. Make B. L. W.

Equalization to be arranged in accordance with B.L.W. Standard.

Front Engine Truck None Wheels ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck None Wheels ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels.

Operating : Engine, sch. No. 6-ET West'g. Combined Automatic

Parts : Eng. Tr'k sch. --- and Straight Air.

Foundation : Drivers, sch. WY-2 American outside equalized

Parts : Eng. Tr'k. sch. ---

Air pump One 9½" Pos. Left Side

Train connections Front and Back

Train signal, sch. None

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1641

Weight, with fuel and water, about 52,000 pounds

Tender to be weighed: Yes

Tank 2500 Gallons, Bill 5570

Tank "U" shape, sloping back. Fuel capacity 3 tons.

Water tank to have splash plates.

Tool Boxes Hard wood, top

Frame 6" and 8" steel channels, with bumpers of wood re-inforced by steel plate.

Front Drawbar height 29¼"

Pilot None

Back drawhead, center above rail 33½"

Coupler M. C. B. Automatic

Face of coupler to be at least 13" wide.

Steps, hand holds, etc., to bonform to I.C.C. Requirements.

Steps and hand holds across rear.

Steps and hand rail on sloping back of tank.

Trucks Arch bar type with cast steel bolsters.

Springs Elliptic B. L. W. make

Journals, Diam. 3¾" Length 7"

Wheels, Diam. 26" Tread 4¼" Kind Chilled cast iron plate.

Tires None Cen. diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET West'g. Automatic and straight air, with 8" x 12" tender brake cylinders.

✳ Boiler to be inspected by the Hartford Steam Boiler Inspection and Insurance Co. (This inspection to be done at the expense of customer. Have Hartford send bill direct to purchaser.)

List of tools, sch. 26

Photo sch. None Inspection B. L. W., except (See Sup. ✳ above / See Sup. 4 above)

To be weighed Yes Material specs B. L. W., except see Sup. 4

Certificate of boiler test: three copies B. L. W. Form 1036

Junior laws to 12-1-20 Shipment On own wheels

Brass shop finish, No. 1

Machine shop finish D-165

Property plates None

Painting, style 291 Olive Green and Aluminum

Mark on tank sides: The Albert Hanson Lumber Co. Ltd.

	Road Nos. Pos.	Road Nos.	Name None
Front No. Plate		12	
Front Sand Box			
Cab Sides			
Back of Tank			

Actual Dimensions of Loco. Extreme height over all 13' 3⅛"

Extreme Width: Cab boards 9' 1" : Cylinders or valve motion 8' 6½"

Length outside face front bumper of engine to face of tender wedge 25' 0"

Length face of tender wedge to outside face back bumper of tender 21' 10½"

Total length outside face front bumper of engine to outside face back bumper of tender 46' 10½"

SPECIFICATION FOR LOCOMOTIVES 4 24 C 93

FOR THE ALBERT HANSON LUMBER CO., LTD.

P

1 BOILER TO BE OPERATED IN THE STATE OF LOUISIANA
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND-ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL / MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6959. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	⅜"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜" (I. E., USE FUSIBLE PLUG CARD 1114 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6959.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEGS ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY PADS AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER ⅝" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES ⅝" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ¼" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼" THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(MANUFACTURER'S SERIAL NUMBER)	LOUISIANA (STATE OR BOARD NUMBER TO BE USED) / No. 1 (MANUFACTURER'S STATE STANDARD NUMBER) / THE BALDWIN LOCOMOTIVE WORKS (NAME OF MANUFACTURER) / (LEAVE BLANK) (STATE NUMBER) / (LEAVE BLANK) (YEAR BUILT OR APPROVED) / 190 LBS. (MAXIMUM WORKING PRESSURE ALLOWED)

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6865.

Memorandum Spec'n 21029.

SPECIFICATION FOR LOCOMOTIVES 10 24 ½ D 147.

FOR HARRIS LIPSITZ LUMBER COMPANY, FOR CHRONISTER LUMBER CO. — Except to have air brake and oil headlight.

HNW. Gen. as Photo. 6154.

8-19-21 **Engine Drawing No.** 39

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 9' 2" Driving 9' 2" Total 23' 9"

Total wheelbase, eng. and tend. {Actual 45' 5¾" {Limited to ---

{**Curves** 10 degrees. Grades, 6%. {Not many curves or grades.

Limits, Height --- Width ---

Weight (approximate) in working order, Total 93,500

On F. truck 11,500 lbs., Drivers 70,000 lbs., B. truck 12,000 lbs.

Tractive power 18,700 lbs., Ratio of adhesion 3.74

Work'g St'm Pres. 180 lbs., Service LOGGING.

Fuel SOFT COAL AND WOOD.

Boiler STEEL. Thick ⅝" Bill 3466.

Front Tube Sheet ½" Thick

Boiler, Diam. 52" Plan EXTENDED WAGON TOP.

Allowable st'm pres. 200 lbs. Tested to 220 lbs. steam pres.

With Factor of Safety of 5.02 Tested to 300 lbs. water pres.

Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

AUXILIARY DOME, NONE.

Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL. Combustion chamb. NONE.

Firebox, length 59⅛" Width 34¼" Depth F. 56⅝" B. 53¼"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4". Sides 3" Back 3"

Water space frame SINGLE Riveted

Water space stays ⅝" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S. {TWO ROWS B.L.W.

Radial stays 1" DIAM. Sling stays front {EXPANSION STAYS.

Button heads below crown on EIGHT central rows

Crown bars NONE. Placed --- above crown

Crown bolts ---

Flues ---

Tubes No. 11 B. W. G. STEEL.

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 160 Diam. 2" Length 11' 10½"

Heating {Flues --- Combus. Chamb. --- Total 1071⁰

Surface {Tubes 988⁰ Fire Box 83⁰ Fire Brick Tubes ---

Grate area 14.1⁰ Ratio to Heating Surface 1: 76.

Superheater ---

Fire Brick ARCH, NONE.

Grates ROCKING BARS AND DROP PLATE.

Ash Pan, Dampers FRONT AND BACK.

ASH PAN DUMP DOORS TO BE OPERATED BY AIR.

ASH PAN TO HAVE STEAM VALVE FOR CLEANING.

Throttle BALANCE. Pos. DOME.

Dry pipe STEEL.

Superheater NONE.

SMOKE BOX TO HAVE SHORT EXTENSION.

Smokebox extension SHORT Cleaning hole and cap NONE.

Spark ejector or stopper NONE.

Netting and deflect. plates NONE.

Exhaust nozzles DOUBLE LOW.

CLEANING PIPES, WITH.

Stack RUSHTON IMPROVED. Dia. 15"

Safety Valves (Not Spec) TWO CONSOLIDATED 1½" OPEN;

Safety valves BOTH with relief lever, Set to 180 POUNDS.

Whistle ONE B.L.W. PLAIN.

Steam Gauge ONE IRON 6¾" MAKER: U.S. GAUGE CO.

Steam gauge stem IRON. **Clock** NONE.

Water Gauge ONE B.L.W. IRONCLAD, **Cab Lamps** TO BURN OIL.

Gauge Cocks THREE BACK. Surface valve NONE.

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock TWO B. L. W. POS: R. AND L.

Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER;

Firebox CORNERS, AND FRONT AND BACK.

Crown, TWO EACH SIDE AND TWO BACK.

Waist ONE UNDER FRONT.

Front tube sheet ONE. 10 Handle plug ONE.

LOCOMOTIVE TO OPERATE IN STATE OF TEXAS;

BOILER TO BE BUILT TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE. (SEE SUP. 1 ETC.)

BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY. (SEE SUP. 1 ETC. 19)

Injectors TWO MONITOR (Not Spec) No. 7

Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.

Pipes, Check IRON. Feed IRON. Overflow IRON.

Check B.L.W. WITH STOP VALVE. Pos. R. AND L.

ONE 3" SYPHON UNDER CAB BOARD ON LEFT SIDE WITH PIPE CONNECTION TO TANK AND WITH 20 FEET OF SUCTION HOSE.

Steam Heat ONE.

Cab STEEL.

CAB BOARDS TO BE COVERED WITH WOOD PLANKING, 1¼" THICK.

Cab boards STEEL. Nosing T-IRON.

Running boards STEEL. Nosing T-IRON.

Hand rail IRON. Located on BOILER.

Back Bumper PAR STEEL. Back drawbar height 34½"

Pilot WOOD.

Front Bumper OAK. Bumper plate WITH.

Steps HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail 33½", 28" AND 23".

Couplers EXACT DUPLICATE OF 10 24 ½ D 113, I.E., DRAW CASTING WITH THREE POCKETS AND WITH M. C. B. AUTO. COUPLER IN TOP POCKET. OPENINGS IN LOWER POCKETS TO BE AT LEAST 3¼" WIDE FOR LINK AND PIN CONNECTION. BOLTS HOLDING DRAWHEAD TO BUMPER TO BE 1½" DIAMETER.

SIGNAL FIXTURES: IRON ON BUMPER.

Headlight TWO ROUND CASE 18". Reflector, To burn KEREOSENE.

Headlight, Nos. on sides WITH. H'dl't step WITH.

Lamp shelf ONE. Nosing ---

Bell 85 POUNDS.

Sand Box TWO Diam. 23" Body IRON PAINTED. Pipes IRON.

Sander (Not Spec) LEACH AIR, TRAP A-1, IN EACH BOX TO SAND FRONT AND REAR.

Dome casing IRON PAINTED, WITH PRESSED STEEL TOP RING AND CAST IRON BOTTOM RING.

Boiler Jacket #20 SOFT STEEL PTD. Bands IRON. Style 9

Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

H.K. Harwick Nov 1921

SPECIFICATION FOR LOCOMOTIVES 10 24 ½ D 147.

FOR HARRIS LIPSITZ LUMBER COMPANY, FOR CHRONISTER LUMBER CO.

151

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Frames CAST STEEL.

Cylinders, Diam. 15" Stroke 24"

Stm ports, Length 13" Width 1¼" Bridges 1"

Exh. ports, Length 13" Width 2½" Vol. each 1/8"

Valve travel 4½" Steam lap ¾" Exhaust clearance ---

Eccentric crank throw 9½" (Spec) Boiler Valve ONE.

S. F. Lubr. MICHIGAN TRIPLE BULL'S EYE.

Cyl'r heads CAST IRON. LUBR. PIPES OF COPPER UNDER JACKET.

Cyl'r casings IRON PAINTED, Head covers STEEL PAINTED.

Stm chest castings IRON PAINTED. Covers STEEL PAINTED.

Stm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES.

Main valve motion (Not Spec) UNITED STATES, KING TYPE.

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN.

Guides STEEL. Guide bars NEEDLE.

Crossheads CAST STEEL, WITH BEARINGS OF BRASS OR BRONZE. Slide blocks HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Wrist Pins STEEL. Rod bushings PLUNGER.

PARALLEL RODS TO HAVE SOLID ENDS.

GUIDE YOKE OF MILD WROT STEEL.

Valve Motion WALSCHAERTS.

Links, sliding blocks, pins Main links and transfer rod bushings

Valves, as hardened or to have hardened bushings

All threads on bolts (except stayrolts) to be United States S

All finished movable nuts of steel or of iron case hardened

Wearing Bearings B. L. W.

Driving wheel flange rings BRONZE.

Drivers, O. S. Diam. 44" Centers diam. 30" CENTERS CAST IRON.

Tires STEEL. Flanges SHRINKAGE AND SHOULDER.

Tires, Flanged, Pos. ALL. Size 3" x 5½"

Tires, Plain, Pos. NONE. Size ---

Driving Boxes CAST STEEL, WITH OIL CELLARS.

Journals, Diam. 6" Length 8"

LATERAL PLAY BETWEEN DRIVING BOXES AND WHEELS HUBS, ¼ INCLUDING

LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

Springs, Make B. L. W.

EQUALIZING BEAMS OF CAST STEEL.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING

To swing 1½" each side of cent. Cen. pin liners NONE. Bolster NONE.

Journals, Diam. 4½" Length 7½" Boxes CAST IRON. Pedestals

Wheel hub liners NONE. TRUCK FRAME WROT STEEL.

Wheels, Diam. 24" Tread 4½" Kind CHILLED CAST IRON PLATE.

Tires NONE. Cen. diam. --- Size --- Property plates NONE.

LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

Back Engine Truck TWO Wheeled SWING BOLSTER, SIDE BEARING

To swing 2" each side of cent. Cen. pin liners NONE.

Journals, Diam. 4½" Length 7½" Boxes CAST IRON.

Wheel hub liners NONE. TRUCK FRAME WROT STEEL.

Wheels, Diam. 24" Tread 4½" Kind CHILLED CAST IRON PLATE.

Tires NONE. Cen. diam. --- Size ---

LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating Engine sch NO. 6 ET WESTG. COMBINED AUTO. AND

Parts Eng. Trk. sch --- STRAIGHT AIR.

Foundation Drivers, sch NM-1. AMERICAN O. S. EQUALIZED.

Parts Eng. Trk. sch ---

Air pump ONE 9½" Pos. LEFT SIDE.

Train connections FRONT AND BACK.

Train signal, sch ---

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 921.

Weight, with fuel and water, about 70,000 POUNDS.

TENDER TO BE WEIGHED: YES.

Tank 3,500 Gallons, Bill 5711

TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 6 TONS.

TANK TOP, BOTTOM AND SIDES, ¼" THICK.

Tool Boxes HARD WOOD, TOP. FUEL RACK NOT REQUIRED.

SYPHON CONNECTION TO TOP OF TANK ON LEFT SIDE.

Frame STEEL, 6" AND 8" CHANNELS WITH BUMPERS OF WOOD AND STEEL PLATE.

Front Drawhead, height 28¾"

Pilot NONE.

Back drawhead, center above r. 33½", 28", AND 23".

Coupler (SAME AS SPECIFIED FOR FRONT OF ENGINE).

Trucks ARCH BAR TYPE WITH BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B. L. W.

Journals, Diam. 4¼" Length 8"

Wheels, Diam. 30" Tread 4¼" Kind CHILLED CAST IRON PLATE.

Tires NONE. Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE.

Brake position ON ALL WHEELS.

Brake sch No. 6 ET. Nestg. AUTOMATIC AND STRAIGHT AIR, WITH 10" x 12" TENDER BRAKE CYLINDER.

List of tools sup. 155. ONE PAIR WRECKING FROGS.

Photo sch No. 2. Inspection B. L. W., (EXCEPT SEE * AND SUP. REQ. 19)

To be weighed YES. Material specifications B. L. W. (EXCEPT SEE SUP. 4)

Certificate of inspection {THREE COPIES B.L.W. FORM 1036, AND FIVE COPIES B.L.W. FORM 1915.

Junior laws to 10-1-21. Shipment ON OWN WHEELS.

Brass shop finish, No. 1.

Machine shop finish D-165.

Painting, style 291, OLIVE GREEN AND ALUMINUM.

MARK ON CAB PANELS: C. L. Co.

Mark on TANK SIDES: CHRONISTER LUMBER COMPANY

Road Nos. Pos. Road Nos. Name NONE.

F. No. PLATE. 8

F. SAND BOX.

BACK OF TANK.

Actual Dimensions of Loco. Extreme height over all 13' 1½"

Extreme Width: Cab boards 9' 0" Cylinders ~~at valve motion~~ 9' 2"

Length outside face front bumper of engine to face of tender wedge = 29' 1⅝"

Length face of tender wedge to outside face back bumper of tender = 21' 8½"

Total length outside face front bumper of engine to outside face back bumper of tender = 50' 10¼"

SPECIFICATION FOR LOCOMOTIVES 10, 24 ½ D 147

FOR HARRIS LIPSITZ LUMBER COMPANY
P FOR CHRONISTER LUMBER CO.

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1 BOILER TO BE OPERATED IN THE STATE OF TEXAS
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, OR FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND-ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL / MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	½"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝", (I. E., USE FUSIBLE PLUG CARD 4114 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER,

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6858.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG: ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT TO EXCEED 4" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(MANUFACTURER'S SERIAL NUMBER)	TEXAS (STATE IN WHICH BOILER IS TO BE USED) / NO. 1 (MANUFACTURER'S STATE STANDARD NUMBER) / THE BALDWIN LOCOMOTIVE WORKS (NAME OF MANUFACTURER) / (LEAVE BLANK) (STATE NUMBER) (LEAVE BLANK) (YEAR PUT IN SERVICE) / 200 LBS. (MAXIMUM WORKING PRESSURE WHEN BUILT)

THE BALDWIN LOCOMOTIVE WORKS As Spec. 0-7013 (Sup. 1 etc.)
Memorandum Spec'n 21025.
SPECIFICATION FOR LOCOMOTIVES 10 36 D 634 and 635. Gen. as Photo. 2574, except to have superheater, piston valves, outside steam pipes and elec. headlights.
FOR Huntington & Broad Top Mountain R. R. and Coal Co.
HNW. Engine Drawing No. 50.
7-13-21.

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 13' 6" Driving 13' 6" Total 24' 3"
Total wheelbase, eng. and tend, {Actual 56' 0½" / Limited to ----
Rails, 85 pounds.
Curves 18 degrees.
Grades, 1.86% for a distance of 1½ miles.
Limits, Height 15' 0" Width ---
Weight (approximate) in working order, Total 167,000 pounds.
On F. truck 40,000 lbs., Drivers 127,000 lbs., B. truck ---- lbs.

Tractive power 28,056 lbs. Ratio of adhesion 4.52
Work'g St'm Pres. 190 lbs., Service Passenger.
Fuel Soft coal.

Boiler Steel. Thick 1 1/16" Bill 9457.
Front Tube Sheet ½" Thick
Boiler, Diam. 68" Plan Extended wagon top.
Allowable st'm pres. 190 lbs. Tested to 210 lbs. steam pres.
With Factor of Safety of 4.72 254 lbs. water pres.
Longitud. seams (See sup. 4)

Dome, diam. 33" Pos. Forward of fire box.

Firebox Steel. Combustion chamb. None.
Firebox, length 100⅜" Width 66" Depth F. 69⅝" B. 58⅞"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening Oval, 16" x 20"
Water space, Front 4" Sides 4" Back 4"
Water space frame Double Riveted
Water space stays ⅜" diam. with 3/16" holes 1½" deep from O.S.
Radial stays 1" diam. Sling stays front {Three rows B. L. W. / Expansion stays.
Button heads below crown on Ten central rows
Crown bars None. Placed ---- above crown
Crown bolts ---

Flues No. 9 B. W. G. Steel.
Tubes No. 11 B. W. G. Charcoal iron.
Tube ends Swaged for copper ferrules, fire box ends.
Number {30 / 171} Diam. {5⅜" / 2"} Length 13' 9"

Heating Surface Flues 577 sq. ft. Combus. Chamb. ---- Total 1987 sq. ft.
Tubes 1224 sq. ft. Fire Box 168 sq. ft. Fire Brick Tubes 18 sq. ft.
Grate area 46.7 sq. ft. Ratio to Heating Surface 1: 42.5
Superheater 489 sq. ft.

Fire Brick Arch, (See sup. 8)

Grates Rocking bars with drop plate, (See sup. 9)
Ash Pan, Dampers Front and back.

10 **Throttle** Balance. Pos. Dome.
Dry pipe Steel.

Superheater Schmidt type, (See sup. 11a)

Smokebox extenstion With. 12 Cleaning hole and cap Left side only.
Spark ejector or hopper With.
Netting and deflect. plates With.

13 Exhaust nozzles Single high.

Stack Cast iron, straight. Dia. 19"

6 **Safety Valves** Two Coale 3" Open.
Safety valves None, with relief lever, Set to 190 pounds.
6 **Whistle** One Chime.

Steam Gauge One Iron 7". Maker: Ashcroft.
Steam gauge stand Iron. **Clock** None.

Water Gauge One Klinger. **Cab Lamps** Electric.
Gauge Cocks Three Back. Surface valve None.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
14 **Blower Valve** B. L. W.

Blow off Cock One B. L. W. Pos: Front.
Cleaning Plugs
Firebox, Corners diagonal, and sides.
Crown, Three each side and two back.
Waist, Hand hole and plate under front.
Front tube sheet. One. Fusible plug One.

Pump None.

Injectors Two Sellers, Class "N". (Spec) No. 9½
Injectors, Pos. (See sup. 15) Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check B. L. W. Pos. Right and left.

Steam Heat With, (See sup. 16)

17 **Cab** Steel.
Cab boards to be covered with wood.
Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler.

18 **Back Bumper** Bar steel. Back drawbar height 33"

Pilot Wood.
Front Bumper Cast steel. Bumper plate With.
23 **Steps** Hand holds, etc., to conform to I.C.C. requirements.

Front Drawhead. Center above rail 33½"
19 **Coupler** M. C. B. Automatic.

21 Signal fixtures Iron on bumper.

20 **Headlight** One round base 18" Reflector.
Headlight, Nos. on sides With. Hdlt step With.
Lamp shelf None. Nosing ----

Bell 92 pounds. Goolmar air bell ringer.
Sand Box One Diam. 42" Body Iron painted. Pipes Iron.
Sander (Spec) Leach air, trap A-10, to sand front and back.

Dome casing Iron painted.

Boiler Jacket #18 Soft steel ptd. Bands Iron. Style 9 and 14.
Boiler Lagging Magnesia sectional.
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS
H. K. Harwick Oct 1921 154
SPECIFICATION FOR LOCOMOTIVES 10 36 D 634 and 635.
FOR Huntingdon & Broad Top Mountain R. R. and Coal Co.
HNW. 153

Frames Cast steel.

Cylinders, Diam. 21" Stroke 26"
23 Stm ports, Length 26.7" Width 1-1 1/16" Bridges ---
Exh. ports, Length --- Width --- Valve less ¼"
Valve travel 5½" Steam lap 1 5/16" Exhaust clearance ----
Eccentric crank throw 1½" (Spec) By-pass valve None.
S. P. Lubr. Detroit five-feed No. 42 Bull's Eye.
Cyl. heads Cast iron. Lubr. pipes of copper under jacket.
Cyl. casings Iron painted. Head covers Steel painted.
Stm chest casings ---- Covers ----
Stm chest valves 12" diam., Piston type.
Main pkg. (Spec) United States, King type.

22 Pistons Heads of cast iron, rings of cast iron sprung in.
Guides Steel. Oil cups Needle.
Crossheads Cast steel, with bearings of bronze.
24 Wrist Pins Steel. 24 Wrist pins for hard grease, forged on.

Valve Motion Walschaerts.
25 Link, sliding blocks, pins, lifting links and eccentric rods to be well case hardened or to have renewable bushings.

All threads on bolts (except stud bolts to be U. S. Standard.
All finished movable pins except wrist pins case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners Bronze, pressed into hubs of wheels.
Drivers, O. S. Diam. 66" Gen. diam. 59", Centers cast steel.

Tires Steel. Held by Shrinkage and shoulder.
Tires, Flanged, Pos. All. Size 3½" x 5½"
Tires, Plain, Pos. None. Size ---
Lateral play between driving boxes and wheel hubs (See sup. 26)

27 Driving Boxes Cast steel.
Journals, Diam. 9½" Length 11"

Springs. Make B. L. W.

Front Engine Truck Four Wheeled Swing bolster, center bearing.
28 To swing 3½" each side of cen. Cen. pin liners None.
29 Journals, Diam. 5½" Length 12" Boxes Cast iron.
Wheel hub liners Bronze.
Wheels, Diam. 30" Tread --- Kind Cast steel spoke center.
Tires Steel. Cen. diam. 25" Size 2½" x 5½"
Tires held by Shrinkage and shoulder.

Back Engine Truck None. Wheeled ---
To swing ----each side of cen. Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

31 Brake, position On all driving and tender wheels.
Operating {Engine, sch. No. 6 ET. Westg. combined auto. and / Parts {Eng. Trk. sch. --- straight air.
Foundation {Drivers, sch. WM-2, American outside equalized. / Parts {Eng. Trk. sch. ---
30 Air pump One 9½" Pos. Left side.
Train connections Front and back.
Train signal, sch. "L".

*Tender Eight Wheeled. Drawing No. 1683.
Weight, with fuel and water, about 133,000 pounds.
Tender to be weighed: Yes.
Tank 7,000 Gallons in it 5699.
Tank, Water bottom type, straight top. Fuel cap., 10 tons.

Tool Boxes of Wood, Top.

Frame Steel, 12" channels, with bumpers of wood and channel iron.
Front Drawbar Height 32⅛" {Spring buffer between / Engine and tender.
Pilot None.
Back drawbar, center above rail 33½"
Coupler M. C. B. Automatic, with 5" x 7" shank and Westinghouse type D-3 friction draft gear.
9 Couplers to be same as for 10 36 E 3725 and 3726.
Steps, hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type, with bolsters of cast steel.
Both trucks to have side bearings.
Springs Elliptic, Make: B. L. W.
Journals, Diam. 5½" Length 10"
Wheels, Diam. 33" Tread --- Kind Solid rolled steel.
Tires --- Cen. diam. --- Size ---
Tires held by --- Wheel rims, 2½" thick x 5½" wide.
Spring rigging Single.

Brake Position On all wheels.
Brake sch. No. 6 ET. Westg. combined auto. and straight air, with 12" x 12" tender brake cylinders.
*Tender, wherever possible, to be duplicate of 10 38 E 3725.

List of tools, see 158.
Photo sch. No. 2. Inspection B. L. W.
To be weighed Yes. Material B. L. W.
Certificate of boiler test (See sup. 3)
Junior tank by 8-24-21. Shipped On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

Front Engine Truck B. L. W.
Patents None.

Property plates None.

Painting, style 291, Mod., Black and color.
Painting, striping and marking as Ry. Co's painted sketch herewith.
Mark on tank sides: H. & B. T. M. R. R.

Road Nos. Pas. --- Road Nos. --- Name None.
Fr. No. Plate. 35
Cab sides. 36
Back of tank.

Actual Dimensions of Loco. Extreme height, about 14' 11"
Extreme Width: Cab boards 10' 1" Cylinders or valve motion 9' 10"
Length outside faces front bumper of engine to face of tender wedge 34' 7"
Length face of tender wedge to outside face back bumper of tender 27' 4½"
Total length outside face front bumper of engine to outside face back bumper of tender 61' 11½"

SPECIFICATION FOR LOCOMOTIVES:- 10 36 D 634 AND 635.

FOR:- HUNTINGDON & BROAD TOP MOUNTAIN R. R. & COAL CO.

1 DETAILS, WHENEVER POSSIBLE, TO BE SAME AS FOR 10 38 E 3725, IF CONSISTENT WITH THIS SPECIFICATION.

2 LOCOMOTIVE FOR I. C. C. SERVICE.

3 BOILER TEST CERTIFICATE:- THREE COPIES B. L. H. FORM 1036, AND TWO COPIES B. L. W FORM 491.

4 LONGITUDINAL SEAMS BUTT JOINTED, WITH DOUBLE COVERING STRIPS, SEXTUPLE RIVETED.

5 MAIN DOME, ONE-PIECE TYPE.

6 AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

7 (SPEC.) FLEXIBLE STAYBOLTS, TATE, ABOUT 500 IN BREAKING ZONE.

8 FIRE BRICK ARCH, AMERICAN SECURITY ARCH, ON THREE TUBES, 3" OUTSIDE DIAMETER, NO. 7 B. W. G THICK, SPACED 18" CENTER TO CENTER.

9 GRATES TO HAVE DROP PLATES AT FRONT AND BACK OF FIRE BOX, OPERATED INDEPENDENTLY.

10 THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.

11 SUPERHEATER IN ACCORDANCE WITH THE SUPERHEATER CO'S SPEC. NO. G-16584, DATED 7-22-21. (COPY ATTACHED). SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS. ROYALTY PAYABLE BY THE B. L. H.

12 PATENT PLATES (HEREWITH) FROM THE SUPERHEATER CO. COVERING SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO SUPERHEATER DAMPER CYLINDER.

13 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

14 STEAM BLOWER CONNECTION ON EXHAUST NOZZLE, P.R.R. STYLE.

15 INJECTORS TO BE LOCATED RIGHT AND LEFT ON BACK HEAD.

16 STEAM HEAT TO HAVE MASON REGULATING VALVE, 1" INLET, 1" OUTLET AND S-4 COUPLERS FOR TRAIN CONNECTIONS FRONT OF ENGINE AND REAR OF TENDER.

17 BRIDGE PIPE IN CAB WITH CUT-OFF VALVES.

18 SPRING BUFFER BETWEEN ENGINE AND TENDER.

19 COUPLERS TO BE SAME AS FOR 10 38 E 3725 AND 3726.

20 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2 WITH INCANDESCENT HEADLIGHT. HEADLIGHT GENERATOR TO HAVE FUSE.

21 ELECTRIC CLASSIFICATION LAMPS FOR FRONT OF ENGINE AND REAR OF TENDERM WITH CONTROL SWITCH IN CAB.

22 CYLINDERS TO BE FITTED WITH PORT COCKS, CONNECTED TO CYLINDER COCK RIGGING.

23 PISTON RODS TO BE KEYED TO CROSSHEADS.

24 PARALLEL RODS TO HAVE SOLID ENDS.

25 REVERSE LEVER TO HAVE DOUBLE LATCH.

26 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

27 DRIVING BOX JOURNALS TO HAVE HARD GREASE LUBRICATION.

28 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

29 TRUCK BOXES WITH OIL LUBRICATION.

30 AIR PUMP EXHAUST TO BE PIPED TO EXHAUST CAVITY OF CYLINDER, P. R. R. STYLE.

31 AIR PUMP TO HAVE DETROIT AIR CYLINDER LUBRICATOR.

32 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

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SPECIFICATION FOR LOCOMOTIVES 10 36 D 634, 635

FOR: HUNTINGDON & BROAD TOP MOUNTAIN R. R. & COAL CO.

Specification for Type A Double Loop Superheater SPECN. NO. G-16584 DATED JULY 22, 1921

BOILER TUBES	171 in number 2 o.d. 13 ft. 9 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A 28-18.	
BOILER FLUES	30 in number 5½ o.d. #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18.	Card 11625-E
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrules, rolled, beaded and prossered except for copper sheets. Front end rolled and headed. Rollers to have at least 5 rolls. Prosser to have at least 12 sections	Card 1136
TUBE SHEET LAYOUT		Card 3-50349
UNITS	30 units 12 o.d #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 1064-L
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 500 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls	AHM 4x8-2 Card 11275-C
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	Card 1L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card 1067
PYROMETER	Model No. Pyrometer	Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 1L-10838
TEST FINAL	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card	2-11518-Q	S. H. UNIT BOLT WASHER	Card	1071
DAMPER CYL. ARM	Card	1074	S. H. UNIT CLAMP	Card	1073
DAMPER CYL. PIPE FITTING	Card	11115	S. H. UNIT CLAMP WASHER	Card	10305
DAMPER CYL. PIPE UNION	Card	11114	S. H. PIPE END	Card	1344
DAMPER CYL. PIPE CONNECTION	Card	1L-11437	S. H. PIPE BAND	Card	1988
DAMPER CYL. PIPING DIAGRAM	Card	2-11442	SPACING OF BANDS & SUPPORTS	Card	10759
DAMPER CYL. SUPPORT	Card		TYPE OF RETURN BENDS		FORGED
DAMPER SHAFT	Card	1068-H	RETURN BENDS	Card	11022
DAMPER SHAFT ARM	Card	1065	LUBRICATOR CONNECTION	Card	3023
DAMPER SHAFT BEARING (O. S.)	Card	1148-B	DEFLECTING PLATE HANDLE	Card	1487
DAMPER SHAFT BEARING (I.S.)	Card	10386-P	DEFLECTING PLATE STUDS	Card	10809
DAMPER SHAFT LINK	Card	1070	DEFLECTING PLATE CLAMP	Card	10809-A
PATENT PLATE	Card	3-3367			
DAMPER RIGGING	CARD	2-11496-A			

7

THE BALDWIN LOCOMOTIVE WORKS AS SPECN. C-6889. (SEE SUP. 1 ETC.)
Memorandum Spec'n 20147.
SPECIFICATION FOR LOCOMOTIVES 10 38 E 3725 AND 3726.
E.P. **FOR** HUNTINGDON & BROAD TOP MOUNTAIN RAILROAD & COAL CO.
MNR.
Gen. as PHOTO. 7479.
Engine Drawing No. 113.
12-15-20.

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 14' 8" Driving 14' 8" Total 23' 8"
Total wheelbase, eng. and tend. {Actual 55' 0¼" / Limited to ---

Curves ---

Limits, Height 15' 0" Width ---
Weight (approximate) in working order, Total 196,000 POUNDS.
On F. tr'k 22,500 lbs., Drivers 173,500 lbs., B. tr'k -------- lbs.

Tractive power 42,900 lbs., Ratio of adhesion 4.05
Work'g St'm Pres. 190 lbs., Service FREIGHT.
Fuel SOFT COAL.

Boiler STEEL. Thick ¾" Bill 9337.
Front Tube Sheet ½" Thick
Boiler, Diam. 74" Plan STRAIGHT TOP.
{Allowable st'm pres. 190 lbs. / With Factor of Safety of 5.05} **Tested to** {210 lbs. steam pres. / 294 lbs. water pres.}
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS, SEXTUPLE RIVETED.
Dome, diam. 33" Pos. FORWARD OF FIRE BOX.

Firebox STEEL. Combustion chamb. NONE.
Firebox, length 102-3/16" Width 66" Depth F. 69¼" B. 64¼"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening OVAL, 16" x 20.
Water space, Front 4" Sides 4" Back 4"
Water space frame DOUBLE Riveted
Water space stays ⅜" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S.
Radial stays 1" DIAM. Sling stays front {THREE ROWS B. L. W. / EXPANSION STAYS.}
Button heads below crown on TEN central rows
Crown bars NONE. Placed --- above crown
Crown bolts ---

Flues No. 9 B. W. G. STEEL.
Tubes No. 12 B.W.G. CHARCOAL IRON OR STEEL. (B.L.W.OPTION).
Tube ends SHAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number {34 / 204} Diam. {2⅝" / 2"} Length 13' 3"
TUBES AND FLUES TO BE WELDED TO FIRE BOX TUBE SHEET.
Heating Surface Flues 630⁰ Combus. Chamb. ---- Total 2237⁰
Tubes 1407⁰ Fire Box 172⁰ Fire Brick Tubes 28⁰
Grate area 46.7⁰ Ratio to Heating Surface 1: 47.8
Superheater 503⁰

Fire Brick ARCH, (SEE SUP. 6)

Grates ROCKING BARS WITH DROP PLATES, (SEE SUP. 7, 35)
Ash Pan, Dampers FRONT AND BACK.

Throttle BALANCE. Pos. DOME.
Dry pipe STEEL.

Superheater SCHMIDT TYPE, (SEE SUP. 10)

Smokebox extenstion WITH. Cleaning hole and cap L. S. ONLY.
Spark ejector or hopper WITH.
Netting and deflect. plates WITH.

Exhaust nozzles SINGLE, HIGH.

Stack CAST IRON, STRAIGHT. Dia. 18"

Safety Valves (NOT SPEC) TWO SCALE 3" OPEN.
Safety valves NONE with relief lever, Set to 190 POUNDS.
Whistle ONE CHIME.

Steam Gauge ONE IRON 7" MAKER: ASHCROFT.
Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE B.L.W. IRONCLAD. **Cab Lamps** ELECTRIC.
Gauge Cocks THREE (SUP. 13) Surface valve NONE.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B. L. W. (SEE SUP. 12)

Blow off Cock ONE B. L. W. POS: FRONT.
Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.
Firebox, CORNERS DIAGONAL, SIDES AND BACK.
Crown, THREE EACH SIDE AND FOUR BACK.
Waist, HAND HOLE AND PLATE UNDER FRONT.
Front tube sheet, ONE. Fusible plug ONE.

Pump NONE.

Injectors TWO SELLERS, CLASS "P". (SPEC) No. 10½
Injectors, Pos. (SEE SUP. 15) Steam pipes COPPER.
Pipes, Check IRON. Feed IRON. Overflow IRON.
Check B. L. W. Pos. RIGHT AND LEFT.

Steam Heat NONE.

Cab STEEL.
CAB BOARDS COVERED WITH WOOD PLANKING, 1¼" THICK.
Cab boards STEEL. Nosing T-IRON.
Running boards STEEL. Nosing T-IRON.
Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 33"

Pilot WOOD.
Front Bumper CAST STEEL. Bumper plate WITH.
Steps HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"
Coupler M. C. B. AUTOMATIC.

Signal fixtures IRON ON BUMPER.

Headlight ONE ROUND CASE 18" Reflector,
Headlight, Nos. on sides WITH. H'd'l't step WITH.
Lamp shelf NONE. Nosing ---

Bell 92 POUNDS.
Sand Box TWO Diam. 28" Body IRON PAINTED. Pipes IRON.
Sander (NOT SPEC) LEACH AIR, TRAP A-1, EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED, WITH PRESSED STEEL TOP AND BOTTOM RINGS.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON. Style 9 AND 14.
Boiler Lagging MAGNESIA SECTIONAL.
BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS
P.W. STOUDT
SPECIFICATION FOR LOCOMOTIVES 10 38 E 3725 & 3726. MARCH 1921
FOR HUNTINGDON & BROAD TOP MOUNTAIN RAILROAD & COAL CO.
157/158
FURNISH PRINTS, (SEE SUP. 3)

Frames CAST STEEL.

Cylinders, Diam. 22" Stroke 28"
St'm ports, Length 26.32" Width 1-11/16" Bridges ----
Exh. ports, Length ---- Width ---- Valve lead 3/16"
Valve travel 5¾" Steam lap 15/16" Exhaust clearance ----
Eccentric crank throw 15-11/16" By-pass valve NONE.
S. F. Lubr. (NOT SPEC) DETROIT FIVE-FEED No. 42 BULL'S EYE.
Cyl'r heads CAST IRON. LUBR. PIPES OF COPPER UNDER JACKET.
Cyl'r casings IRON PAINTED. Head covers STEEL PAINTED.
St'm chest casings ---- Covers ----
St'm chest valves 12" DIAM., PISTON TYPE.
Met. pkg. (NOT SPEC) PISTON ROD / VALVE STEM UNITED STATES, KING TYPE.
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.
Guides STEEL.. Oil cups NEEDLE.
Crossheads CAST STEEL, WITH BEARINGS OF BRONZE.
Wrist Pins STEEL. Rod cups PLUNGER, FORGED ON.
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS.
Links, sliding blocks, pins, lifting links and eccentric rod laws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboltsⁱ to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners (SEE SUP. 26)
Drivers, O. S. Diam. 51" Cen. diam. 44" CENTERS CAST STEEL.

Tires STEEL. Held by SHRINKAGE AND SHOULDER.
Tires, Flanged, Pos. FRONT AND BACK. Size 3½" x 5½"
Tires, Plain, Pos. INTERMEDIATE AND MAIN. Size 3½" x 6½"
Lateral play between driving boxes and wheel hubs 3/16" TOTAL.
Driving Boxes CAST STEEL. (SEE SUP. 27)
Journals, Diam. {MAIN, 10" Length 13" / OTHERS, 9"}

Springs. Make B. L. W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING.
To swing 4½" each side of cen., Cen. pin liners NONE.
Journals, Diam. 5½" Length 12" Boxes CAST IRON.
Wheel hub liners NONE.
Wheels, Diam. 30" Tread --- Kind CAST IRON SPOKE CENTER.
Tires STEEL. Cen. diam. 25" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating Parts: Engine, sch. No. 6 ET. WESTG. COMBINED AUTO. AND STRAIGHT AIR. Eng. Tr'k, sch. ---
Foundation Parts: Drivers, sch. WN-2 AMERICAN OUTSIDE EQUALIZED. Eng. Tr'k, sch. ----
Air pump TWO 9½" Pos. BOTH LEFT SIDE.
Train connections FRONT AND BACK.
Train signal, sch. NONE.
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled. Drawing No. 1655.
Weight, with fuel and water, about 124,000 POUNDS.
TENDER TO BE WEIGHED: YES.
Tank 6,000 Gallons. Bill 5605
TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 10 TONS.

Tool Boxes HARD WOOD, TOP.

Frame STEEL, 12" CHANNELS, WITH BUMPERS OF WOOD AND CHANNEL.

Front Drawbar height 32⅛"
Pilot NONE.
Back drawhead, center above rail 33½"
Coupler M. C. B. AUTOMATIC WITH 5" x 7" SHANK, AND WITH WESTINGHOUSE FRICTION DRAFT GEAR, TYPE D-3.

Steps, HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B. L. W. MAKE
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread --- Kind CAST IRON PLATE CENTER.
Tires STEEL. Cen. diam. 28" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.
Safety chains SINGLE.

Brake Position ON ALL WHEELS.
Brake sch. No. 6 ET. WESTINGHOUSE AUTO. AND STRAIGHT AIR, WITH 12" x 12" TENDER BRAKE CYLINDER.

List of tools, sch. 29
Photo sch. No. 2. Inspection B. L. W.
To be weighed YES. Material specns B. L. W.
Certificate of boiler test THREE COPIES B. L. W. FORM 1036.
Junior laws to 2-1-21. Shipment ON OWN WHEELS.

Brass shop finish, No 1.
Machine shop finish D-165.

Painting, style 161, BLACK AND COLOR.
PAINTING AND MARKING SAME AS FOR 10 38 E 3474, ETC.

Mark on TANK SIDES: H. & B. T. M. R. R.

	Road Nos. Pos.	Road Nos.	Name NONE.
F. No. PLATE.		33	
CAB SIDES.		34	
BACK OF TANK.			

Actual Dimensions of Loco. Extreme height over all 14' 11"
Extreme Width: Cab boards 10' 1"; Cylinders or valve motion 9' 11½"
Length outside face front bumper of engine to face of tender wedge 35' 10⅝"
Length face of tender wedge to outside face back bumper of tender 25' 1½"
Total length outside face front bumper of engine to outside face back bumper of tender 61' 3½"

SPECIFICATION FOR LOCOMOTIVES:- 10 38 E 3725 & 3726.

FOR: HUNTINGDON & BROAD TOP MOUNTAIN RAILROAD AND COAL CO.

HND.

1 LOCOMOTIVE FOR I. C. C. SERVICE.

2 PARTS TO BE INTERCHANGEABLE WITH 10 38 E 3474 AND 3475.

3 FURNISH TO RY. CO. ONE COMPLETE SET OF BLUE PRINTS.

4 MAIN DOME, ONE-PIECE TYPE.

5 AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

6 FIRE BRICK ARCH TO BE AMERICAN SECURITY ARCH ON THREE TUBES, SPACED 18" CENTER TO CENTER, AS SHOWN ON MARKED PRINT A. A. CO. DESIGN 11756.

7 GRATE DROP PLATES TO BE LOCATED FRONT AND BACK OF FIRE BOX, AND TO OPERATE INDEPENDENTLY OF EACH OTHER.

8 ASH PAN TO BE HOPPER TYPE.

9 THROTTLE TO BE PROVIDED WITH AUXILIARY DRIFTING VALVE.

10 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPEC. NO. O-15565, DATED JAN. 7TH, 1921, (COPY ATTACHED). SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX, AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS. ROYALTY, IF ANY, PAYABLE B. THE B. L. W.

11 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

12 STEAM BLOWER CONNECTION ON EXHAUST NOZZLE TO BE P.R.R. STYLE.

13 GAUGE COCKS TO BE LOCATED IN BACK CORNER RIGHT SIDE.

14 WASHOUT PLUGS LOCATED AS SHOWN ON B. L. W. PRINT 44305, ARE APPROVED, WITH THE ADDITION OF TWO WASHOUT PLUGS LOCATED ABOVE THE INJECTOR CHECKS, ONE ON THE RIGHT SIDE ABOUT 18" BACK OF FACE OF FRONT TUBE SHEET, AND ABOUT 14" VERTICALLY FROM TOP OF BOILER TO CENTER OF HOLE; THE OTHER ON THE LEFT SIDE, ABOUT 37" BACK OF FACE TO FRONT TUBE SHEET AND ABOUT 14" VERTICALLY FROM TOP OF BOILER TO CENTER OF HOLE.
IF THE SUGGESTED LOCATIONS OF THESE TWO PLUGS INTERFERE IN ANY WAY WITH ANYTHING NOT SHOWN, THE LOCATIONS MAY BE VARIED SLIGHTLY.

15 INJECTORS TO BE LOCATED RIGHT AND LEFT ON BACK HEAD OF BOILER.

16 ~~BRIDGE PIPE IN CAB WITH CUT-OFF VALVE.~~ OMIT (RSMC 3.7.21)

17 BUMPERS BETWEEN ENGINE AND TENDER TO BE ARRANGED TO TAKE UP SLACK BETWEEN DRAWBAR PINS.

18 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2 WITH INCANDESCNET HEADLIGHT.

19 CYLINDERS TO BE FITTED WITH PORT COCKS CONNECTED TO CYLINDER COCK RIGGING.

20 REVERSE LEVER TO HAVE DOUBLE LATCH.

26 DRIVING WHEELS TO HAVE BRONZE WEARING PLATES PRESSED INTO HUBS.

27 DRIVING BOX JOURNALS TO HAVE HARD GREASE LUBRICATION.

28 ENGINE TRUCK BOX OIL CELLARS WITH HAND HOLE FOR SPONGING WITHOUT TAKING CELLARS DOWN.

29 LATERAL PLAY BETWEEN ENGINE TRUCK BOXES AND WHEEL HUBS, 1/4" TOTAL.

30 AIR PUMPS TO BE 27" CENTER TO CENTER, WITH STEAM PIPE BRANCHING FROM A TEE TO EACH PUMP, WITH A 1" STOP COCK IN EACH LINE CLOSE TO PUMP. THE DISCHARGE FROM PUMPS TO CONNECT TO A 1 1/4" x 1 1/4" x 2" TEE, THEN TO A 2" PIPE TO BACK OF MAIN RESERVOIR ON LEFT SIDE.

31 AIR PUMPS TO HAVE DETROIT AIR CYLINDER LUBRICATOR.

32 AIR PUMP EXHAUST TO BE PIPED TO EXHAUST CAVITY OF CYLINDER, P. R. R. STYLE.

33 THE AIR FOR THE STRAIGHT AIR BRAKE TO BE TAKEN INDEPENDENTLY FROM THE MAIN RESERVOIR. THE STRAIGHT AIR BRAKE VALVE TO BE PLACED CLOSE TO THE AUTOMATIC.

34 DRIVER BRAKE CYLINDERS TO BE PLACED TO PUSH DOWN.

35 FOR HEREAFTER: MORE CLEARANCE TO BE PROVIDED FOR GRATES TO ROCK. (SEE SKETCH ATTACHED TO D. R. SPECN.) (K.R., 4-15-21)

160

159

SPECIFICATION FOR LOCOMOTIVES: 10 38 E 3725 AND 3726

FOR: HUNTINGDON & BROAD TOP MOUNTAIN R. R. AND COAL CO.

Specification for Type A Double Loop Superheater SPECN. O-15565, JANUARY 7, 1921.

BOILER TUBES	34 in number 2" o. d. 13 ft. 3 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	34 in number 5 1/2 o. d. #9 BWG of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card	1197-F
BOILER FLUE SETTING	1/8 in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card	1136
TUBE SHEET LAYOUT	Card	3-50763
UNITS	34 units 12 o. d. #9 BWG Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card	10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card	1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A. Card	1054-M
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card	AHM 489-2 10714-C
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card	1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units Card	See Arrgt.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	4L 11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card	1067
PYROMETER	Model No. Pyrometer. Card	None
PYROMETER ARRANGEMENT	Generally in accordance with Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration. Card	
S. H. ARRANGEMENT	In accordance with Card	4L-10764-A
TEST FINAL	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 2L-11463-L	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1024 1065-A	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 2L 11442	S. H. PIPE BAND	Card 1988
DAMPER CYL. SUPPORT PIPE CONN.	Card 1L 11437	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1068-E-F	TYPE OF RETURN BENDS	Forged
DAMPER SHAFT ARM	Card 1065 1074-B	RETURN BENDS	Card 1022
DAMPER SHAFT BEARING (O. S.)	Card 1149 2L-11484-G	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I. S.)	Card 10386-E	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A
DAMPER RIGGING	Card 11384-G 11405-L	DAMPER CYLR. SUPPORT	Card 1598-A

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6561.

Memorandum Spec'n 20116

SPECIFICATION FOR LOCOMOTIVES 10 32 E 174 and 175.

FOR Jonesboro, Lake City & Eastern Railroad Co.

Gen. as Photo. 6102, {except to have piston valves.

Engine Drawing No. 28

6-11-20.

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 14' 0" Driving 14' 0" Total 21' 8"

Total wheelbase, eng. and tend. {Actual 51' 7½" / Limited to ----

Curves ----

Limits, Height (See sup. 21) Width ----

Weight (approximate) in working order, Total 134,000 pounds.

On F. tr'k 13,500 lbs., Drivers 120,500 lbs., B. tr'k ---- lbs.

Tractive power 28,400 lbs. Ratio of adhesion 4.25

Work'g St'm Pres. 185 lbs. Service Freight.

Fuel Soft coal.

Boiler Steel. Thick ⅞" Bill 9221

Front Tube Sheet ½" Thick

Boiler, Diam. 54" Plan Extended wagon top.

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 5.13 300 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips.

Main dome, one-piece type. Auxiliary dome, none.

Dome, diam. 29" Pos. Forward of fire box.

Firebox Steel. Combustion chamb. None.

Firebox, length 96⅛" Width 41¼" Depth F. 63⅛" B. 61⅛".

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" diam.

Water space, Front 4" Sides 3½" Back 3½"

Water space frame Single Riveted

Water space stays ⅝" diam. with 3/16" holes 1¼" deep from O.S. {Two rows B. L. W.

Radial stays 1" diam. Sling stays front {Expansion stays.

Button heads below crown on Eight central rows

Crown bars None. Placed ---- above crown

Crown bolts ----

Flues No. 9 B.W.G. Seamless steel.

Tubes No. 12 B.W.G. Steel.

Tube ends Swaged for copper ferrules, fire box ends.

Number 114 / 18 Diam. 2" / 5⅛" Length 13' 10"

Heating Surface Flues 3486 Tubes 8210 Combus. Chamb. --- Fire Box 1328 Total 1301⅛ Fire Brick Tubes ----

Grate area 27.5⅛ Superheater 292⅛ Ratio to Heating Surface 1: 47.4

Fire Brick Arch, none.

Grates Rocking bars and drop plate.

Ash Pan, Dampers None

Throttle to have auxiliary drifting valve.

Throttle Balance. Pos. Dome.

Dry pipe Steel.

Superheater Schmidt type.

Smokebox extension With. Cleaning hole and cap L. S. only.

Spark (not sync.) hopper With.

Netting and deflect. plates With.

Exhaust nozzle Single high.

Stack Straight Dia. 16"

Safety Valves Two Consolidated 2½" Open.

Safety valves None with relief lever, Set to 185 pounds.

Whistle One B. L. W. Plain.

Steam Gauge One 7" Brass. Maker: Ashcroft.

Steam gauge stand Cast iron **Clock** None.

Water Gauge One B.L.W. Ironclad. **Cab Lamps** Electric.

Gauge Cocks Three, (Sup. 30) Surface valve None.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One Talmadge, Pos: Front.

Cleaning Plugs One plug above fire door.

Firebox, Corners diagonal and back.

Crown, Three each side and two back.

Waist, (not sync.) One under front.

Front tube sheet, Two Fusible plug One.

Pump None.

Injectors Two Sellers, Class M. (See sup. 31) (Spec.)

Injectors, Pos. (See sup. 31) Steam pipes Copper.

Pipes, Check Iron. Feed Iron. Overflow Iron.

Check (See sup. 32) Pos. (See sup. 32)

Steam Heat None.

Cab Steel.

Cab boards Wood. Nosing None.

Running boards Wood. Nosing None.

Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 30¼"

Pilot Wood.

Front Bumper Cast steel. Bumper plate With.

Steps Hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Automatic.

Signal fixtures Iron on bumper.

Headlight Two round case 18" Reflector,

Headlight, Nos. on sides With. H'dl't step With.

Lamp shell None Nosing ----

Bell 92 pounds.

Sand Box, One Diam. 28" Body Iron painted. Pipes Iron.

Sander (not sync.) Leach air, trap A-10, to sand front of front and back of main drivers.

Dome casing Iron painted.

Boiler Jacket No. 22 Soft Steel Planis Iron. Style 9.

Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

W. Farmer Nov 1920

SPECIFICATION FOR LOCOMOTIVES 10 32 E 174 and 175.

FOR Jonesboro, Lake City & Eastern Railroad Co.

Frames Cast steel.

Cylinders, Diam. 19" Stroke 24"

St'm ports, Length 20.84" Width 1¼" Bridges ----

Exh. ports, Length ---- Width ---- Valve bars 3⅛"

Valve travel 5½" Steam lap ⅜" Exhaust clearance ----

Eccentric crank throw 1⅛" By-pass valve None.

(not sync.) S. F. Lubr. Nathan No. 9 Triple Bull's Eye.

Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

St'm chest castings ---- Covers ----

St'm chest valves 9½" diam. piston valve.

(Spec.) Mst. pkg. United States, King type.

Pistons Heads of cast iron, rings of cast iron sprung in.

Guides Steel. Oil cups Needle.

Crossheads Cast steel, with bearings of cast iron, tinned.

Wrist Pins Steel. Rod cups (See sup. 41)

Valve Motion Walschaerts.

Links, sliding blocks, pins, lifting links and eccentric rod laws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Cast iron, and to be interchangeable.

Drivers, O.S. Diam. 48" Cen. diam. 42", centers cast iron.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. Front and back. Size 3" x 5½"

Tires, Plain, Pos. Intermediate. Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = 3/16" total.

Driving Boxes Cast steel, with Franklin lubricators.

Journals, Diam. {Main, 7½" Length 8½" / Others, 7"

Springs. Make B. L. W.

Front Engine Truck Two Wheels Swing bolster, center bearing.

To swing 2⅜" each side of cen., Cen. pin liners None.

Journals, Diam. 5" Length 8" Boxes Cast iron.

Wheel hub liners ----

Wheels, Diam. 30" Tread --- Kind Cast iron spoke center.

Tires Steel. Cen. diam. 25" Size 2½" x 5½"

Tires held by Shrinkage and shoulder.

Back Engine Truck None. Wheels ----

To swing ---- each side of cen., Cen. pin liners ----

Journals, Diam. ---- Length ---- Boxes ----

Wheel hub liners ----

Wheels, Diam. ---- Tread ---- Kind ----

Tires ---- Cen. diam. ---- Size ----

Tires held by ----

Brake, position On all driving and tender wheels.

Operating { Engine, sch. No. 6 ET. Westg. combined auto. and straight air.

Parts { Eng. Tr'k, sch. ----

Foundation { Drivers, sch. WN-1, American outside equalized.

Parts { Eng. Tr'k, sch. ----

Air pump One 8½" Cos. Left side.

Train connections Front and back.

Train signal, sch. None.

Tender Eight Without, Drawing No. 1611 {Tender tc be retained: Yes.

Weight, with fuel and water 54,500 pounds.

Tank 4500 Gallons, Sp. 5127

Tank "U" shape, straight top. Fuel capacity, 7 tons.

Lindstrom improved syphon to be applied.

Fuel Boards Hard wood, top.

Frame Steel, 8" and 10" channels, with bumpers of cast steel at front and back. {Draft iron with spring buffer to be applied between engine and tender.

Front Deadblock Height 29½"

Pilot None. Pilot wheels ----

Back deadblock Height 33½"

Coupler M. C. B. Auto.

Steps Hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, B. L. W. make

Journals, Diam. 4½" Length 8"

Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.

Tires None. Cen. diam. ---- Size ----

Tires held by ----

Safety chains Single.

Brake Position On all wheels.

Brake sch. No. 6 ET. Westg. auto. and straight air, with 10" x 12" tender brake cylinders.

List of tools sch. 29.

Photo sch. No. 2. Inspection B. L. W., except for boiler. (Sup 14)

To be weighed Yes. Material spec'n B. L. W., except for boiler. (Sup 25)

Certificate of boiler test Three copies B.L.W. form 1036.

Journal lines to 9-27-20. Stripping On dirt wheels.

Brass shop finish, No. 1.

Machine shop lines D-165.

Patents { B. L. W. / None.

Property rights B. L. W., for engine and tender.

Painting, Kind 291. Olive green and aluminum.

Mark on cab sides: J. L. C. & E.

Mark on back of tank, 4500 gallons

Marking to be same as for B 30 D 563.

Road Nos. Pos. Road Nos. Name None.

F. No. plate. 40

Sand box. 41

Sides of tank.

Back of tank.

Actual Dimensions of Loco. Extreme height over all 13' 4½"

Extreme Width: Cab boards 9' 9" Cylinders ---- 8' 8"

Length outside face front bumper of engine to face of tender wedge 33' 1½"

Length face of tender wedge to outside face back bumper of tender 24' 3½"

Total length outside face front bumper of engine to outside face back bumper of tender 57' 5"

SPECIFICATION FOR LOCOMOTIVES 10 32 E 174 AND 175

FOR JONESBORO, LAKE CITY & EASTERN RAILROAD CO.
RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF ARKANSAS MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYBOLT DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOMES:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH REACHING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

13 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S

ARKANSAS
(State in which boiler is to be used)
3 AND 4
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (State's number)
(LEAVE BLANK) (Year put in service)
(Manufacturer's serial number)
200 POUNDS
(Maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVES 10 32 E 174-175

FOR:- JONESBORO, LAKE CITY AND EASTERN R.R.Co.

Specification for Type A Double Loop Superheater. SPECN. No. O-14741 DATED SEPT. 17, 1920.

BOILER TUBES	114 in number 2 o.d. 13 ft 10 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	18 in number 5½ o.d. #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 ..... Card 1713-N
BOILER FLUE SETTING	¼ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections ..... Card 1136
TUBE SHEET LAYOUT	..... Card 3L-50684
UNITS	18 units 1½ o.d. #9 B.W.G. Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 800 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide ..... Card 10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on ..... Card 1043
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A ..... Card 10695
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls ..... Card 1850-D
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place ..... Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with ..... Card SEE ARRGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 3L-11436.
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer ..... Card 1067
S. H. ARRANGEMENT	To be in accordance with ..... Card 4L-40698
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 2L-11451-H	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM.	Card 1065-A	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 2L-11442.	S. H. PIPE BAND	Card 1588
DAMPER CYL. SUPPORT	Card 11073-A.	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1062-H.	TYPE OF RETURN BENDS	FORGED.
DAMPER SHAFT ARM	Card 1074-C.	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (G.S.)	Card 2L-11434-C	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 1275-A.	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINE	Card 11177-K.	DEFLECTING PLATE STUDS	Card 10909
PATENT PLATE	Card 3272.	DEFLECTING PLATE CLAMP	Card 10809-A
PYROMETER	NONE	DAMPER RIGGING	CARD 3L-11495.
		DAMPER CYL. PIPE CONN.	CARD 1L-11437.

SPECIFICATION FOR LOCOMOTIVES:- 10 32 E 174 AND 175.

FOR:- JONESBORO, LAKE CITY & EASTERN RAILROAD CO.

HNW.

167

21 LOCOMOTIVE TO BE BUILT LOW, CONSISTENT WORK DESIGN.

22 LOCOMOTIVE TO OPERATE IN STATE OF ARKANSAS.

23 LOCOMOTIVE TO OPERATE UNDER THE REQUIREMENTS OF THE I.C.C. LAW. THIS PERMITS US TO SHIP LOCOMOTIVES WITH SAFETY VALVES WITHOUT RELIEF LEVERS.

24 BOILER TO CONFORM TO A. S. M. E. CODE, OF 1918 (SEE SUP. 1 &c)

25 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

26 RAILROAD CO. HAD TROUBLE FROM ASH PANS WARPING ON LOCO. 8 30 D 683. TAKE MEASURES TO PREVENT THIS ON THIS LOCOMOTIVE.

27 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPEC. NO. O-14741, DATED 9-17-20, (COPY ATTACHED). SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS. ROYALTY PAYABLE BY THE B. L. W.

28 PATENT PLATES (HEREWITH) COVERING SUPERHEATER, TO BE APPLIED TO SUPERHEATER DAMPER CYLINDER.

29 HAND HOLE AND CAP IN SMOKE BOX FOR INSPECTION OF SUPERHEATER RIGHT AND LEFT.

30 GAUGE COCK TO BE BALTIMORE COCKS LOCATED IN BACK HEAD.

31 INJECTORS:- ONE NO. 9½ ON RIGHT SIDE AND ONE NO. 8½ ON LEFT SIDE.

32 INJECTOR CHECK TO BE SELLERS DUPLEX, WITH STOP VALVES LOCATED TO CONFORM TO STATE LAWS. POSITION: RIGHT AND LEFT.

33 CAST STEEL DECK PLATE AT BACK OF ENGINE.

34 CHAFING IRON WITH SPRING BUFFER TO BE APPLIED BETWEEN ENGINE AND TENDER.

35 CENTER CASTING AND PILOT BEAM TO BE MADE SEPARATE.

36 SAFETY APPLIANCES ETC., TO MEET THE I. C. C. REQUIREMENTS.

37 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHT.

38 PISTON ROD TO BE KEYED TO CROSSHEADS.

39 MAIN ROD BACK END TO BE MARKEL TYPE.

40 PARALLEL RODS TO HAVE SOLID ENDS.

41 GREASE CUPS FOR ALL RODS, NOT FORGED.

42 FRONT AND BACK DRIVING PIN COLLAR BOLTS TO HAVE NUTS ON OUTSIDE.

43 SPRING RIGGING TO BE OVERHUNG.

44 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

THE BALDWIN LOCOMOTIVE WORKS {DUP. 10 24 ½ D 123 AS SPEC'N. C-6463 WITH SAME EXTRAS, EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20071

SPECIFICATION FOR LOCOMOTIVES 10 24 ½ D 137

FOR KENTUCKY LUMBER COMPANY

HW

PHOTO. 7116

Engine Drawing No. 34

3.20.20

Gauge of Road 4'8½" Play 2" **Wheelbase,** Rigid 9'10" Driving 9'2" Total 23'9"

Total wheelbase, engine and tend[er] Actual 54' 4½" Limited ---

Curves 24 DEGREES GRADE 6%

Limits, Height --- Width ---

Weight (approx.) In working order 34,000 POUNDS

On F. Brk. 10,500 On Drivers 34,000 Tons B[ase] 11,500

Tractive power 11,950 Factor of adh[esion] 4.75

Work'g St'm Pres. 180 lbs. per sq. in. **Fuel** LOGGING SOFT COAL

Boiler STEEL Thick 11/16" Built 3523

Front Tube Sheet ½" Thick

Boiler, Diam. 50" Plan STRAIGHT TOP

Allowable st'm press. 180 lbs. **Tested to** 200 lbs. per sq. in.

With Factor of Safety of 5.1

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS

DOME-ONE PIECE TYPE

Dome, diam. 35" Pos. CENTRAL

Firebox STEEL Combustion chamber NONE

Firebox, length 59 3/4" Width 33" Depth 72" B 5/16"

Firebox, Tube 2" Crown 5/16" Sides 5/16" Back 5/16"

Firedoor opening 16" DIAM.

Water space, Front 4" Sides 3" Back 3"

Water space frame SINGLE Rivets

Water space stays ½" DIAM. WITH 3" PITCHES 1st ROW 1½" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays from TWO ROWS B.L.W. EXPANSION STAYS

Button heads below crown sheet SIX CENTRAL ROWS

Crown bars NONE Pitch --- Sling stays

Crown bolts ---

Flues ---

Tubes #12 W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 147 Diam 2" Length 11'10½"

Heating	Flues ---	Comb. Chamb. ---	Total	991
Surface	Tubes 908	Fire Box 83	Fire Brick Tubes ---	
Grate area	13.7	Ratio to Heating Surface	72.4	
Superheater	---			

Fire Brick ARCH NONE

Grates ROCKING BARS AND DROP PLATE

Ash Pan, Dampers FRONT AND BACK

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and can L.S. ONLY

Spark ~~arrester~~ hopper WITH

Netting and deflect. plates WITH

Exhaust nozzles DOUBLE HIGH

Stack STRAIGHT Diam. 15"

Safety Valves TWO CROSBY 3" OPEN (NOT SHOWN)

Safety valves BOTH WITH [illegible] SET AT 180 POUNDS

Whistle ONE B.L.W. PLAIN

Steam Gauge ONE IRON 7" MAKER ASHCROFT

Steam gauge stem IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3" above highest part of crown

Lubricator steam TO HAVE connection to [illegible]

Blower Valve B.L.W.

Blow off Cock TWO ~~B.L.W.~~ Pos: R. AND L.

Cleaning Plugs

Firebox, CORNERS

Crown, TWO EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT

Front tube sheet ONE 10" Side sheet ONE Back sheet ---

Loco. FOR OPERATION IN ALABAMA. (See Sup'l Spec.)

BOILER TO MEET A.S.M.E. CODE.

BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY. (See Sup'l Spec.)

* SYPHON UNDER CAB BOARD ON LEFT SIDE, WITH PIPE CONNECTION TO TANK AND WITH 20 FEET OF SUCTION HOSE.

Injectors TWO SELLERS IMPROVED

Injectors, Pos. RIGHT AND LEFT

Pipes, Check IRON Steam IRON Supply IRON

Valves B.L.W. WITH STOP VALVE (See *) RIGHT AND LEFT

Steam Heat NONE

Cab STEEL VENTILATOR IN CAB ROOF.

ENGINEERS SEAT TO BE A DROP SEAT.

Cab boards WOOD Corner angle IRON

Running boards WOOD Footing angle IRON

Hand rail IRON Material BOILER

Back Bumper STEEL PLATE Buffing surface 34½"

CHAFING CASTINGS TO BE WIDE AND DEEP.

Pilot NONE Pushing surface AT FRONT

Front Bumper OAK Buffing surface WITH

Steps ACROSS FRONT WITH HAND RAIL.

STEPS, HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead. Spacing 33½" AND 12½"

Coupler M.C.B.A. AUTO. WITH SLOTTED KNUCKLE AT STANDARD HEIGHT WITH POCKET BELOW FOR LINK AND PIN CONNECTION, SAME AS FOR 10 18 ½ D 140

Signal Fixtures IRON ON BUMPER

HEADLIGHT EQUIPMENT TO BE SCHROEDER ELECTRIC WITH INCANDESCENT HEADLIGHTS. REAR HEADLIGHT ON TOP OF CAB.

Headlight TWO ROUND CASE 14" Reflector

Headlight, Nos. of sides WITH Front glass WITH

Lamp shell NONE Lens ---

Bell 85 POUNDS

Sand Box TWO Diam. 23" Body IRON PAINTED Pipes IRON

Sanding HAND IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL Pto. Sheet IRON Style 9

Boiler Lagging PLASTIC MAGNESIA FROM B.L.W. STOCK

THE BALDWIN LOCOMOTIVE WORKS

P.W. STOUDT. JUNE 1920

SPECIFICATION FOR LOCOMOTIVES 10 24 ½ D 137

FOR KENTUCKY LUMBER COMPANY

HW

169 170

Frames CAST STEEL

Cylinders, Diam. 15" Stroke 20"

Steam ports Length 13" Width 1½" Bridge 1½"

Exhaust ports Length 13" Width 2½" Vaulting 1/32"

Valve travel 4½" Steam lap 7/8" Exhaust clearance ---

Exhaust lap ½" Release valve NONE

(NOT SHOWN) SAFETY DETROIT TRIPLE No. 22 BULLS EYE

Cylinder saddle CAST IRON Lubricating pipes IRON UNDER JACKET

Cylinder jacket IRON PAINTED Lagging STEEL PAINTED

Steam chest IRON PAINTED Valves STEEL PAINTED

(NOT SHOWN) PISTON ALLEN-BALANCED, WITH VACUUM VALVES

Packing UNITED STATES, KING TYPE

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST IRON, WITH RINGS OF CAST IRON SPRUNG IN

Guides ALLIGATOR TYPE, STEEL Guide bearings NEEDLE

Crossheads CAST STEEL, WITH BEARINGS OF BRASS

Wrist Pins STEEL Wrist plugs PLUNGER, FORGED ON RODS.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON - SKELETON LINKS

All thrust bearings and pins are to be United States standard

All bearings subject to wear are to be case hardened

Wearing Bearings B.L.W.

Driving wheel hub liners BRASS

Drivers, U.S. Diam. 44" Dist. apart 39" CENTERS, CAST IRON

Tires STEEL Flanges SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"

Tires, Plain, Pos. MIDDLE Size 3" x 5½"

Extra wearing between driving boxes and wheel hubs 3" TOTAL

Driving Boxes CAST STEEL, WITH PHOSPHOR BRONZE BEARINGS

Journals, Diam. 6" Length 8"

EQUALIZER STAND OF CAST STEEL

Springs, Make B.L.W.

AMPLE CLEARANCE TO BE PROVIDED FOR EQUALIZER.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING

To swing 3½" each side of cen. Cent. pin liners NONE

Journals, Diam. 4½" Length 7½" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 26" Tread 4½" Kind DOUBLE PLATE, CHILLED

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck TWO Wheeled SWING BOLSTER, SIDE BEARING

To swing 4½" each side of cen. Cent. pin liners NONE

Journals, Diam. 4½" Length 7½" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 26" Tread 4½" Kind DOUBLE PLATE, CHILLED

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Engine, sch. S - AMERICAN STEAM

Parts Eng. Trk. sch. ---

Foundation Drivers, sch. A-1 AMERICAN C. S. EQUALIZED

Parts Eng. Trk. sch. ---

Air pump NONE Pos. ---

Train connections NONE

Train signal, sch. NONE

Tender EIGHT Wheel Drawing No. 1549

Weight, with fuel and water about 60,000 POUNDS

TENDER TO BE WEIGHED: YES

Tank 3,000 Gallons Built 49H

TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 7 TONS

Tool B[ox] OF HARD WOOD, TOP.

SYPHON CONNECTION TO TANK ON LEFT SIDE.

Frame STEEL, 8" CHANNELS, WITH BUMPERS OF WOOD.

CHAFING CASTINGS TO BE WIDE AND DEEP.

Front Drawhead Spacing 2¾"

Pilot NONE Pushing surface AT REAR

Buffing surface WITH 33½" AND 12½"

Coupler M.C.B. AUTO. WITH SLOTTED KNUCKLES AT STANDARD HEIGHT, WITH POCKET BELOW FOR LINK AND PIN COUPLING SAME AS FOR 10 18 ½ D 140

Steps ACROSS REAR WITH HAND RAIL.

STEPS HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTERS.

TRUCKS TO HAVE STEEL SIDE BARS

Springs ELLIPTIC, B.L.W.

Journals, Diam. 5½" Length 10"

Wheels, Diam. 28" Tread 4½" Kind CHILLED CAST IRON PLATE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake POSITION ALL WHEELS

Brake shoes "T" AMERICAN STEAM

PUSH POLE AND SWITCHING CHAIN

List of tools sent 26 ONE PAIR OF WRECKING FROGS

Photo sch. No. 2 Inspection B.L.W. (EXCEPT FOR BOILER) (See Sup'l Spec.)

To be stamped YES Material stamped B.L.W. (Except See Sup'l)

Certificate of inspection THREE COPIES OF B.L.W. FORM 1036

Junior leaves to 5.1.20 Shipped ON OWN WHEELS

Brass shop finish !

Machine shop finish D-165

Boiler B.L.W.

Patents NONE

Property plates NONE

Painting, style 29L, OLIVE GREEN AND ALUMINUM

Mark on TANK SIDES: KENTUCKY LUMBER COMPANY

Road Nos. Pos Road Nos Name NONE

F. No. Plate 64

F. Sand Box

Cab Panel

Back of Tank

Actual Dimensions of Loco. Extreme height over all 12' 4"

Extreme Width Cab boards 8' 7" Cylinders ~~over casings~~ 8' 7"

Length outside face front bumper of engine to face of tender wedge 29' 6½"

Length face of tender wedge to outside face back bumper of tender 21' 6½"

Total length outside face front bumper of engine to outside face back bumper of tender 51' 1"

SPECIFICATION FOR LOCOMOTIVES 10 24 4 D 137

FOR KENTUCKY LUMBER COMPANY
RTL

170 171

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF ALABAMA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYBOLT DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝", (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6850. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S
ALABAMA
(State in which boiler is to be used)
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (State's number)
(LEAVE BLANK) (Year put in service)
(Manufacturer's Serial Number)
180 LBS.
(Maximum working pressure when built)

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6449.

Memorandum Spec'n 20131.

SPECIFICATION FOR LOCOMOTIVES 6 30 D 475.

EW

FOR The Koppers Company, for Domestic Coke Corporation, Fairmont, W. Va.

HNW.

Gen. as Photo. 3172.

Engine Drawing No. 55.

8-24-20

Gauge of Road 4'8½" Play 2"

Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"

Total wheelbase, eng. and tend. Actual ---
Limited to ---

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 120,000 pounds.

On F. tr'k --- lbs., Drivers 120,000 lbs., B. tr'k ---- lbs.

Tractive power 27,100 lbs., Ratio of adhesion 4.4

Work'g St'm Pres. 180 lbs., Service Switching.

Fuel Soft coal.

Boiler Steel. Thick 9/16" Bill 9256.

Front Tube Sheet ½" Thick

Boiler, Diam. 54" Plan Straight top.

Allowable st'm pres. 180 lbs. With Factor of Safety of 5.24 **Tested to** 200 lbs. steam pres. 240 lbs. water pres.

Longitud. seams butt jointed, with double covering strips.

Auxiliary dome, None.

Dome, diam. 25" Pos. Central.

Firebox Steel. Combustion chamb. None.

Firebox, length 69⅜" Width 42" Depth F. 54-5/16" B. 52-13/16"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays ⅜" diam. with 3/16" holes 1¼" deep from O.S.

Radial stays 1" diam. Sling stays front Two rows B. L. W. Expansion stays.

Button heads below crown on Eight central rows

Crown bars None. Placed --- above crown

Crown bolts ---

Flues ---

Tubes No. 12 B. W. G. Charcoal iron or steel, (B.L.W. Option).

Tube ends Swaged for copper ferrules, fire box ends.

Number 193 Diam. 2" Length 12' 4"

Heating Surface Flues --- Combus. Chamb. --- Total 1331 sq. ft.
Tubes 1238 sq. ft. Fire Box 93 sq. ft. Fire Brick Tubes ---

Grate area 20.2 sq. ft. Ratio to Heating Surface 1: 66.

Superheater ----

Fire Brick Arch, None.

Grates Rocking bars and drop plate.

Ash Pan, Dampers Front and back.

Throttle Balance. Pos. Dome.

Dry pipe Steel.

Superheater None.

Smokebox extension With. Cleaning hole and cap L. S. Only.

Spark ~~ejector or~~ hopper With.

Netting and deflect. plates With.

Exhaust nozzles Double, high.

Stack Cast iron, straight. Dia. 18"

Safety Valves Two Coale 2½" Open.

Safety valves None, with relief lever. Set to 180 pounds.

Whistle One B. L. W. Plain.

Steam Gauge One Iron, 7" Maker: Ashcroft.

Steam gauge stand Iron. **Clock** None

Water Gauge B.L.W. Ironclad, One. **Cab Lamps** To burn oil.

Gauge Cocks Three back. Surface valve None.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.

Cleaning Plugs

Firebox, Corners, sides and back.

Crown, Two each side and two back.

Waist, One under front.

Front tube sheet, One. Fusible plug One.

Pump None.

Locomotive to operate in West Virginia.

Locomotive to meet I. C. C. requirements for yard service.

Injectors Two Monitor (Not Spec) No. 7

Injectors, Pos. Right and left. Steam pipes Copper.

Pipes, Check Iron. Feed Iron. Overflow Iron.

Check B. L. W. Pos. Right and left.

Steam Heat None.

Cab Steel.

Cab boards Steel. Nosing T-Iron.

Running boards Steel. Nosing T-Iron.

Hand rail Iron. Located on Tank.

Back Bumper Cast steel.

Pilot None.

Front Bumper Cast steel. Bumper plate None.

Steps across front and back of engine with hand rails.

Steps, hand holds, etc., to conform to I. C. C. requirements.

F. & B. Drawhead, Center above rail 33½"

Coupler Simplex M. C. B. Automatic.

Signal fixtures None.

Headlight Two Round case 16" Reflector, To burn Kerosene.

Headlight, Nos. on sides None. H'd'l't step With.

Lamp shelf None. Nosing ----

Bell 92 pounds.

Sand Box (Not Spec) Two. Diam. 28" Body Iron painted. Pipes Iron.

Sander Leach air single, trap A-1, in each box, to sand front and rear.

Dome casing Iron painted.

Boiler Jacket #22 Soft steel ptd. Bands Iron. Style 9

Boiler Lagging Plastic Magnesia, from B. L. W. Stock.

THE BALDWIN LOCOMOTIVE WORKS

E. O. Elliott Nov. 1920

SPECIFICATION FOR LOCOMOTIVES 6 30 D 475.

173 172

FOR The Koppers Company, for Domestic Coke Corp.

HNW.

Frames Cast steel.

Tender None.

Cylinders, Diam. 18" Stroke 24"

St'm ports, Length 16" Width 1¼" Bridges 1"

Exh. ports, Length 16" Width 2½" Valve lead 1/16"

Valve travel 5¼" Steam lap ⅞" Exhaust clearance ---

Eccentric ~~crank~~ throw 5⅛" By-pass valve None.

S. F. Lubr. (Not Spec) Nathan Triple No. 9 Bull's Eye.

Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

St'm chest casings Iron painted. Covers Steel painted.

St'm chest valves Richardson balanced, with vacuum valves.

Met. pkg. (Not Spec) Piston rods / Valve stems United States, King type.

Piston rods to be keyed to crossheads.

Pistons heads of cast iron with rings of cast iron sprung in.

Guides Steel. Oil cups Needle.

Crossheads Cast steel, with bearings of cast iron tinned.

Wrist Pins Steel. Rod cups Plunger, forged on.

Parallel rods to have solid ends.

Valve Motion Stephenson.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners None.

Drivers, O. S. Diam. 44" Cen. diam. 38" Centers cast iron.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. Front and back. Size 3" x 5½"

Tires, Plain, Pos. Middle. Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = 3/16" total.

Driving Boxes Steeled cast iron.

Journals, Diam. 8" Length 8½"

Springs. Make B. L. W.

Front Engine Truck None. Wheeled ---

To swing ---each side of cen. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck None. Wheeled ---

To swing --- each side of cen. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all drivers, (No tender).

Operating Parts: Engine, sch. No. 6 ET. Westg. combined auto. and straight air. Eng. Tr'k, sch. ---

Foundation Parts: Drivers, sch. WM-2, American outside equalized. Eng. Tr'k. sch ---

Air pump One 9½" Pos. Left side.

Train connections Front and back.

Train signal, sch. ---

Air reservoirs to have hydrostatic test of 210 pounds.

Tank 1800 Gallons, Bill 5547

Saddle tank over top of boiler.

Coal box on rear extension of engine frame, back of cab.

Capacity, 1½ tons.

FOR HEREAFTER:-

Raise question about using engine drawing No. 63 instead of 55 on account of frame centers providing better clearance.

(L.L.N., 6-29-21)

List of tools, scn. 29.

Photo sch. No. 2. Inspection B. L. W.

To be weighed Yes. Material specns B. L. W.

Certificate of boiler test Three copies B. L. W. form 1036.

Junior laws to 10-1-20. Shipment One own wheels.

Brass shop finish, No. 1.

Machine shop finish D-165.

B. L. W. Patents None.

Property plates None.

Painting, style 222, Olive green and aluminum.

Mark on tank sides: D.C.C. in letters of good size.

No other marking or numbering required.

Front Number Plate a Star.

Road Nos. Pos. --- Road Nos. None. Name None.

Actual Dimensions of Loco. Extreme height over all 13' 8"

Extreme Width Over cab boards 10' 1". Over cab handles 10' 6"
Over cylinders ~~valve motion~~ 8' 10"

Length outside face of front bumper to outside face of back bumper of engine 28' 8"

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6763

Memorandum Spec'n 20145

SPECIFICATION FOR LOCOMOTIVES 8 32 C 144

FOR Lake Erie, Franklin & Clarion Railroad Company

P

Gen. as Photo. 1621

Engine Drawing No. 19

12-8-20

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 8' 0" Driving 8' 0" Total 22' 11"

Total wheelbase, eng. and tend., {Actual 51' 9½" / Limited to ---

Curves 10 degrees Grades 3%

Limits, Height --- Width ---

Weight (approximate) in working order, Total 128000 pounds

On F. tr'k 43000 lbs., Drivers 85000 lbs., B. tr'k --- lbs.

Tractive power 20070 lbs., Ratio of adhesion 4.23

Work'g St'm Pres. 180 lbs., Service Passenger

Fuel Soft Coal

1st **Boiler** Steel Thick ¾" & 13/16" Rivet 9341

Front Tube Sheet ½" Thick

Boiler, Diam. 62" Plan Wagon top

{Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.22} **Tested to** {200 lbs. steam pres. / 240 lbs. water pres.}

Longitud. seams Butt jointed, with double covering strips

Dome, diam. 29" Pos. Forward of fire box

Main dome, One-piece type. Auxiliary dome, None

Firebox Steel Combustion chamb. None

4th Firebox, length 108-1/16" Width 42⅜" Depth F. 67¼" B. 64"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

6th Firedoor opening 16" diam.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays ⅞" diam. (See Sup. 7) {Two rows B. L. W.

Radial stays 1" diam. Sling stays front (Expansion Stays,

Button heads below crown on Eight central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues ---

Tubes No. 12 B. W. G. Steel

Tube ends Swaged for copper ferrules, fire box ends

Number 320 Diam. 2" Length 12' 0"

Tubes to be welded to fire box tube sheet.

Heating Surface Flues --- Combus. Chamb. --- Total 2166

Tubes 1997 Fire Box 169 Fire Brick Tubes ---

Grate area 31.5 Ratio to Heating Surface 1: 69

Superheater ---

Fire Brick Arch, None

Grates Rocking Bars, with drop plate at front and rear.

Ash Pan, Dampers Back only

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater None

8th **Smokebox** extenstion With Cleaning hole and cap L.S. only

Spark ~~ejector~~ hopper With

Netting and deflect. plates With

Exhaust nozzles Single, High

Stack Straight Dia. 13½".

(Not Spec) **Safety Valves** Two Consolidated 3" Open

Safety valves None with relief lever, Set to 180 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 6¾" Maker: U.S. Gauge Co.

Steam gauge stand Iron **Clock** None

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome

Blower Valve B. L. W.

10th **Blow off Cock** Two Everlasting 2" diam. Pos: R. and L.

9th **Cleaning Plugs** (See Sup. 9)

Firebox, Corners, back ones diagonal and sides.

Crown, Two each side and three back

Waist, (See Sup. 9)

Front tube sheet, None Fusible plug None

Pump None

11th **Injectors** Two Monitor Lifting (Spec) No. 10-XX

Injectors, Pos. R. and L. Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check (See Sup. 12) Pos. R. and L.

Steam Heat (See Sup. 13)

Cab Steel

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 37"

Franklin radial buffer between engine and tender.

Pilot Wood

1st **Front Bumper** Cast Steel (Sup. 14) Bumper plate With

Steps hand holds, etc., to conform to I. C. C. requirements

Front Drawhead, Center above rail 33½"

3rd **Coupler** Simplex M. C. B. Automatic

15th Signal fixtures Iron on bumper

Headlight equipment to be Pyle National Electric, Type "E-2" with incandescent headlights.

Headlight Two Round Case 18" Reflector,

Headlight, Nos. on sides With H'dl't step With

Lamp shelf None Nosing ---

Bell 92 pounds Gollmar Air Bell Ringer

Sand Box One Diam. 28" Body Iron painted Pipes Iron

Sander Leach Air, Double, A. & D. combination, to sand front and back.

Dome casing Iron painted

Boiler Jacket #18 Soft Steel ptd. Bands Iron Style 9

Boiler Lagging Magnesia Sectional from Franklin Mfg. Co.

THE BALDWIN LOCOMOTIVE WORKS

H.W. Howitz Aug. 1921

SPECIFICATION FOR LOCOMOTIVES 8 32 C 144

FOR Lake Erie, Franklin & Clarion Railroad Company

P

175

Frames Cast Steel

Cylinders, Diam. 19" Stroke 24"

St'm ports, Length 16" Width 1⅞" Bridges 1⅞"

Exh. ports, Length 16" Width 3" Valve lead 3/32"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ---

Eccentric ~~crank~~ throw 5½" By-pass valve None

(Not Spec) S. P. Lubr. Detroit Triple No. 22 Bulls Eye

Cyl'r heads Cast Iron Lubr. pipes of copper under jacket

Cyl'r casings Iron painted Head covers Steel painted

St'm chest casings Iron painted Covers Steel painted

St'm chest valves Balanced, with vacuum valves.

(Spec) Met. pkg. {Piston rods / Valve stems} United States, King Type.

Piston rods bolted with double lock nuts to crossheads.

Pistons Heads of cast iron, rings of cast iron sprung in.

Guides Steel Oil cups Needle

Crossheads Cast Steel, with bearings of brass.

Wrist Pins Steel Rod cups Plunger, forged on.

Parallel rods to have solid ends.

Valve Motion Stephenson

{Links, sliding blocks, pins, fitting links and eccentric rod jaws to be / well case hardened or to have hardened bushings.

All threads on bolts except staybolts to be United States Standard

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Bronze

16th **Drivers,** O. S. Diam. 66" Cen. diam. 60" Centers cast steel.

16th **Tires** Steel Held by Shrinkage and shoulder

Tires, Flanged, Pos. All Size 3" x 5½"

Tires, Plain, Pos. None Size ---

Lateral play between driving boxes and wheel hubs 3/16" total

Driving Boxes Cast Steel

Journals, Diam. 9" Length 9"

Springs. Make B. L. W.

Front Engine Truck Four Wheeled Swing bolster, center bearing

18th To swing 2½" each side of cen., Cen. pin liners None

Journals, Diam. 5½" Length 10" Boxes Cast Iron

Wheel hub liners (See Sup. 17)

Wheels, Diam. 30" Tread 4½" Kind Rolled Steel (Sup. 19)

Tires None Cen. diam. --- Size ---

Tires held by --- Wheel rims 2½" thk. x 5½" wide.

Back Engine Truck None Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels

Operating {Engine, sch. No. 6-ET Westinghouse Combined Auto. and / Eng. Tr'k, sch. --- Straight Air

Foundation {Drivers, sch. WY-2-American O. S. Equalized / Eng. Tr'k, sch. ---

Parts

Air pump One 9½" Pos. L. S.

20th Train connections Front and Back

Train signal, sch. ---

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled. Drawing No. 1656

Weight, with fuel and water, about 86,000 pounds

Tender to be weighed: Yes

Tank 4,000 Gallons, Bill 5057

Tank "U" shape, straight top. Fuel capacity 7 tons.

Tool Boxes Hard Wood, Top

Frame Steel, 8" and 10" channels, with front and back bumpers of cast steel. Franklin radial buffer between engine and tend.

Front Drawbar height 35½"

Pilot None

Back drawhead, center above rail 33½"

3rd **Coupler** Simplex M. C. B. Automatic

1st Steps hand holds, etc., to conform to I. C. C. requirements

Trucks Arch bar type, with bolsters of cast steel

Springs Elliptic, B. L. W.

Journals, Diam. 4½" Length 8"

2nd Wheels Diam. 33" Tread 4½" Kind Rolled Steel

Tires None Cen. diam. --- Size ---

Tires held by --- Wheel rims 2½" thick x 5½" wide.

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET Westg. Auto. and Straight Air, with 10" x 12" tender brake cylinder.

List of tools, sch. #29

Photo scn. No. 2 Inspection B. L. W. (See Sup. 2)

To be weighed Yes Material spec'ns B. L. W.

Certificate of boiler test Three copies B. L. W. form 1036

Junior laws to 2-10-21 Shipment On own wheels

Brass shop finish, No. 1

Machine shop finish D-165

Springs. Make B. L. W.

B. L. W. {Patents None

Property plates B. L. W., for engine and tender.

Painting, style 291, Olive Green and Gold

Lettering etc. in Gold Leaf, similar to 10 38 E 3649 & 3724.

Mark on tank sides: Lake Erie, Franklin & Clarion R. R.

Mark on back of tank above number: 4000 Gallons

Road number on back of tank to be in large figures.

Road Nos. Pos.	Road Nos.	Name
F. No. Plate	97	
Sand Box		
Cab Sides		
Back of Tank		

Actual Dimensions of Loco. Extreme height over all 14' 11½"

Extreme Width: Cab boards 9' 11" Cylinders or valve casting 9' 0"

Length outside face front bumper of engine to face of tender wedge 32' 4½"

Length face of tender wedge to outside face back bumper of tender 24' 7½"

Total length outside face front bumper of engine to outside face back bumper of tender 56' 11½"

SPECIFICATION FOR LOCOMOTIVES 8 32 C 144

FOR LAKE ERIE, FRANKLIN & CLARION RAILROAD COMPANY

P

176

175

1 ENGINE AND TENDER TO MEET ALL REQUIREMENTS OF THE U. S. SAFETY APPLIANCE STANDARDS, AND ALL RULES OF THE I.C.C.

2 ~~MR. J. W. BAUM, MASTER MECHANIC OF THE COMPANY WOULD LIKE TO INSPECT THE LOCOMOTIVE WHEN IT REACHES THE ERECTING SHOP. SALES DEPARTMENT TO BE ADVISED WHEN LOCOMOTIVE IS IN THE PROCESS OF CONSTRUCTION IN THE ERECTING SHOP, SO THAT MR. BAUM CAN ARRANGE A TRIP TO EDDYSTONE; SAID TO BE ADVISED ALSO WHEN BOILER IS READY TO BE TESTED AND THE BOILER FITTINGS READY TO BE APPLIED.~~
MR. BAUM WILL NOT BE ABLE TO COME TO INSPECT BOILER.
B. L. W. TO KEEP CAREFUL RECORD OF INSPECTION OF BOILER.

3 WHERE POSSIBLE, WITHOUT INCREASING THE PRICE, PREFERENCE TO BE GIVEN TO AMERICAN STEEL FOUNDRIES PRODUCTS.

4 SEAMS JOINING FIRE BOX CROWN AND SIDES TOGETHER TO BE WELDED (SUP. 5)

5 HEREAFTER: CROWN AND SIDES OF FIRE BOX IN ONE PIECE $\frac{5}{8}$" THK.

6 FIRE DOOR TO BE FRANKLIN PNEUMATIC, BUTTERFLY TYPE.

7 WATER SPACE STAYBOLTS TO BE OF ULSTER SPECIAL SEAMLESS HOLLOW IRON.

8 SMOKE BOX TO HAVE M. M. SELF CLEANING FRONT END ARRANGEMENT.

9 WASHOUT PLUGS AS TRACING 34182, EXCEPT OMIT PLUG OVER FIRE DOOR.
ONE PLUG EACH SIDE IN WAIST ABOVE INJECTOR CHECK.
TWO PLUGS UNDER WAIST, ONE FRONT AND ONE BACK.
WASHOUT PLUG HOLES TO HAVE "V" THREADS, 12 PER INCH.
BOILER PLUGS APPLIED WITH BRASS CASTINGS RIVETED TO BOILER.

10 BLOW OFF COCKS TO BE OPERATED FROM RUNNING BOARD.

11 INJECTORS TO BE SAME AS FOR 10 38 E 3724.

12 INJECTOR CHECK TO BE NATHAN TYPE 287-A, REVERSIBLE STOP AND CHECK VALVE, WITH FLANGE CONNECTION, SAME AS FOR 10 38 E 3724.

13 STEAM HEAT WITH IMPROVED REDUCING VALVE NO. 14 MANUFACTURED BY STANDARD HEAT AND VENTILATION CO. OF NEW YORK AND WITH COMPLETE CONNECTIONS FITTED WITH McLAUGHLIN JOINTS.

14 FRONT BUMPER FROM COMMONWEALTH STEEL CO.

15 CLASSIFICATION LAMPS ~~AND MARKER LAMPS~~ TO HAVE ELECTRIC LIGHTS.

16 DRIVING TIRES FROM STANDARD STEEL WORKS.
CAST STEEL DRIVING WHEEL CENTERS FROM AMERICAN STEEL FOUNDRIES.

17 ENGINE TRUCK BOXES TO HAVE BABBITT ON FACE OF BOX NEXT TO HUB OF WHEEL.

18 LATERAL PLAY BETWEEN ENG. TRK. BOXES AND WHEEL HUBS $\frac{1}{2}$" TOTAL.

19 ENGINE TRUCK WHEELS FROM STANDARD STEEL WORKS.

20 AIR BRAKE CONNECTIONS BETWEEN ENGINE AND TENDER TO BE McLAUGHLIN FLEXIBLE JOINTS.

TENDER

21 TENDER FRONT AND BACK BUMPERS FROM COMMONWEALTH STEEL CO.

22 TENDER TRUCK WHEELS FROM STANDARD STEEL WORKS.

23 MARKER LAMPS TO HAVE ELECTRIC LIGHTS.

THE BALDWIN LOCOMOTIVE WORKS — As Spec'n. C-6762 Duplicate 10 38 E 3649
Except where otherwise specified.

Memorandum Spec'n 20144

SPECIFICATION FOR LOCOMOTIVES 10 38 E 3724

FOR Lake Erie, Franklin & Clarion Railroad Company

P

Gen. as Photo. 1494

10-20-20 — **Engine Drawing No.** 104

Gauge of Road 4' 8½" — Play ¾" except ⅞" for F.&B. drivers

Wheelbase, Rigid 15' 4" — Driving 15' 4" — Total 23' 11"

Total wheelbase, eng. and tend., Actual 56' 2½" / Limited to ---

Curves 11 degrees — **Grades** 3%

Limits, Height --- — Width ---

Weight (approximate) in working order, Total 181,000 pounds

On F. tr'k 18,000 lbs., Drivers 163,000 lbs., B. tr'k --- lbs.

Tractive power 39,400 lbs., Ratio of adhesion 4.14

Work'g St'm Pres. 185 lbs., Service Freight

Fuel Soft Coal

Boiler Steel — Thick ⅞" — Bill 9302

Front Tube Sheet ½" Thick

Boiler, Diam. 72" — Plan Straight top

Allowable st'm pres. 200 lbs. — **Tested to** 220 lbs. steam pres.

With Factor of Safety of 4.7 — **Tested to** 267 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips

Auxiliary dome for safety valves and whistle.

Dome, diam. 33" — Pos. Forward of fire box.

Main dome, one-piece type.

Firebox Steel — Combustion chamb. None

Firebox, length 101-15/16" — Width 66" — Depth F. 70⅜" — B 55"

Firebox, Tube ½" — Crown ⅜" — Sides 5/16" — Back 5/16"

Firedoor opening Oval 16" x 20"

Water space, Front 4" — Sides 3½" — Back 3½"

Water space frame Double — Riveted

Water space stays 1" diam. (See Sup. 4)

Radial stays 1⅛" diam. Sling stays front — Three rods B. L. W. / Expansion Stays

Button heads below crown on Six central rows

Crown bars None — Placed --- above crown

Crown bolts ---

Flues ---

Tubes #12 B. W. G. Steel

Tube ends Swaged for copper ferrules, fire box ends.

Number 309 — Diam. 2" — Length 14' 6"

Tubes to be welded to fire box tube sheet.

Heating Surface: Flues --- — Combus. Chamb. --- — Total 2505 sq. ft.

Tubes 2332 sq. ft. — Fire Box 173 sq. ft. — Fire Brick Tubes ---

Grate area 46.7 sq. ft. — Ratio to Heating Surface 1: 53.6

Superheater ---

Fire Brick Arch: None

Grates Rocking bars, with drop plate at front and rear.

Ash Pan, Dampers None

Throttle Balance — Pos. Dome

Dry pipe Steel

Superheater None

Smokebox extension With — Cleaning hole and cap L.S. only

Spark-ejector hopper With

Spark deflect. plates With

Exhaust nozzles Single, high

Stack Straight — Dia. 16"

Safety Valves Two Consolidated 3" Open (Spec.)

Safety valves None with relief lever, Set to 185 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 7" — Maker: Ashcroft

Steam gauge stand Iron — **Clock** None

Water Gauge One B.L.W. Ironclad — **Cab Lamps** Electric

Gauge Cocks Three Back — Surface valve None

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock Two B. L. W. 2" Pos: R. and L.

Cleaning Plugs One plug above fire door

Firebox, Corners, diagonal: sides, front and back

Crown, three each side and two back

Waist, (See Sup. 6)

Front tube sheet, Two — Fusible plug None

Pump None

Injectors Two Monitor Lifting (Spec.) — No. 10-XX

Injectors, Pos. R. and L. — Steam pipes Copper

Pipes, Check Iron — Feed Iron — Overflow Iron

Check (See Sup. 7) — Pos. R. and L.

Steam Heat None

Cab Steel

Cab boards Steel — Nosing T-Iron

Running boards Steel — Nosing T-Iron

Hand rail Iron — Located on Boiler

Back Bumper Bar Steel — Back drawbar height 31"

Franklin Radial Buffer between engine and tender.

Pilot Steel

Front Bumper Cast Steel — Bumper plate With

Steps & hand holds, to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler Simplex M. C. B. Automatic with slotted knuckle.

Signal fixtures Iron on bumper

Headlight Equipment to be Pyle National Electric, Type "E-2" with incandescent headlights.

Headlight Two Round Case 18" — Reflector,

Headlight, Nos. on sides With — H'd'l't step With

Lamp shelf None — Nosing ---

Bell 92 pounds.

Sand Box One — Diam. 31" — Body Iron painted — Pipes Iron

Sander (Spec.) Leach Air, Trap A-10, Double, to sand front and back.

Dome casing Iron painted.

Boiler Jacket #22 Soft Steel pto Sands Iron — Style 9

Boiler Lagging Magnesia Sectional from Franklin Mfg. Co.

THE BALDWIN LOCOMOTIVE WORKS

H. McDonald

SPECIFICATION FOR LOCOMOTIVES 10 38 E 3724

FOR Lake Erie, Franklin & Clarion Railroad Company

P

Frames Cast Steel

Cylinders, Diam. 22" — Stroke 28"

St'm ports, Length 19" — Width 1⅞" — Bridge 1⅛"

Exh. ports, Length 19" — Width 2¾" — Valve bead 1/32"

Valve travel 5¾" — Steam lap ⅞" — Exhaust clearance ---

Eccentric (Spec.) throw 5" — By-pass valve None

S. P. Lubr. Detroit Triple No. 22 Bulls Eye.

Cyl'r heads (See Sup. 11) — Lubr. pipes of copper under jacket.

Cyl'r casings Iron painted — Head covers Steel painted

St'm chest castings Iron painted — Covers Steel painted

St'm chest valves Balanced, with vacuum valves.

Main pkg (Spec.) United States, King Type

Piston rods bolted with double lock nuts to crossheads.

Pistons Heads of cast iron with rings of cast iron sprung in.

Guides Steel — Oil cups Needle

Crossheads Cast steel, with bearings of brass.

Wrist Pins Steel — Rod cups Plunger, forged on.

Parallel rods to have solid ends.

Valve Motion Stephenson

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboits) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Brass

Drivers, O. S. Diam. 54" — Cen. diam. 48" Centers cast steel

Tires Steel — Held by Shrinkage and shoulder

Tires, Flanged, Pos. All — Size 3" x 5½"

Tires, Plain, Pos. None — Size ---

Lateral play between driving boxes and wheel hubs 3/16" total

Driving Boxes Cast Steel, with Elvin driving box lubricators.

Journals, Diam. 9" — Length 12"

Springs. Make B. L. W., designed with ample margin.

Front Engine Truck Two — Wheels Swing bolster, center bearing

To swing 3½" each side of cen. — Cen. pin liners None

Journals, Diam. 6" — Length 10" — Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 30" — Tread --- — Kind Cast Iron Spoke Center

Tires Steel — Cen. diam. 25" — Size 2½" x 5½"

Tires held by Shrinkage and shoulder

Back Engine Truck None — Wheels ---

To swing --- each side of cen. — Cen. pin liners ---

Journals, Diam. --- — Length --- — Boxes ---

Wheel hub liners ---

Wheels, Diam. --- — Tread --- — Kind ---

Tires --- — Cen. diam. --- — Size ---

Tires held by ---

Brake, position On all driving and tender wheels

Operating Parts — Engine, sch. No. 6-ET Westg. Combined Automatic and Straight Air

Foundation Parts — Drivers, sch. WN-2 American C. S. Equalized

Eng. Trk. sch. ---

Air pump Two 9½" — Pos. Both L. S.

Train connections Front and back

Train signal, sch. ---

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1646

Weight, with fuel and water about 124,000 pounds.

Tender to be weighed: Yes

Tank 6,000 — Gallons, Bill 5977

Tank: Water bottom type, fuel capacity 10 tons.

Tool Boxes: Hard Wood, Top, and tool boxes to be built into legs of tank.

Frame: Steel, 12" channels, with front and back end sills of cast steel. Franklin Radial buffer between engine and tend.

Front Drawbar height 30½"

Pilot None

Back drawbar, center above rail 33½"

Coupler Simplex M. C. B. Automatic, with solid knuckle.

Steps, hand holds, etc., to conform to I. C. C. requirements

Floor across rear with suitable hand rails.

Both trucks to have side bearings.

Trucks Arch bar type, with bolsters of cast steel.

Tender truck bolsters to be heavier than for 10 38 E 3649.

Springs Elliptic, B. L. W. make.

Journals, Diam. 5" — Length 9"

Wheels, Diam. 33" — Tread 4" — Kind Davis Steel

Tires None — Cen. diam. --- — Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET Westg. Auto. and Straight Air, with 12" x 12" tender brake cylinders.

List of tools, sch. #29

Photo sch. No. 2 — Inspection B. L. W. (Sup. 2)

To be weighed Yes — Material specn B. L. W.

Certificate of boiler by Three copies B. L. W. form 1036

Junior laws to 11-1-20 — Shipment On own wheels

Brass shop finish, No. 1

Machine shop finish D-165

Property plates None

Painting, style 29i, Olive Green and Gold.

Lettering etc. in Gold Leaf, similar to 10 38 E 3649.

Mark on tank sides: Lake Erie, Franklin & Clarion R. R.

Mark on back of tank above number: 6000 Gallons.

Road number on back of tank to be in large figures.

Road Nos. Pos. — Road Nos. — Name: None

F. No. Plate 98

Dome

Cab Panel

Back of Tank

Actual Dimensions of Loco. Extreme height over all 15' 2"

Extreme Width: Cab boards 10' 3" — Cylinders ~~valve motion~~ 9' 8½"

Length outside face front bumper of engine to face of tender wedge 36' 0"

Length face of tender wedge to outside face back bumper of tender 26' 1"

Total length outside face front bumper of engine to outside face back bumper of tender 2' 1"

SPECIFICATION FOR LOCOMOTIVES 10 38 E 3724

FOR LAKE ERIE, FRANKLIN & CLARION RAILROAD COMPANY
P

178 179

1 ENGINE AND TENDER TO MEET ALL REQUIREMENTS OF THE U. S. SAFETY APPLIANCE STANDARDS, AND ALL RULES OF THE I. C. C.

2 MR. J. W. BAUM, MASTER MECHANIC OF THE COMPANY WOULD LIKE TO INSPECT THE LOCOMOTIVE WHEN IT REACHES THE ERECTING SHOP. SALES DEPARTMENT TO BE ADVISED WHEN LOCOMOTIVE IS IN THE PROCESS OF CONSTRUCTION IN THE ERECTING SHOP, SO THAT MR. BAUM CAN ARRANGE A TRIP TO EDDYSTONE, AND TO BE ADVISED ALSO WHEN BOILER IS READY TO BE TESTED AND THE BOILER FITTINGS READY TO BE APPLIED.

3 FIRE DOOR TO BE FRANKLIN PNEUMATIC, BUTTERFLY TYPE.

4 TATE STAY BOLTS, ABOUT 300 IN BREAKING ZONE.
ALL WATER SPACE STAY BOLTS, (EXCEPT TATE BOLTS) TO BE OF ULSTER SPECIAL SEAMLESS HOLLOW IRON.

5 SMOKE BOX TO HAVE M. M. SELF CLEANING FRONT END ARRANGEMENT.

6 WASHOUT PLUG HOLES TO HAVE "V" THREADS, 12 PER INCH.
TWO PLUGS IN WAIST NEAR FRONT AND TOP OF BOILER, CLOSE TO INJECTOR CHECKS.
TWO PLUGS UNDER WAIST, ONE IN FRONT AND ONE NEAR CENTER OF BOILER RINGS.

7 INJECTOR CHECK TO BE NATHAN TYPE 287-A REVERSIBLE STOP AND CHECK VALVE WITH FLANGE CONNECTION.

8 FOOT PLATE TO BE REVISED TO BE BOLTED TO LOWER RAIL OF FRAME.

9 SNOW PLOW AS B. L. W. TRACING 10697, AND RAY SNOW FLANGER TO BE APPLIED.

10 CLASSIFICATION AND MARKER LAMPS TO HAVE ELECTRIC LIGHTS.

11 CYLINDER HEADS, FRONT CAST IRON, BACK CAST STEEL.

12 PISTON HEAD PACKING TO BE SNAP RING TYPE, SAME AS FOR 10 38 E 3649.

13 DRIVING TIRES FROM ~~RY. STEEL SPRING CO. OR~~ STANDARD STEEL WORKS.

14 AIR BRAKE CONNECTIONS BETWEEN ENGINE AND TENDER TO BE McLAUGHLIN FLEXIBLE JOINTS.

15 WHERE POSSIBLE, WITHOUT INCREASING PRICE, PREFERENCE TO BE GIVEN TO AMERICAN STEEL FOUNDRIES' PRODUCTS.

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-6410

Memorandum Spec'n 21038

SPECIFICATION FOR LOCOMOTIVES 10 30 D-686

6/

FOR LAURINBURG & SOUTHERN RAILROAD COMPANY.

DAR

Gen. as PHOTO. 5872

Engine Drawing No. 101

11-22-21

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 11' 4" Driving 11' 4" Total 22' 2"
Total wheelbase, eng. and tend. {Actual 51' 2" / Limited to ----

Curves ---- Rails 56 pounds per. yard.

Limits, Height ---- Width ----
Weight (approximate) in working order, Total 126,500 pounds.
On F. tr'k 30,000 lbs., Drivers 96,500 lbs., B. tr'k ---- lbs.

Tractive power 23,000 lbs., Ratio of adhesion 4.2
Work'g St'm Pres. 180 lbs., Service PASSENGER AND FREIGHT.
Fuel SOFT COAL.

Boiler STEEL. Thick 15/16" & 1 1/16" Bill 9519
Front Tube Sheet ½" Thick
Boiler, Diam. 58" Plan EXTENDED WAGON TOP.
{Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.0} **Tested to** {200 lbs. steam pres. / 240 lbs. water pres.
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.
AUXILIARY DOME, NONE.
Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL. Combustion chamb. NONE.
Firebox, length 95-15/16" Width 42⅜" Depth F. 60⅞" B. 59½"
Firebox, Tube ⅝" Crown ⅜" Sides 5/16" Back 5/16"
Firedoor opening 16" DIAM.
Water space, Front 4" Sides 3" Back 3"
Water space frame SINGLE Riveted
Water space stays ⅞" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S. {TWO ROWS B.L.W. EXPANSION STAYS.
Radial stays 1" DIAM. Sling stays front
Button heads below crown on EIGHT central rows
Crown bars NONE Placed --- above crown
Crown bolts ----

Flues ----
Tubes No. 11 B.W.G. STEEL.
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 230 Diam. 2" Length 13' 1"
TUBES TO HAVE ¾" BRIDGES.

Heating Surface {Flues --- Combus. Chamb. --- Total 1701⁰ / Tubes 1566⁰ Fire Box 135⁰ Fire Brick Tubes ---}
Grate area 28.2⁰ Ratio to Heating Surface 1: 60.4
Superheater -----

Fire Brick ARCH, NONE.

Grates ROCKING BARS AND DROP PLATE.
Ash Pan, Dampers FRONT AND BACK.

Throttle BALANCE. Pos. DOME.
Dry pipe STEEL.

Superheater NONE.

Smokebox extenstion WITH Cleaning hole and cap L.S. ONLY.
Spark ~~ejector or~~ hopper WITH
Netting and deflect. plates WITH

Exhaust nozzles DOUBLE, HIGH.

Stack STRAIGHT. Dia. 14"

Safety Valves (Spec) TWO STAR 3" OPEN.
Safety valves NONE with relief lever, Set to 180 pounds.
Whistle ONE STAR CHIME FIG. 165 AND 166.

Steam Gauge ONE IRON 7" MAKER: STAR.
Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC.
Gauge Cocks THREE BACK Surface valve NONE.
Lowest gauge cock 3¼" above highest part of crown
Lubricator steam valve WITHOUT separate dry pipe to dome
Blower Valve B.L.W.

Blow off Cock ONE B.L.W. Pos: FRONT.
Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.
Firebox, CORNERS, BACK ONES DIAGONAL, AND BACK
Crown, TWO EACH SIDE AND FOUR BACK.
Waist, ONE UNDER FRONT.
Front tube sheet, TWO Fusible plug ONE

Pump NONE.

AS MANY DETAILS AS POSSIBLE TO BE INTERCHANGEABLE WITH Co's PREVIOUS LOCO., B.L.W. CLASS 10 30 D 554.

Injectors TWO, HANCOCK. (Spec) No. 9
Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.
Pipes, Check IRON. Feed IRON. Overflow IRON.
Check B.L.W. Pos. RIGHT AND LEFT.

Steam Heat NONE.

Cab STEEL.
CAB ROOF TO BE LINED WITH WOOD, AND TO HAVE VENTILATOR.

Cab boards WOOD. Nosing NONE.
Running boards WOOD. Nosing NONE.
Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 31⅜"

Pilot WOOD, B.L.W. DESIGN
Front Bumper OAK. Bumper plate WITH
Steps HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"
Coupler TOWER M.C.B. AUTO SHORT SHANK IN DRAW CASTING.

Signal fixtures IRON ON BUMPER.
HEADLIGHTS TO BE INCANDESCENT ELECTRIC WITH SUNBEAM TYPE RE-3 GENERATOR. HEADLIGHTS TO BE OPERATED INDEPENDENTLY.
Headlight TWO ROUND CASE 16" Reflector,
Headlight, Nos. on sides WITH H'dl't step WITH
Lamp shelf NONE. Nosing ---

Bell 92 POUNDS.
Sand Box ONE Diam. 28" Body IRON PAINTED Pipes IRON.
Sander (Spec) WATTERS AIR SANDER TO SAND FRONT AND BACK.

Dome casing IRON PAINTED.

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON. Style 9
Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

E. O. Elliott Feb. 1922

SPECIFICATION FOR LOCOMOTIVES 10 30 D 686

181

FOR LAURINBURG & SOUTHERN RAILROAD COMPANY.

DAR

180

Frames CAST STEEL.

Cylinders, Diam. 18" Stroke 26"
St'm ports, Length 16" Width 1¾" Bridges 1"
Exh. ports, Length 16" Width 2½" Valve lead ¼"
Valve travel 5½" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 12⅜" By-pass valve NONE.
S. F. Lubr. (Spec) NATHAN TRIPLE BULL'S EYE.
Cyl'r heads CAST IRON. LUBR. PIPES OF IRON UNDER JACKET.
Cyl'r casings IRON PAINTED. Head covers STEEL PAINTED.
St'm chest casings IRON PAINTED Covers STEEL PAINTED.
St'm chest valves BALANCED, WITH VACUUM VALVES.
Met. pkg. (Spec) PISTON RODS VALVE STEMS U.S. KING TYPE.
PISTON RODS TO BE BOLTED TO CROSSHEADS.
Pistons HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.
Guides STEEL. Oil cups NEEDLE.
Crossheads CAST STEEL, WITH BEARINGS OF CAST STEEL, TINNED.
Wrist Pins STEEL. Rod cups GREASE CUPS, FORGED ON.
CROSSHEADS TO BE A.C.L. DESIGN, "ALLIGATOR" TYPE.
PARALLEL RODS TO HAVE SOLID ENDS.
Valve Motion WALSCHAERTS.
{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings DAMASCUS BRONZE.
Driving wheel hub liners NONE.
Drivers, O. S. Diam. 56" Cen. diam 49½" CENTERS CAST IRON.

Tires STEEL. Held by SHRINKAGE AND SHOULDER.
Tires, Flanged, Pos. FRONT AND BACK. Size 3¼" x 5½"
Tires, Plain, Pos. MIDDLE. Size 3¼" x 6½"

Driving Boxes STEELED CAST IRON.
Journals, Diam. 8⅛" Length 8½"
LATERAL, PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS-7/32" TOTAL.
Springs. Make, B.L.W.

Front Engine Truck FOUR Wheeled SWING BOLSTER, CENTER BEARING.
To swing 4½" each side of cen., Cen. pin liners NONE.
Journals, Diam. 5" Length 10" Boxes CAST IRON.
Wheel hub liners NONE.
Wheels, Diam. 28" Tread --- Kind CAST IRON SPOKE CENTERS.
Tires STEEL. Cen. diam. 23" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER. LATERAL PLAY BETWEEN TRUCK BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN PEDESTAL FITS-5/16" TOTAL.
Back Engine Truck NONE. Wheeled ---
To swing -- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating Parts {Engine, sch. No. 6-ET WESTG. COMBINED AUTOMATIC AND STRAIGHT AIR. / Eng. Tr'k, sch. ----}
Foundation Parts {Drivers, sch. W-1 AMERICAN O.S. EQUALIZED. / Eng. Tr'k, sch. ----}
Air pump ONE 9½" Pos. L.S.
Train connections FRONT AND BACK.
Train signal, sch. NONE.
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1697. {TENDER TO BE WEIGHED: YES.
Weight, with fuel and water, about 95,500 POUNDS.
TENDER TO BE DUPLICATE OF 10 30 D 554.
Tank 4500 Gallons, Bill 5746.
TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY - 8 TONS.

Tool Boxes OF WOOD, TOP.

Frame STEEL 10" CHANNEL WITH BUMPERS OF WOOD AND STEEL PLATE.

Front Drawbar height 31⅛"
Pilot NONE.
Back drawhead, center above rail 33½"
Coupler TOWER M.C.B. AUTOMATIC, LONG SHANK, WITH WESTG. FRICTION DRAFT GEAR.
STEPS, HAND HOLDS ETC., TO CONFORM TO I.C.C. REQUIREMENTS
Steps AT FRONT OF TENDER.

Trucks ARCH BAR TYPE, WITH BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B.L.W. MAKE.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 33" Tread 1½" Kind CHILLED CAST IRON PLATE.
Tires NONE. Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE.

Brake Position ON ALL WHEELS.
Brake sch. No. 6-ET WESTG. AUTO. AND STRAIGHT AIR WITH 12" x 12" TENDER BRAKE CYLINDERS.

List of tools, sch. 158.
Photo sch. No. 2 Inspection B.L.W.
To be weighed YES. Material specns B.L.W.
Certificate of boiler test (See * below)
Junior laws to 12-31-21 Shipment ON OWN WHEELS.

Brass shop finish, No. 1
Machine shop finish D-165.

* BOILER TEST CERTIFICATES, THREE COPIES B.L.W. FORM 1036, AND TWO COPIES B.L.W. FORM 491.

B. L. W. Patents NONE.

Property plates NONE.

Painting, style 291, OLIVE GREEN AND ALUMINUM.

MARKING TO BE SAME AS FOR 10 30 D 554.
Mark on TANK SIDES: LAURINBURG & SOUTHERN.

Road Nos. Pos. Road Nos. Name NONE.
F. No. Plate 655
Cab Panel
Back of Tank

Actual Dimensions of Loco. Extreme height over all 14' 3½"
Extreme Width: Cab boards 9' 11". Cylinders ~~same~~ 9' 11"
Length outside face front bumper of engine to face of tender wedge 32' 1"
Length face of tender wedge to outside face back bumper of tender 24' 5½"
Total length outside face front bumper of engine to outside face back bumper of tender 56' 6½"

THE BALDWIN LOCOMOTIVE WORKS Dup. 8 22 ½ C 49 WITH SAME EXTRAS, EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20122

SPECIFICATION FOR LOCOMOTIVES 8 22 ½ C 51

FOR MENGEL BOX COMPANY

HW.

7-26-20

Engine Drawing No. 14

Gauge of Road 4'8½" Play ⅜"
Wheelbase, Rigid 7'0" Driving 7'0" Total 21'7"
Total wheelbase, eng. and tend. { Actual 41'11" / Limited to ---
RAILS, 56 AND 60 LBS. PER YARD.
Curves 16 DEGREES GRADES 1%
LOCO. WILL BE RUN AS MUCH BACKWARD AS FORWARD.
Limits, Height --- Width ---
Weight (approximate) in working order, Total 73,000 POUNDS
On F. tr'k 11,000 lbs., Drivers 53,000 lbs., B. tr'k 9,000 lbs.

Tractive power 13,300 lbs., Ratio of adhesion 4.
Work'g St'm Pres. 160 lbs., Service SWITCHING
Fuel SOFT COAL

Boiler STEEL Thick ½" Bill 9851
Front Tube Sheet ½" Thick
Boiler, Diam. 48" Plan STRAIGHT TOP.
{ Allowable st'm pres. 160 lbs. **Tested to** { 180 lbs. steam pres. / With Factor of Safety of 6. { 214 lbs. water pres.
Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

Dome, diam. 25" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE
Firebox, length 53 11/16" Width 39¼" Depth F. 53" B. 51½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.
Water space, Front 4" Sides 3" Back 3"
Water space frame SINGLE Riveted
Water space stays ⅝" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O. S.

Radial stays 1" DIAM. Sling stays front { TWO ROWS B. L. W. / EXPANSION STAYS
Button heads below crown on FOUR central rows
Crown bars NONE Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 W. G. SEAMLESS STEEL
Tube ends SWAGED FOR COPPER FERRULES FIRE BOX ENDS.
Number 145 Diam. 2" Length 10'7¾"

Heating { Flues --- Combus. Chamb. --- Total 871.5
Surface { Tubes 801.8 Fire Box 69.7 Fire Brick Tubes ---
Grate area 12.7 Ratio to Heating Surface 1: 68.6
Superheater ---

Fire Brick ARCH, ON STUDS.

Grates ROCKING BARS WITH DROP PLATES
Ash Pan, Dampers RIGHT AND LEFT

Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L. S. ONLY
Spark ejector or nooper WITH
Netting and deflect. plates WITH

Exhaust nozzles DOUBLE HIGH

Stack STRAIGHT- Dia. 14"

Safety Valves TWO CONSOLIDATED 2" OPEN (NOT SPEC)
Safety valves NONE with relief lever, Set to 160 POUNDS
Whistle ONE B. L. W. PLAIN

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (NOT SPEC)
Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** TO BURN OIL
Gauge Cocks THREE BACK Surface valve NONE
Lowest gauge cock 3" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock ONE B. L. W. Pos:- FRONT
Cleaning Plugs
Firebox CORNERS, DIAGONAL AND BACK
Crown, TWO EACH SIDE AND TWO BACK
Waist, ONE UNDER FRONT
Front tube sheet, ONE Fusible plug ONE

Pump NONE

LOCOMOTIVE TO OPERATE AT CO'S PLANT AT RAYVILLE, LOUISIANA, AND MUST MEET ALL STATE LAWS OF LOUISIANA.
Injectors TWO HANCOCK TYPE "A" (NOT SPEC) No. 7
Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER
Pipes, Check IRON Feed IRON Overflow IRON
Check B. L. W. Pos. RIGHT AND LEFT

Steam Heat NONE

Cab WOOD VENTILATOR IN CAB ROOF.

Cab boards WOOD Nosing NONE
Running boards WOOD Nosing NONE
Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 32"

Pilot NONE Pushing shoes AT FRONT
Front Bumper OAK Bumper plate WITH
Steps ACROSS FRONT WITH HAND RAIL.

Coupler THREE POCKET CASTING WITH TOP POCKET OF SUITABLE HEIGHT TO COUPLE TO M. C. B. STANDARD CARS 33½" CEN. ABOVE RAIL. COUPLING PIN LIFTER TO BE PROVIDED. DO NOT FURNISH AUTO. COUPLER.
Signal fixtures IRON ON BUMPER

Headlight TWO ROUND CASE 16" Reflector To burn KEROSENE
Headlight, Nos. on sides WITH H'dl't step WITH
Lamp shell NONE Nosing ---

Bell 85 POUNDS
Sand Box TWO Diam. 23" Body IRON PAINTED Pipes IRON
Sander HAND, IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL Ptd. Bands IRON Style 9
Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

L. C. TANDY Dec. 1920

SPECIFICATION FOR LOCOMOTIVES 8 22 ½ C 51

FOR MENGEL BOX COMPANY

HW.

183
182

Frames CAST STEEL

Cylinders, Diam. 14" Stroke 22"
St'm ports, Length 13" Width 1¼" Bridges 1"
Exh. ports, Length 13" Width 2½" Valve lead 1/16"
Valve travel 4½" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 4½" By-pass valve NONE
S. P. Lub'r (NOT SPEC) DETROIT TRIPLE NO. 22 BULL'S EYE
Cyl'r heads CAST IRON LUBR. PIPES OF COPPER UNDER JACKET.
Cyl'r casings IRON PTD. Head covers STEEL PAINTED
St'm chest casings IRON PTD. Covers STEEL PAINTED
St'm chest valves (NOT SPEC) RICHARDSON BALANCED, WITH VACUUM VALVES
Met. pkg. (PISTON RODS / VALVE STEMS) U. S. KING TYPE.

Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN.
Guides STEEL Oil cups NEEDLE
Crossheads CAST STEEL
Wrist Pins STEEL Rod cups PLUNGER
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners NONE
Drivers, O. S. Diam. 44" Cen. diam. 38" CENTERS CAST IRON

Tires STEEL Held by SHRINKAGE AND SHOULDER
Tires, Flanged, Pos. ALL Size 3" x 5½"
Tires, Plain, Pos. NONE Size ---
Lateral play between driving boxes and wheel hubs = 3/16" TOTAL
Driving Boxes CAST IRON
Journals, Diam. 6½" Length 8"

Springs. Make STANDARD STEEL WORKS.

Front Engine Truck TWO Wheeled SWING BOLSTER CENTER BEARING
To swing 4" each side of cen., Cen. pin liners NONE
Journals, Diam. 4½" Length 7½" Boxes CAST IRON
Wheel hub liners NONE
Wheels, Diam. 26" Tread 4½" Kind CHILLED CAST IRON
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck TWO Wheeled SWING BOLSTER SIDE BEARING
To swing 4½" each side of cen., Cen. pin liners NONE
Journals, Diam. 4½" Length 7½" Boxes CAST IRON
Wheel hub liners NONE
Wheels, Diam. 26" Tread 4½" Kind CHILLED CAST IRON
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating { Engine, sch. No. 6 ET WESTG. COMBINED AUTO. AND / Parts { Eng. Trk, sch. --- STRAIGHT AIR.
Foundation { Drivers, sch. AW-1 AMERICAN OUTSIDE EQUALIZED / Parts { Eng. Trk, sch. ---
Air pump ONE 9½" Pos. LEFT SIDE
Train connections FRONT AND BACK
Train signal, sch. NONE
AIR RESERVOIR TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 356
Weight, with fuel and water, about 50,000 POUNDS
TENDER TO BE WEIGHED:- YES
Tank 2,500 Gallons, Bill 2839
TANK "U" SHAPE, SLOPING BACK. FUEL CAP. 5 TONS.

Tool Boxes HARD WOOD, TOP.

Frame OAK, AND YELLOW PINE

Front Drawbar height 28⅞"
Pilot NONE Pushing shoes AT REAR
Back drawhead, center above rail ---
Coupler THREE POCKET CASTING WITH TOP POCKET OF SUITABLE HEIGHT TO COUPLE TO M. C. B. STANDARD CARS, 33½" CENTRE ABOVE RAIL. COUPLING PIN LIFTER TO BE PROVIDED. DO NOT FURNISH AUTO. COUPLER
Steps ACROSS REAR WITH HAND RAIL.

Trucks ARCH BAR TYPE WITH WOOD BOLSTERS
TRUCK CHANNEL BAR TO BE LAID FLAT
Springs ELLIPTIC, STANDARD STEEL WORKS
Journals, Diam. 5½" Length 7" M. C. B. AXLE BOX ETC.,
Wheels, Diam. 28" Tread 4½" Kind CHILLED CAST IRON
Tires --- Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE

Brake Position ON ALL WHEELS
Brake sch. No. 6 ET WESTG. AUTO. AND STRAIGHT AIR WITH 8" x 12" CYLINDERS.

List of tools, sch. 26
Photo sch. No. 2 Inspection B. L. W.
To be weighed YES Material specing B. L. W.
Certificate of boiler test THREE COPIES OF B. L. W. FORM 1036
Junior laws to V7-30-20 Shipment ON OWN WHEELS

Brass shop finish, No. 1
Machine shop finish D-165

Painting, style 291, OLIVE GREEN AND ALUMINUM

LETTERING ETC., TO BE SIMILAR TO 8 22 ½ C 49
Mark on TANK SIDES:- C. C. MENGEL AND BRO. COMPANY

Road Nos. Pos. Road Nos. Name NONE
F. NO. PLATE 3
F. SAND BOX
CAB SIDES
BACK OF TANK

Actual Dimensions of Loco. Extreme height overall 11'11"
Extreme Width: Cab boards 8'7" FRONT BUMPER PLATE 8'9" (Between centers of drive wheels)
Length outside face front bumper of engine to face of tender wedge 25'4½"
Length face of tender wedge to outside face back bumper of tender 20'11½"
Total length outside face front bumper of engine to outside face back bumper of tender 46'4"

THE BALDWIN LOCOMOTIVE WORKS DUP. 12 38 ½ E 119 SAME EXTRAS EXCEPT AS OTHERWISE SPECIFIED.

Memorandum Specn {20019 FOR 153 / 20043 FOR 154}

SPECIFICATION FOR LOCOMOTIVES 12 38 ½ E 153 AND 154 2-20-20

WS **FOR** MIDLAND VALLEY RAILROAD COMPANY.

HW.

Gen. as PHOTO. 6348

Engine Drawing No. 19

2.3.20 (Spec'd)

Gauge of Road 4' 8½" Play ¾" EXCEPT ⅞" FOR F & B DRIVERS

Wheelbase, Rigid 15' 0" Driving 15' 0" Total 31' 8"

Total wheelbase, eng. and tend. {Actual 60' 7½" / Limited to ---}

GRADES COMPENSATED FOR CURVES. RAILS, 65 TO 75 LBS.

Curves 6 DEGREES GRADES, 0.6 OF 1%

BRIDGES: COPPER E-40.

Limits, Height --- Width ---

Weight (approximate) in working order, Total 200,500 POUNDS.

On F. tr'k 18,000 lbs. Drivers 154,500 lbs. B. tr'k 28,000 lbs.

Tractive power 37,390 lbs. Ratio of adhesion 4.1

Work'g St'm Pres. 185 lbs. Service FREIGHT

Fuel ARKANSAS SOFT COAL

1K **Boiler** STEEL Thick 11/16" Bill 8891

Front Tube Sheet ½" Thick

Boiler, Diam. 65" Plan STRAIGHT TOP.

{Allowable st'm pres. 200 lbs. / With Factor of Safety of 4.77} **Tested to** {220 lbs. steam pres. / 267 lbs. water pres.}

Longitud. seams BUTT JOINTED DOUBLE COVERING STRIPS, SEXTUPLE RIVETED.

3 **Dome,** diam. 29" Pos CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 102⅞" Width 65⅞" Depth F. 67½" B. 56½"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

5 Firedoor opening CVAL 16" x 20"

Water space, Front 4½" Sides 4½" Back 4½"

Water space frame DOUBLE Riveted

6 Water space stays ⅞" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O. S.

6 Radial stays 1" DIAM. Sling stays front {TWO ROWS OF B. L. W. EXPANSION STAYS.}

Button heads below crown on TEN central rows

Crown bars NONE Placed --- above crown

Crown bolts ----

Flues #9 W. G. STEEL

Tubes #11 W. G. CHARCOAL IRON OR STEEL

Tube ends SWAGED FOR COPPER FERRULES FIRE BOX ENDS

Number 24 / 172 Diam 5½" / 2" Length 19' 3"

Heating Surface	Flues 647.0	Combus. Chamb. ---	Total 2566.5
	Tubes 1728.0	Fire Box 166.5	Fire Brick Tubes 28.5

Grate area 46.8 Ratio to Heating Surface 1: 54.8

Superheater 562.0

Fire Brick ARCH (SEE SUP. 7)

Grates ROCKING BARS AND DROP PLATE.

Ash Pan, Dampers BACK ONLY.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater SCHMIDT TYPE (SEE SUP. 8 ETC.)

9 Cleaning hole and cap NONE

10 **Smokebox** extension WITH

Spark ejector or hopper NONE

11 Netting and deflect. plates WITH

Exhaust nozzles SINGLE, HIGH

Stack STEEL STRAIGHT Dia. 18"

Safety Valves TWO CROSBY 3"

Safety valves NONE with relief lever, Set to 185 POUNDS.

Whistle B. L. W. PLAIN

1 **Steam Gauge** ONE IRON 7" MAKER: ASHCROFT (Not Spec.)

Steam gauge stand IRON **Clock** NONE

15 **Cab Lamps** ELECTRIC

1 **Water Gauge** ONE KLINGER REFLEX

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE EVERLASTING POS:- FRONT

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS DIAGONAL, SIDES AND BACK

Crown, TWO EACH SIDE AND FOUR BACK

Waist, TWO UNDER, ONE IN FIRST AND ONE IN THIRD COURSES

Front tube sheet, TWO Fusible plug ONE

Pump NONE

Injectors TWO MONITOR (Not Spec.) No. 10

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check HANCOCK Pos. TOP OF BOILER

Steam Heat NONE

Cab STEEL WITH LARGE SIDE WINDOWS

Cab boards STEEL Nosing T-IRON

Running boards STEEL Nosing T-IRON

Hand rail IRON Located on BOILER

13 **Back Bumper** BAR STEEL Back drawbar height 32½"

12 **Pilot** WOOD Pushing shoes CAST IN BUMPER

Front Bumper CAST STEEL Bumper plate WITH

1 **Steps** HAND HOLDS ETC. TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler SIMPLEX M. C. B. AUTOMATIC

Signal fixtures (SEE SUP. 14 AND 47)

15 **Headlight** ONE ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH Hdl't step WITH

Lamp shelf NONE Nosing ---

Bell 92 POUNDS, SECURITY AIR BELL RINGER.

Sand Box ONE Diam. 33" Body IRON PAINTED Pipes IRON

Sanding (Not Spec.) LEACH AIR TRAP A-10, SANDING FRONT OF FRONT WHEELS, AND BACK OF MAIN WHEELS.

Dome casing IRON PAINTED

Boiler Jacket #22 PLAN. STEEL Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

Geo. P. Tucker April 1920.

SPECIFICATION FOR LOCOMOTIVES 12 38 ½ E 153 AND 154

FOR MIDLAND VALLEY RAILROAD COMPANY

HW.

16 **Frames** CAST STEEL

Cylinders, Diam 22" Stroke 28"

Stm ports, Length 2 5/16" Width 1½" Grades ---

Exh. ports, Length --- Width --- Valve lead ⅛"

Valve travel 5½" Steam lap 1" Exhaust clearance ---

Eccentric crank throw 22" By-pass valve NONE

S. P. Lub. DETROIT FIVE FEED HI-2 BULL'S EYE. (Spec'd)

Cyl'r bolts (SEE SUP. 17) LUBR. PIPES OF COPPER UNDER JACKET.

Cyl'r casings IRON PTD. Steam chests STEEL PAINED

Stm chest linings --- Covers ---

Stm chest valves 12" DIAM. PISTON TYPE

Met. pkg U. S. KING TYPE. (Spec'd)

Pistons (SEE SUP. 18)

Guides STEEL Oil cups NEEDLE

19 **Crossheads** CAST STEEL

Wrist Pins STEEL Rod cups GREASE CUPS FOR ALL RODS

PARALLEL RODS TO HAVE SOLID ENDS.

20 **Valve Motion** SOUTHERN, ROYALTY PAYABLE BY THE B. L. W.

Links, saddle blocks, and lifting links and eccentric rod jaws to be Case hardened or to have hardened bushings.

All threads on bolts (except stay bolts) to be United States Standard.

All finished moveable parts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners BRONZE

Drivers. O. S. Diam. 57" Cen. diam 50" CENTRES CAST STEEL.

24 **Tires** STEEL (SUP. 24) Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos ALL Size 3½" x 5½"

Tires, Plain, Pos. ---- Size ----

Lateral play between driving boxes and wheel hubs 3/16" TOTAL

Driving Boxes CAST STEEL, WITH ELVIN GREASE CELLARS

Journals, Diam {MAIN 9" / OTHERS 8½"} Length 12"

Springs. Make RAILWAY STEEL SPRING CO.

Front Engine Truck TWO Wheeled SWING BOLSTER CEN. BEARING

To swing 2½" each side of cen., Cen. pin liners NONE

Journals, Diam. 5½" Length 10" Boxes CAST IRON

Wheel hub liners BRONZE

27 Wheels, Diam. 33" Tread --- Kind CAST STEEL SPOKE CENTER

Tires STEEL Cen. diam. 28" Size 2½" x 5½"

Tires held by BOLTED TYPE FASTENING

Back Engine Truck TWO Wheeled OUTSIDE BEARING TYPE

To swing 3" each side of cen., Cen. pin liners NONE

Journals, Diam. 7½" Length 12" Boxes CAST STEEL

Wheel hub liners BRONZE

27 Wheels, Diam. 40" Tread --- Kind CAST STEEL SPOKE CENTER

Tires STEEL Cen. diam. 34" Size 3" x 5½"

Tires held by BOLTED TYPE FASTENING.

28 **Brake,** position ON ALL DRIVING AND TENDER WHEELS.

Operating Parts {Engine, sch. No. 6 ET WESTG. COMBINED AUTOMATIC AND STRAIGHT AIR. / Eng. Trk, sch. ---}

Foundation Parts {Drivers, sch. WN-2 BC AMERICAN O. S. EQUALIZED. / Eng. Trk, sch. ----}

Air pump TWO 9½" Pos. BOTH LEFT SIDE

Train connections FRONT AND BACK

Train signal, sch. NONE

28 AIR RESERVOIR TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

24c **Tender** EIGHT Wheeled, Drawing No. 610

Weight, {Empty and water about 115,000 POUNDS.

TENDER TO BE WEIGHED:- YES

Tank 6,000 Gallons Bill 3669

TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY - 10 TONS

Tool Box HARD WOOD, TOP.

Frame STEEL 12" CHANNELS, WITH BUMPERS OF WOOD, REINFORCED WITH CHANNEL

28 Front Drawbar height 30⅝"

Pilot NONE Pushing shoes NONE

Back Drawbar, Center above rail 33½"

Coupler SIMPLEX, M. C. B. AUTO. AND MINER FRICTION DRAFT GEAR, TYPE "A-18"

Steps HAND HOLDS, ETC. TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, RAILWAY STEEL SPRING COMPANY

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind CHILLED CAST IRON PLATE.

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake Position ON ALL WHEELS.

Brake sch. No. 6 ET WESTINGHOUSE AUTOMATIC AND STRAIGHT AIR, WITH 12" x 12" TENDER BRAKE CYLINDER.

List of tools, sch. 29

Photo sch. NONE Inspection (SEE SUP. 2)

To be weighed No Material specns B. L. W.

Certificate of boiler test THREE COPIES OF B. L. W. FORM 1036

Journal bars to 3.1.20 Shipment ON OWN WHEELS.

Brass shop finish No. 1

Machine shop finish D-165

B. L. W. {FEED PIPE STRAINER, PAT'D. SEPT. 1, 1903 (CAST ON)

Patents {BACK ENGINE TRUCK, 1060499, APR. 29, 1913 (BRASS PLATE)

Property plates B. L. W. FOR ENGINE AND TENDER.

Painting, style 291 OLIVE GREEN AND ALUMINUM.

LETTERING ETC. TO BE SAME AS FOR 12 38 ½ E 119

Mark on TANK SIDES, MIDLAND VALLEY

MARK ON BACK OF TANK, IN SMALL LETTERS AND FIGURES, 6000 GALS.

Road Nos. Pos.	Road Nos.	Name NONE
F. No. PLATE	72	
SAND BOX	73	
CAB SIDES		

Actual Dimensions of Loco. Extreme height over all 14'3⅝"

Extreme Width: Cab boards 10'3" ; Cylinders or valve motion 10'5"

Length outside face front bumper of engine to face of tender wedge 45'1⅛"

Length face of tender wedge to outside face back bumper of tender 26'2½"

Total length outside face front bumper of engine to outside face back bumper of tender 71'3⅝"

SPECIFICATION FOR LOCOMOTIVES 12 38 ½ E 153 AND 154

FOR MIDLAND VALLEY RAILROAD COMPANY

HW

1 LOCOMOTIVE TO CONFORM TO THE I. C. C. REQUIREMENTS.

2 INSPECTION BY MR. ALFRED LOVELL. FURNISH TO HIM COPIES OF ORDERS IN DUPLICATE FOR MATERIAL, COVERING PRINCIPAL ITEMS TESTED AND INSPECTED; AND ARRANGE TO GIVE HIM THE USUAL FACILITIES TO FOLLOW UP THE INSPECTION OF THE MATERIALS AND THE WORKMANSHIP OF THE LOCO. AS IT PASSES THROUGH THE SHOPS.

3 DOME C. H. STEEL, PRESSED OUT IN ONE SHEET.

4 AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

5 FIRE DOOR, FRANKLIN "BUTTER-FLY" TYPE.

6 WATER SPACE AND RADIAL STAYS OF EWALD IRON.
TATE FLEXIBLE STAYBOLTS OF EWALD IRON, ABOUT 300 IN NUMBER IN BREAKING ZONE.

7 FIRE BRICK - AMERICAN ARCH CO'S SECURITY ARCH SUPPORTED ON FOUR TUBES OF SEAMLESS STEEL No. 7 W. G. THICK, 3" O.S. DIAM.

8 SUPERHEATER AS LOCO. SUPERHEATER CO'S SPEC'N. NO. O-13011, DATED FEB. 19, 1920.
SUPERHEATER, TO CONNECT WITH TOP HEADER IN SMOKE BOX, AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. M.

9 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

10 SMOKE BOX FRONT AND DOOR OF STEEL.

11 FRONT END ARRANGEMENT TO BE M.M. STANDARD SELF CLEANER TYPE.

12 PILOT TO BE RAILROAD CO'S STANDARD DESIGN.

13 SPRING BUFFER TO BE APPLIED BETWEEN ENGINE AND TENDER.

14 COMBINATION BRACKET, RY. CO'S STYLE FOR BLIZZARD LAMPS AND FLAGS TO BE APPLIED ON FRONT AT CENTRE OF SMOKE BOX AT EACH SIDE. PROVIDE ALSO A FIXTURE ON EACH END OF PILOT BEAM FOR FLAGS AND A PAIR OF BRACKETS ON FACE OF PILOT BEAM FOR LAMPS.

15 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC TYPE K-2 WITH INCANDESCENT HEADLIGHT.

16 ENGINE FRAMES TO HAVE COMMONWEALTH CRADLE CASTING AND TAIL PIECE.

17 CYLINDER HEADS:- FRONT, CAST IRON, BACK, CAST STEEL.

18 PISTON HEADS OF HUNT SPILLER IRON FITTED WITH PACKING RINGS OF HUNT SPILLER IRON.

19 CROSSHEAD GIBS OF PHOSPHOR BRONZE.

20 SOUTHERN LOCO. VALVE GEAR LICENSE PLATES, COVERING VALVE GEAR TO BE APPLIED TO THE REAR END OF THE LINK SUPPORT ON EACH SIDE OF LOCO.

21 RAGONNET POWER REVERSE GEAR, AS COVERED ON EXTRA ORDER No. 16589, DATED 3-13-20.

22 CHICAGO FLANGE OILERS ELLIOTT SYSTEM, TO BE APPLIED TO FRONT OF FRONT DRIVERS.

24 DRIVING TIRES, RAILWAY STEEL SPRING CO.

23 ENGINE TRUCK WHEELS, FRONT AND BACK FROM THE RAILWAY STEEL SPRING CO.

23 AIR RESERVOIRS TO BE ENAMELLED.
BRAKE RIGGING TO HAVE CASE HARDENED BUSHING.

TENDER

A6 TENDER TO BE OF THE LONG, LOW DESIGN, HAVING TRUCKS WELL SPACED.

A7 COMBINATION BRACKETS FOR FLAGS AND LAMPS TO BE APPLIED ON EACH REAR CORNER OF TENDER AT THE TOP.

A8 SPRING BUFFER TO BE APPLIED BETWEEN ENGINE AND TENDER.

186 187

SPECIFICATION FOR LOCOMOTIVES - 12 38 ½ E 153 154

FOR MIDLAND VALLEY RAILROAD COMPANY

Specification for Type A Double Loop Superheater O-13011-DATED FEB. 12TH, 1920.

BOILER TUBES	172 in number 2 o.d. 13 W.G. 3 in. over tube sheets. Tubes locked in and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	24 in number 5 o.d. 9 W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card 1409-S
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, headed and pressed. Except for copper sheets. Front end to be rolled and headed. Rollers to have at least 5 rolls. Card 1136 Pressor to have at least 12 sections. Card 553-A
TUBE SHEET LAYOUT	
UNITS	24 units 15 o.d. 9 W.G. Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes tested by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide Card 10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on Card 1052
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A Card 10-H-L
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets [illegible] joint seats. Headers must not be treated with sal ammoniac [illegible] Header casting to be tight under water pressure of 250 lbs. [illegible] to be applied separately to the saturated and to the superheated steam passages so as to insure soundness of all partition walls Card 10502
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with Card 10598
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 1143-H
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer Card 1067 Card 4571-B
S. H. ARRANGEMENT	To be in accordance with
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 11106-L	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM.	Card 104	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. PIPE BAND	Card 1363
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1062-B	TYPE OF RETURN BENDS	FO GED
DAMPER SHAFT ARM	Card 1063	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O.S.)	Card 1148	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 1265-E	DEFLECTING PLATE HANDLE	Card 14-7
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10609
PATENT PLATE	Card 3612	DEFLECTING PLATE CLAMP	Card 10609-A
PYROMETER	NONE		

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7395

Memorandum Spec'n 22019

SPECIFICATION FOR LOCOMOTIVES 12 38¼ E 160 to 162

FOR Midland Valley Railroad Company

FXD

Gen. as Photo. 6348 {Except to have short pilot

Engine Drawing No. 19

3-21-22 (Spec)

Gauge of Road 4' 8½" Play ¾" except 7/8" for Rod Drivers.
Wheelbase, Rigid 15' 0" Driving 15' 0" Total 31 ' 8"
Total wheelbase, eng. and tend. {Actual 64' 5½" {Limited to ---

Grades compensated for curves.
Curves 10 degrees Grades, 0.6 of 1%
Bridges, Copper E-40 Rails, 65 and 75 pounds
Limits, Height --- Width ---
Weight (approximate) in working order, Total 199,500 pounds.
On F. tr'k 17,000 lbs. Drivers 155,500 lbs. B. tr'k 27,000 lbs.

Tractive power 37,370 lbs. Ratio of adhesion 4.17
Work'g St'm Pres. 185 lbs. Service Freight.
Fuel Arkansas Soft Coal

Boiler Steel Thick 1 1/16" Blt 8891
Front Tube Sheet ½" Thick
Boiler, Diam. 66" Plan Straight Top
{Allowable st'm pres. 200 lbs. **Tested to** {220 lbs. steam pres.
{With Factor of Safety of 4.77 {267 lbs. water pres.
Longitud. seams Butt jointed, double covering strips, sextuple riveted.
Dome, diam. 29" Pos. Central

Firebox Steel Combustion chamb. None
Firebox, length 102⅜" Width 65⅞" Depth F. 67½" B. 56½"
Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"
Firedoor Oval, 16" x 20"
Water space, Front 4½" Sides 4½" Back 4½"
Water space frame Double Riveted
Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O.S.
Radial stays 1" diam. Sling stays front {Two rows B. L. W. {Expansion stays
Button heads below crown on Ten central rows
Crown bars None Placed --- above crown
Crown bolts ---

Flues #9 B. W. G. Steel
Tubes No. 11 B.W.G. Charcoal Iron or steel, (B.L.W. Option)
Tube ends Swaged for copper ferrules, firebox ends
Number 24 Diam. 5⅜" Length 19' 3"
172 2"

Heating {Flues 647.5 Combus. Chamb. --- Total 2566.5
Surface {Tubes 1728 Fire Box 165 Fire Brick Tubes 28.5
Grate area 46.8 Ratio to Heating Surface 1: 54.8
Superheater 562

Fire Brick Arch (See sup. 6)

Grates Rocking bars and drop plate.
Ash Pan, Dampers Back only

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater Schmidt type, (See sup 8-c)

Smokebox extension With Cleaning hole and cap None
Spark ejector or hopper None
Netting and deflect. plates With

Exhaust nozzles Single, high

Stack Steel, straight Dia. 18"

Safety Valves Two Crosby 3" Open, style, HA-110
Safety valves None with relief lever. Set to 185 pounds

Whistle One B.L.W. Plain

Steam Gauge One Iron, 7" Maker: Ashcroft (spec)
Steam gauge stand Iron **Clock** None

Water Gauge One Klinger reflex **Cab Lamps** Electric
Gauge Cocks Three ~~Back~~ (Sup. 12½) Surface valve None
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock Two Crosby Pos: Right and left
Cleaning Plugs One plug above fire door.
Firebox, Corners diagonal, sides, front and back.
Crown, Two each side and four back.
Waist, Two under, one in first and one in third courses.
Front tube sheet, Two Fusible plug One

Pump None

Injectors Two Monitor (Spec) No. 10
Injectors, Pos. Right and left Steam pipes Copper
Pipes, Check Iron Feed Iron Overflow Iron
Check Hancock Pos. Top of boiler

Steam Heat None

Cab Steel, with Rushton ventilator and large side windows.

Cab boards to be covered with wood.
Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

Back Bumper (See sup. 21) Back drawbar height 33½"

Pilot Wood
Front Bumper Cast Steel Pushing shoes Cast in bumper
Steps Hand holds, etc., to conform to I.C.C. requirements. Bumper plate With

Front Drawhead, Center above rail 33½"
Coupler Simplex M.C.B. Automatic.

Signal fixtures (See sup. 16).

Headlight One Round Case 18" Reflector
Headlight, Nos. on sides With Hdlt'r stop With
Lamp shelf None Nosing ---

Bell 92 pounds, with Security Air Bell Ringer
Sand Box One Diam. 33" Body Iron painted Pipes Iron
Sanders (Spec) Leach Air Trap A-10 double, to sand front of front wheels and front of main wheels.
Dome casing Iron painted

Boiler Jacket #18 Soft Steel Bands Iron Style 9 and 14
Boiler Lagging Magnesia Sectional
Backhead of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

E. H. Kalbach May 1922

SPECIFICATION FOR LOCOMOTIVES 12 38¼ E 160 to 162

FOR Midland Valley Railroad Company

FXD

{Furnish one complete set of prints.

Frames Cast Steel

Cylinders, Diam. 22" Stroke 28"
St'm ports, Length 25¾" Width 1½" Bridges --
Exh. ports, Length --- Width --- Valve bad ⅛"
Valve travel 5¾" Steam lap 1" Exhaust clearance ---
Exhaust clearance (Spec) 22" By-pass valve None
S. F. Lubr. Detroit Five Feed No. 42 Bulls Eye
Cyl'r heads (Sup 22) Lubr. pipes of copper under jacket
Cyl'r casings Iron ptd. Head covers Steel painted
St'm chest castings --- Covers ---
St'm chest valves 12" diam. Piston type
Met'lic (Spec) United States, King type.

Pistons (See sup. 23)
Guides Steel Oil cups Needle
Crossheads Cast Steel (See sup. 24)
Wrist Pins Steel Rod cups Grease cups, forged on
Parallel rods to have solid ends.

Valve Motion Southern, Royalty payable by The B.L.W.
Links, sliding blocks, pins, lifting links and eccentric rod ends to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel Pub liners Bronze
Drivers, O. S. Diam. 57" Cen. diam. 50" Centers cast steel.

Tires, Steel (Sup. 28) Held by Shrinkage and shoulder
Tires, Flanged, Pos. All Size 3½" x 5½"
Tires, Plain, Pos. None Size ---
Lateral play between driving boxes and wheel hubs (See sup. 29)
Driving Boxes Cast Steel, with Elvin Grease Cellars.
Journals, Diam. Main 9" Length 12"
Others 8½"

Springs. Make Railway Steel Spring Co.

Front Engine Truck Two Wheeled Swing bolster, center bearing
To swing 2¼" each side of cent. Cen. pin liners None
Journals, Diam. 5½" Length 10" Boxes Cast Iron
Wheel hub liners Bronze
Wheels, Diam. 33" Tread --- Kind Cast steel spoke center.
Tires Steel Cen. diam. 28" Size 3½" x 5½"
Tires held by Bolted type fastening.

Back Engine Truck Two Wheeled Outside bearing type
To swing 3" each side of cent. Cen. pin liners None
Journals, Diam. 7½" Length 12" Boxes Cast Steel
Wheel hub liners Bronze
Wheels, Diam. 40" Tread --- Kind Cast steel spoke center
Tires Steel Cen. diam. 34" Size 3" x 5½"
Tires held by Bolted type fastening.

Brake, position On all driving and tender wheels.
Operating {Engine, sch No. 6ET Westg. Combined automatic and straight air
Parts {Eng. Trk. sch ---
Foundation {Drivers, sch. WN-2-BC American O.S. Equalized
Parts {Eng. Trk. sch ---
Air pump Two 9½" Pos. Both left side.
Train connections Front and back
Train signal, sch. None

Tender Eight Wheeled Drawing No. 1711
Weight, with fuel and water, about 161,000 pounds
Tender to be weighed: Yes
Tank 8000 Gallons full 5799
Tank "U" shape, straight top. Fuel capacity 14 tons.
Tank funnel to be 18" x 36"
Tank bottom Hard wood top

Frame Steel, 12" channels, with bumpers of wood, reinforced with steel channels.
Front Drawbar height 30½"
Pilot None
Back drawhead, center above rail 33½"
Coupler Simplex M.C.B. Autc. and Miner Friction Draft
Gear type "A-18"

Steps, hand holds etc., to conform to I.C.C. requirements.

Trucks Arch bar type with bolsters of cast steel
Side bearings on both trucks.
Springs Elliptic, Railway Steel Spring Company
Journals, Diam. 5½" Length 10"
Wheels, Diam. 33" Tread 4¼" Kind Chilled Cast Iron plate
Tires None Cen. diam. --- Size ---
Tires held by ---
Safety chains Single

Brake Position On all wheels
Brake sch. No. 6 ET Westinghouse Autc. and Straight Air, with 14" x 12" tender brake cylinder.

List of tools sent #158
Photo sch. No. 2 Inspection B. L. W.
To be weighed No Material supplied B. L. W.
Certificate of boiler test (See sup. 34)
Junior laws to 3-27-22 Shipment On own wheels (See sup 36)

Brass shop finish, No. 1
Machine shop finish D-165

Engine Brass Plate B. L. W., Rear truck No. 1060499 Patented, April 30, 1913
Patents Spring Clip No. 1013774 " January 3, 1912 (Cast on)

Property plates B. L. W. for engine and tender

Painting, style 291, Olive Green and Aluminum
Lettering etc., to be same as for 12 38¼ E 153 etc.
Mark on tank sides: Midland Valley
Mark on back of tank, in small letters and figures, 8000 gals.

Road Nos. P/Cs	Road Nos.	Name None
F. No. plate	74 to 76	
Sand Box		
Cab Sides.		

Actual Dimensions of Loco. Extreme height over all 14' 3½"
Extreme Width: Cab boards 10' 3" Cylinders --- 10' 6"
Length outside face front bumper of engine to face of tender wedge 41' 4¼"
Length face of tender wedge to outside face back bumper of tender 29' 0¼"
Total length outside face front bumper of engine to outside face back bumper of tender 70' 4½"

SPECIFICATION FOR LOCOMOTIVES 12 38¼ E 160 TO 162

FOR: MIDLAND VALLEY RAILROAD COMPANY

Specification for Type A Double Loop Superheater SPEC. O-17980 DATED APRIL 3RD, 1922

BOILER TUBES	172 in number 2" o.d 19 ft 3 in. over tube sheets. Tubes located between and adjacent to boiler fuses are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	24 in number 5½" o.d #9 B.W.G. cold drawn seamless steel. Fuses to be in accordance with the American Society for Testing Materials Specification A-28-18. Card	1409-S
BOILER FLUE SETTING	⅛ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, headed and prosecred except for copper sheets. Front end rolled and headed. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card	1136
	Card	553-A
TUBE SHEET LAYOUT		
UNITS	24 units ½" o.d #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in. Card	10773
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card	1052
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card	1064-L
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A Card	
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card	AHM 3x8 10502
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card	1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units. Card	10598
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.0. in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card	1067
PYROMETER	Model No. Pyrometer. Card	NONE
PYROMETER ARRANGEMENT	Generally in accordance with. Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration. Card	
S. H. ARRANGEMENT	In accordance with. Card	4571-B
TEST FINAL	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card	11106-1	S. H. UNIT BOLT WASHER	Card	1071
DAMPER CYL. ARM	Card	1074	S. H. UNIT CLAMP	Card	1073
DAMPER CYL. PIPE FITTING	Card	11115	S. H. UNIT CLAMP WASHER	Card	10305
DAMPER CYL. PIPE UNION	Card	11114	S. H. PIPE END	Card	1344
DAMPER CYCL PIPE CONNECTION	Card	1L-11437	S. H. PIPE BAND	Card	1966
DAMPER CYL. PIPING DIAGRAM	Card	3L-11442	SPACING OF BANDS & SUPPORTS	Card	10759
DAMPER CYL. SUPPORT	Card	---	TYPE OF RETURN BENDS		FORGED
DAMPER SHAFT	Card	1068-B	RETURN BENDS	Card	
DAMPER SHAFT ARM	Card	1065	LUBRICATOR CONNECTION	Card	3023
DAMPER SHAFT BEARING O. S.	Card	1148	DEFLECTING PLATE HANDLE	Card	1487
DAMPER SHAFT BEARING I.S.	Card	1275-E	DEFLECTING PLATE STUDS	Card	10809
DAMPER SHAFT LINK	Card	1070	DEFLECTING PLATE CLAMP	Card	10809-A
PATENT PLATE	Card	3L-3367			

191

190

SPECIFICATION FOR LOCOMOTIVES 12 38¼ E 160 TO 162

FOR MIDLAND VALLEY RAILROAD COMPANY

FXD

1 LOCOMOTIVE TO CONFORM TO THE I. C. C. REQUIREMENTS.

2 DOME, O.H. STEEL, PRESSED OUT IN ONE SHEET.

3 INSPECTION MANHOLE BACK OF MAIN DOME, WITH SAFETY VALVES AND WHISTLE PLACED IN MANHOLE COVER.

4 FIRE DOOR TO BE FRANKLIN "BUTTERFLY" TYPE.

5 WATER SPACE AND RADIAL STAYS OF EWALD IRON. STAY BOLTS TATE FLEXIBLE, OF EWALD IRON, ABOUT 300 IN NUMBER, IN BREAKING ZONE.

6 FIRE BRICK: AMERICAN ARCH CO'S SECURITY ARCH SUPPORTED ON FOUR TUBES OF SEAMLESS STEEL No. 7 B.W.G. THICK, 3" O. S. DIAMETER.

7 TENDER TO HAVE COAL PUSHER. (SEE SUP. 38)

8 SUPERHEATER AS THE SUPERHEATER CO'S SPECN. No. O-17980 DATED APRIL 3, 1922 (COPY ATTACHED). SUPERHEATER TO [illegible] WITH TOP HEADER IN SMOKE BOX, AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO STEAM CHESTS. ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. W.

9 PATENT PLATE (FROM STOCK) FROM THE SUPERHEATER CO., COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

10 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

11 SMOKE BOX FRONT AND DOOR OF PRESSED STEEL.

12¼ FRONT END ARRANGEMENT TO BE M. M. STANDARD SELF CLEANING TYPE.

12½ WATER COLUMN ON RIGHT SIDE OF BACK HEAD, GAUGE COCKS IN COLUMN. WATER GAUGE ON LEFT SIDE OF BACK HEAD.

13 BLOW-OFF COCKS OPERATING ARRANGEMENT TO BE CONVENIENT TO BOTH ENGINEER AND FIREMAN.

14 PILOT TO BE VERY SHORT DESIGN.

15 SPRING BUFFER TO BE APPLIED BETWEEN ENGINE AND TENDER.

16 COMBINATION BRACKET, RY. CO'S STYLE FOR BLIZZARD LAMPS AND FLAGS TO BE APPLIED ON FRONT AT CENTER OF SMOKE BOX AT EACH SIDE. PROVIDE ALSO A FIXTURE ON EACH END OF PILOT BEAM FOR FLAGS AND A PAIR OF BRACKETS ON FACE OF PILOT BEAM FOR LAMPS.

17 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2 WITH INCANDESCENT HEADLIGHT.

21 ENGINE FRAMES TO HAVE COMMONWEALTH CRADLE CASTING.

22 CYLINDER HEADS:- FRONT OF CAST IRON. BACK OF CAST STEEL

23 PISTON HEADS OF HUNT SPILLER IRON FITTED WITH PACKING RINGS OF HUNT SPILLER IRON. PISTON RODS TO BE KEYED TO CROSSHEADS.

24 CROSSHEAD BEARINGS OF PHOSPHOR BRONZE.

25 SOUTHERN LOCO. VALVE GEAR LICENSE PLATES, COVERING VALVE GEAR TO BE APPLIED TO THE REAR END OF THE LINK SUPPORT ON EACH SIDE OF LOCOMOTIVE.

26 RAGONNET POWER REVERSE GEAR, TYPE "B", AS COVERED ON EXTRA ORDER No. 5330 DATED 4-3-22.

27 CHICAGO FLANGE OILERS, ELLIOTT SYSTEM, TO BE APPLIED TO FRONT OF FRONT DRIVERS.

28 DRIVING TIRES FROM RAILWAY STEEL SPRING CO.

29 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN PEDESTAL FITS 7/32" TOTAL.

30 ENGINE TRUCK WHEELS, FRONT AND BACK, FROM THE RAILWAY STEEL SPRING CO.

31 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN PEDESTAL FITS 5/16" TOTAL.

32 LATERAL PLAY NETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN PEDESTAL FITS 5/16" TOTAL.

33 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS, AND TO BE ARRANGED TO PROVIDE EASY ACCESS TO MACHINERY.

34 CERTIFICATE OF BOILER TEST: THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

TENDER

35 SIX TENDERS COMPLETE COVERED ON EXTRA ORDER No. 5080 DATED 4-3-22 TO BE SHIPPED WITH LOCO.

37 TENDER TO BE OF THE LONG, LOW DESIGN, HAVING TRUCKS WELL SPACED SIMILAR TO 12 38¼ E 153.

38 TENDER TO BE EQUIPPED WITH COAL PUSHER OF THE SLOPING TYPE.

39 COMBINATION BRACKETS FOR FLAGS AND LAMPS TO BE APPLIED ON EACH REAR CORNER OF TENDER AT THE TOP.

40 SPRING BUFFER TO BE APPLIED BETWEEN ENGINE AND TENDER.

THE BALDWIN LOCOMOTIVE WORKS As Spec'd. C-6902

Memorandum Spec'n 2010

SPECIFICATION FOR LOCOMOTIVES ID 24 ¼ D 146

FOR W. G. MITCHELL LUMBER COMPANY

P

" Gen. as Photo. 1874 (except to have electric headlights, and rear headlight to be placed on top of cab.

Engine Drawing No. 25

3-25-21

Gauge of Road 4ft 8½in Play 3in

Wheelbase, Rigid 9ft 2in Driving 9ft 2in Total 23ft 9in

Total wheelbase, eng. and tend. Actual 45ft 2in / Limited to ---

Curves 18 degrees Grades 1%

Limits, Height --- Width ---

Weight (approximate) in working order, Total 89,000 pounds

On F. trk 9,500 lbs., Drivers 68,000 lbs., B. trk 11,500 lbs.

Tractive power 15,500 lbs., Ratio of adhesion 4.12

Work'g St'm Pres. 190 lbs., Service Logging

Fuel Soft Coal

Boiler Steel Thick 9/16" & 5/8" Bill 3380

Front Tube Sheet ½" Thick

Boiler, Diam. 80" Plan Extended wagon top

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 5.2 300 lbs. water pres.

Longitud. seams Butt jointed, double covering strips

Main dome - One-piece type. Auxiliar dome: None

Dome, diam. 25" Pos. Forward of fire box.

Firebox Steel Combustion chamb. None

Firebox, length 95½" Width 39½" Depth F. 64½" B. 59½"

Firebox, Tube ½" Crown ½" Sides ½" Back ½"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays ¾" diam. with 3/16" holes 14" deep from C. S.

Radial stays 1" diam. Sling stays front } Two rows B. L. W. / Expansion stays

Button heads below crown on Six central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues ---

Tubes No. 12 B. W. G. Charcoal iron or steel (B.L.W. option)

Tube ends Swaged for copper ferrules, fire box ends

Number 147 Diam. 2" Length 11ft 10½in

Heating Flues --- Combus. Chamb. --- Total 995

Surface Tubes 905 Fire Box 87 Fire Brick Tubes ---

Grate area 44.1 Ratio to Heating Surface 1 : 20.6

Superheater ---

Fire Brick Arch: On Studs

Grates Rocking bars and drop plates.

Ash Pan, Dampers Front and Back.

Ash pan to be "Panel" type pan that can be dumped from cab.

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater None

Smokebox extension With Cleaning hole and cap L.S. only

Spark arrester or deflector With

Netting and deflect. plates With

Exhaust nozzle Double, High

Stack Straight Dia. 13"

Safety Valves Two Consolidated 1½" Open

Safety valves Both with relief lever. Set to 190 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 6" Maker: U. S. Gauge Co.

Steam gauge stand Iron **Clock** None

Water Gauge One Klinger type **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve To have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Left Side

Cleaning Plugs One filling plug in top of boiler

Firebox, Corners, back ones diagonal, and R. S.

Crown, Two each side and two back.

Waist, One 2" plug under front about 12" back of smoke box.

Front tube sheet: One Fusible plug One

Pump None

Lubr. to be operated in Alabama.

Boiler to conform to The A. S. M. E. Code. (1918)

Boiler to be inspected by The Hartford Steam Boiler Inspection and Insurance Company.

Injectors Two Monitor (Lunkenheimer) No. 7

Injectors, Pos. R. and L. Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B.L.W., with stop valve Pos. R. and L.

Syphon: Handbook 4" No. 9 Ejector under cab boards on left side with pipe connection to tank and with 25 ft. of suction hose.

Steam Heat None

Cab Steel

Cab boards covered with wood planking ½" thick.

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 33"

Pilot Wood

Front Bumper Oak Bumper plate With

Steps Hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Auto., with slotted knuckle.

Signal fixtures Iron on bumper.

Headlight Equipment to be Schroeder Su beam Electric, Type RE-3 with incandescent headlights. Rear headlight on top of cab.

Headlight Two Round Case 18" Reflector

Headlight, Nos. on sides With Hdl't step With

Lamp shell None Nosing ---

Bell 35 pounds

Sand Box Two Diam. 23" Body Iron painted Pipes Iron

Sander Leach Air, Trap A-1, in each box, to sand front and back.

Dome casing Iron painted.

Boiler Jacket #22 Soft Steel ptd. Bands Iron Style 9

Boiler Lagging Magnesia Section on fire box and plastic magnesia on barrel.

THE BALDWIN LOCOMOTIVE WORKS

E. H. Roberts. May 1921

SPECIFICATION FOR LOCOMOTIVES 10 24 ¼ D 146

FOR W. G. Mitchell Lumber Company

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Frames Cast Steel

Cylinders, Diam. 15" Stroke 20"

St'm ports, Length 13" Width 1¼" Bridges 1"

Exh. ports, Length 13" Width 2½" Valve lead 1/16"

Valve travel 4½" Steam lap ¾" Exhaust clearance ---

Eccentric (Not Spec.) Throw 4½" By-pass valve None (With usual choke fittings at chest)

S. F. Lubr. (Not Spec.) Detroit Triple No. 22 Bulls Eye

Cyl'r heads Cast Iron Lubr. pipes of iron under jacket.

Cyl'r casings Iron painted Head covers Steel painted

St'm chest casings Iron painted Covers Steel painted

St'm chest valves Richardson Balanced, with vacuum valves.

Met. pkg. (Not Spec.) (Piston rods / Valve stems) United States, King Type

Piston rods to be keyed to crossheads.

Pistons Cast Iron rings sprung into solid head.

Guides Alligator type, steel Oil cups Needle

Crossheads Cast Steel, with bearings of cast iron, tinned

Wrist Pins Steel Rod cups Plunger, forged on

Parallel rods to have solid ends.

Valve Motion Stephenson

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners None

Drivers, O. S. Diam. 44" Cen. diam. 38" centers cast iron

Tires Steel Held by Shrinkage and shoulder

Tires, Flanged, Pos. Front and Back Size 3" x 5½"

Tires, Plain, Pos. Middle Size 3" x 6½"

Driving Boxes Cast Iron

Journals, Diam. 6" Length 8"

Lateral play between driving boxes and wheel hubs, including lateral play in box pedestal fits 7/32" total.

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing

To swing 3¾" each side of cen., Cen. pin liners None

Journals, Diam. 4½" Length 7½" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 26" Tread 1½" Kind Chilled cast iron plate

Tires None Cen. diam. --- Size ---

Tires held by Lateral play between front engine truck boxes and wheel hubs, including lateral play in box pedestal fits 5/16" total.

Back Engine Truck Two Wheeled Swing bolster, side bearing

To swing 3⅜" each side of cen., Cen. pin liners None

Journals, Diam. 4½" Length 7½" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 26" Tread 1½" Kind Chilled cast iron plate

Tires None Cen. diam. --- Size ---

Tires held by Lateral play between back eng. trk. boxes and wheel hubs, including lateral play in box pedestal fits 5/16" total.

Brake, position On all driving and tender wheels.

Operating Engine, sch. No. 6-ET Westg. Combined Auto. and Straight Air

Parts Eng. Tr'k, sch. ---

Foundation Drivers, sch. WM-1 American O. S. Equalized

Parts Eng. Tr'k, sch. ---

Air pump One 9½" Pos. Left Side

Train connections Front and Back

Train signal, sch. None

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1664

Weight, with fuel and water, about 65,000 pounds.

Tender to be weighed: Yes

Tank Water 3000 Gallons Bill 5225

Tank "U" shape, straight top. Fuel capacity 6 tons.

Syphon connection to left side of tank.

Tool Boxes Hard Wood, Top

Frame Steel, 6" and 8" channels, with bumpers of wood reinforced with steel plate.

Front Drawbar height 30⅝"

Pilot None

Back drawhead, center above rail 33½"

Coupler M. C. B. Automatic, with slotted knuckle.

Steps, hand holds etc. to conform to I. C. C. requirements

Trucks Arch Bar Type, with cast steel bolsters

Springs Elliptic, B. L. W.

Journals, Diam. 4½" Length 8"

Wheels, Diam. 30" Tread 1½" Kind Chilled cast iron plate

Tires None Cen. diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET Westinghouse Auto. and Straight Air, with 10" x 12" tender brake cylinder.

List of tools, sch. 155 One pair wrecking frogs.

Photo sch. No. 2 Inspection B.L.W., except for boiler (Sup. 1 inc.)

To be weighed Yes Material specifs B.L.W. Except for boiler (Sup. 1 inc.)

Certificate of boiler test Three copies B. L. W. form 1036

Junior laws to 1-5-21 Shipment On own wheels

Brass shop finish, No 1

Machine shop finish D-165

B. L. W. Patents None

Property Plates B. L. W., for engine and tender.

Painting, style 291, Olive Green and Aluminum

Mark on TANK SIDES: W. G. MITCHELL LUMBER COMPANY

Road Nos. Pur	Road Nos. 6	Name None
F. No. Plate		
F. Sand Box		
Cab Sides		
Back of Tank		

Actual Dimensions of Loco.

Extreme Width: Cab boards	9ft 0"	Width over F. Bumper	8ft 9"
Cylinders or valve motion		Width over Bk. Bumper	9ft 0½"
Extreme height over all	12ft 3½"		
Length outside face front bumper of engine to face of tender wedge			29ft 0½"
Length face of tender wedge to outside face back bumper of tender			21ft 7½"
Total length outside face front bumper of engine to outside face back bumper of tender			50ft 8½"

SPECIFICATION FOR LOCOMOTIVES 10 24 ½ D 146

FOR W. G. MITCHELL LUMBER CO.

RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF ALABAMA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYBOLT DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRANS. 3408.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜". (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ⅛" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ¼" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S

ALABAMA
(State in which boiler is to be used)
2
(Manufacturer's State number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (Boiler number)
(LEAVE BLANK) (Year put in service)
200 POUNDS
(Maximum working pressure when built)
(Manufacturer's Serial number)

THE BALDWIN LOCOMOTIVE WORKS AS SPEC'N. D-6718

Memorandum Spec'n 20136.

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3587.

EA/ **FOR** MONTANA, WYOMING & SOUTHERN R. R. CO.

DAR

Gen. as PHOTO. 7555.

Engine Drawing No. 103

9-3-20.

Gauge of Road 4' 8½" Play ¾" EXCEPT 7/8" FOR F. & B. DRIVERS

Wheelbase, Rigid 16' 0" Driving 16' 0" Total 24' 6"

Total wheelbase, eng. and tend. {Actual 57' 6" {Limited to ---

Curves 14 DEGREES,

GRADES 1% AND 5%. RAILS 56 POUNDS PER YARD.

Limits, Height --- Width---

Weight (approximate) in working order, Total 175,000 POUNDS.

On F. tr'k 21,000 lbs., Drivers 154,000 lbs., B. tr'k --- lbs.

WEIGHT LIMITED. DO NOT EXCEED WEIGHT SPECIFIED.

Tractive power 37,000 lbs., Ratio of adhesion 4.16

Work'g St'm Pres. 190 lbs., Service FREIGHT.

Fuel SOFT COAL.

Boiler STEEL. Thick 1 1/16" Bill 9304.

Front Tube Sheet ½" Thick

Boiler, Diam. 70" Plan STRAIGHT TOP.

Allowable st'm pres. 200 lbs. Tested to 220 lbs. steam pres.

With Factor of Safety of 4.7 Tested to 267 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS, SEXTUPLE RIVETED.

1. **Dome,** diam. 33" Pos. FORWARD OF FIRE BOX.

Firebox STEEL. Combustion chamb. NONE.

Firebox, length 96" Width 60 1/8" Depth F. 65 1/2" B. 52"

2. Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening OVAL 13" x 18"

[illegible] space, Front 4" Sides 4" Back 4"

Water space frame DOUBLE. Riveted

Water space stays ⅞" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front {THREE ROWS B.L.W. {EXPANSION STAYS.

Button heads below crown on TEN central rows

Crown bars NONE. Placed --- above crown

Crown bolts ---

Flues No.9 B.W.G. STEEL.

Tubes No.12 B.W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number {26 {162 Diam {5/8" {2" Length 13' 9"

Heating	Flues 500 sq. ft.	Combus. Chamb. ---	Total	1837 sq. ft.
Surface	Tubes 1159 sq. ft.	Fire Box 157 sq. ft.	Fire Brick Tubes	21 sq. ft.
Grate area	40 sq. ft.	Ratio to Heating Surface 1:	45.9	
Superheater	366 sq. ft.			

Fire Brick ARCH, AMERICAN SECURITY ON THREE TUBES.

Grates ROCKING BARS AND DROP PLATE.

Ash Pan, Dampers NONE.

3. **Throttle** BALANCE. Pos. DOME.

Dry pipe STEEL.

Superheater SCHMIDT TYPE. (SEE SUP. 4 ETC)

Smokebox extension WITH 6. Cleaning hole and cap L.S. ONLY.

Spark ejector or hopper WITH

Netting and deflect. plates WITH

Exhaust nozzles SINGLE, HIGH.

Stack CAST IRON, STRAIGHT. Dia. 17"

Safety Valves TWO CONSOLIDATED 2½" OPEN. (NOT SPEC)

Safety valves NONE. with relief lever, Set to 190 POUNDS.

Whistle ONE B.L.W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: ASHCROFT.

Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE B.L.W. IRONCLAD. **Cab Lamps** ELECTRIC.

Gauge Cocks THREE BACK. Surface valve NONE

Lowest gauge cock 1 1/8" above highest part of crown

Lubricator steam valve WITHOUT separate dry pipe to dome

Blower Valve B.L.W.

Blow off Cock ONE B.L.W. POS: FRONT.

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS DIAGONAL AND SIDES

Crown, TWO EACH SIDE AND TWO BACK.

Waist, ONE UNDER FRONT.

Front tube sheet. ONE. Fusible plug ONE.

Pump NONE.

Injectors TWO MONITOR (NOT SPEC) No. 9

Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.

Pipes, Check IRON. Feed IRON. Overflow IRON.

Check B.L.W. Pos. R. AND L.

Steam Heat NONE.

Cab STEEL.

Cab boards STEEL. Nosing T-IRON.

Running boards STEEL. Nosing T-IRON.

Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 32½"

Pilot WOOD.

Front Bumper CAST STEEL. Bumper plate NONE.

Steps, HAND HOLDS ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler M.C.B. AUTOMATIC.

Signal fixtures IRON ON BUMPER.

7. **Headlight** TWO ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH H'dl't step WITH

Lamp shelf NONE. Nosing ---

Bell 92 POUNDS. SOLLMAN AIR BELL RINGER.

Sand Box ONE Diam. 31" Body IRON PAINTED Pipes IRON.

Sander LEACH AIR, TRAP A-10 DOUBLE, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED, PRESSED STEEL TOP AND BOTTOM RINGS.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON. Style 9 AND 11½.

Boiler Lagging MAGNESIA SECTIONAL.

BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

H. B. LICHETTI Feb-1921

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SPECIFICATION FOR LOCOMOTIVES 10 36 E 3587.

FOR MONTANA, WYOMING & SOUTHERN R. R. CO.

DAR

Frames CAST STEEL.

Cylinders, Diam. 21" Stroke 28"

St'm ports, Length 22.32" Width 1-11/16" Bridges ---

Exh. ports, Length --- Width --- Valve lead 3/16"

Valve travel 5" Steam lap 1 5/16" Exhaust clearance ---

Eccentric crank throw 1 5/8" By-pass valve NONE.

S. F. Lubr. (NOT SPEC) NATHAN FIVE-FEED No.31 BULL'S EYE.

Cyl'r heads (SEE SUP. 8) LUBR. PIPES OF COPPER UNDER JACKET.

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED.

St'm chest casings --- Covers---

St'm chest valves 12" DIAM., PISTON TYPE.

Met. pkg. (NOT SPEC) (PISTON RODS / VALVE STEMS) UNITED STATES, KING TYPE.

9. **Pistons** HEADS OF CAST IRON, RINGS OF CAST IRON, SPRUNG IN.

10. **Guides** ALLIGATOR TYPE, STEEL. Oil cups NEEDLE.

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

11. **Wrist Pins** STEEL. Rod cups PLUNGER, FORGED ON.

Valve Motion WALSCHAERTS.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.

Driving wheel hub liners BRONZE, PRESSED INTO WHEELS.

Drivers, O. S. Diam. 54" Cen. diam. 48" CENTERS CAST STEEL.

Tires STEEL. Held by SHRINKAGE AND SHOULDER.

Tires, Flanged, Pos. ALL. Size 3" x 5 1/2"

Tires, Plain, Pos. NONE. Size ---

Lateral play between driving boxes and wheel hubs = 3/16" TOTAL.

Driving Boxes CAST STEEL.

Journals, Diam. 9½" Length 10"

Springs. Make, B.L.W.

Front Engine Truck TWO Wheeled SWING BOLSTER CENTER BEARING.

12. To swing 3 1/4" each side of cen., Cen. pin liners NONE.

Journals, Diam. 5½" Length 10" Boxes CAST IRON.

Wheel hub liners NONE.

Wheels, Diam. 30" Tread --- Kind CAST IRON SPOKE CENTER.

Tires STEEL. Cen. diam. 25" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE. Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating {Engine, sch. No.6-ET WESTG. COMBINED AUTO. AND STRAIGHT AIR.

Parts {Eng. Tr'k, sch. ---

Foundation {Drivers, sch. MN-2, AMERICAN O.S. EQUALIZED.

Parts. {Eng. Tr'k, sch. ---

Air pump ONE 8½" CROSS COMPOUND. Pos: L.S.

Train connections FRONT AND BACK.

Train signal, sch. NONE.

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1642

Weight, with fuel and water, about 141,000 POUNDS.

TENDER TO BE WEIGHED YES.

Tank 7000 Gallons, Bill 5567

TANK "U" SHAPE, WATER BOTTOM TYPE. FUEL CAPACITY 12 TONS.

Tool Boxes HARD WOOD, TOP.

Frame STEEL, 12" CHANNELS WITH BUMPERS OF WOOD.

Front Drawbar height 33 1/8"

Pilot NONE.

Back drawhead, center above rail 33½"

Coupler M.C.B. AUTOMATIC. NO. 12452-30 ON 3587. MINEHEART GEAR.

Steps HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE, WITH BOLSTERS OF CAST STEEL.

BOTH TRUCKS TO HAVE SIDE BEARINGS.

Springs ELLIPTIC, B.L.W. MAKE.

Journals, Diam. 5½" Length 10"

Wheels, Diam. 33" Tread 1¼" Kind CHILLED CAST IRON PLATE.

Tires NONE. Cen. diam. --- Size ---

Tires held by --- WHEEL RIMS 2½" THICK.

Safety chains SINGLE.

Brake Position ON ALL WHEELS.

Brake sch. No.6-ET.WESTG. AUTO. AND STRAIGHT AIR WITH 12" x 12" TENDER BRAKE CYL.

List of tools, sch. 29

Photo sch. NONE. Inspection (SEE SUP. 13)

To be weighed No. Material specns B.L.W.

Certificate of boiler test THREE COPIES B.L.W. FORM 1036.

Junior laws to 11-23-20 Shipment ON OWN WHEELS.

Brass shop finish, No. 1.

Machine shop finish D-165.

B. L. W. {Patents NONE.

Property plates B.L.W. FOR ENGINE AND TENDER.

Painting, style 291, OLIVE GREEN AND ALUMINUM.

MARKING OF STYLE TO SUIT B.L.W.

Mark on CAB PANEL ABOVE NUMBER, M. W. & S. IN 4" LETTERS.

Road Nos. Pos	Road Nos.	Name NONE.
F. No. Plate	10	
SAND BOX		
CAB PANELS		

Actual Dimensions of Loco. Extreme height over all 16' 0"

Extreme Width: Cab boards 10' 3" ; Cylinders ~~valve motion~~ 9' 5"

Length outside face front bumper of engine to face of tender wedge 35' 10"

Length face of tender wedge to outside face back bumper of tender 27' 8"

Total length outside face front bumper of engine to outside face back bumper of tender 63' 6"

SPECIFICATION FOR LOCOMOTIVES: 10 36 E 3587.

FOR: MONTANA, WYOMING & SOUTHERN R. R. Co.

BAR

1 MAIN DOME, ONE-PIECE TYPE.
AUXILIARY DOME, NONE.

2 FIRE BOX CROWN AND SIDES TO BE IN ONE SHEET.

3 THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.

4 SUPERHEATER AS LOCO. SUPERHEATER Co'S. SPEC'N. O-15260 DATED JAN. 15, 1920. (COPY ATTACHED)
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO STEAM CHESTS.
ROYALTY PAYABLE BY THE B.L.W.

5 PATENT PLATE (HEREWITH) COVERING SUPERHEATER, TO BE APPLIED TO SUPERHEATER DAMPER CYLINDER.

6 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

7 HEADLIGHT EQUIPMENT TO BE SUNBEAM, TYPE RE-3 WITH INCANDESCENT HEADLIGHTS.

8 CYLINDER HEADS, CAST STEEL, EXCEPT FRONT VALVE HEAD OF CAST IRON.

9 PISTON RODS TO BE KEYED TO CROSSHEADS.

10 GUIDE YOKE OF CAST STEEL.

11 PARALLEL RODS TO HAVE SOLID ENDS.

12 LATERAL PLAY BETWEEN TRUCK BOX AND WHEEL HUBS, ¼" TOTAL.

13 INSPECTION OF CONSTRUCTION AND MATERIALS BY A. LOVELL.
FURNISH TO HIM COPIES IN DUPLICATE OF PRINCIPAL MATERIAL ORDERS, COPY OF SHOP SPECIFICATION, BOILER CARD AND ERECTING CARD.

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SPECIFICATION FOR LOCOMOTIVE 10 36 E 3537.

FOR MONTANA, WYOMING & SOUTHERN R.R.Co.

Specification for Type A Double Loop Superheater SPECN. O-15260. DATED JANUARY 15TH. 1921.

BOILER TUBES	162 ...in number... 2 ...o.d... 13 ...ft... 9 ...in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	26 ...in number... 5½ ...o.d. #9 SWG...of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18.....Card 11025-E.
BOILER FLUE SETTING	⅛ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections.....Card 1136
TUBE SHEET LAYOUT	.....Card 50581.
UNITS	26...units. 1½...o.d...#9 B. W. G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide.....Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints.....Card 1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A.....Card 1064-A
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. AI-M 4x7-2. .....Card 10236
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place .....Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units .....Card SEE ARROT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing.....Card AL-1 1436.
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer.....Card 1067
PYROMETER	Model No.....Pyrometer.....None.....Card.....
PYROMETER ARRANGEMENT	Generally in accordance with.....Card.....
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration.....Card.....
S. H. ARRANGEMENT	In accordance with.....Card 10609-A.
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 11342-T.	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1388
DAMPER CYL. PIPING DIAGRAM	Card 2L-11442-	S. H. PIPE BAND	Card 1988
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 1075
DAMPER SHAFT	Card 1068-M	TYPE OF RETURN BENDS	Formed.
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O. S.	Card 1148-B.	ATOMIZATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.	Card 10386-P.	DEFLECTING PLATE HANDLE	Card 1457
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A.
DAMPER RIGGING.	CARD 1138-B.	DAMP. CYL. PIPE CONN.	CARD 1L-11437.

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. 0-6537

Memorandum Spec'n 20092

SPECIFICATION FOR LOCOMOTIVES 12-30 ♯ E 80

FOR Mount Hood Railroad

NW

Gen. as Photo. 6039 {Except to have rolled steel engine truck wheels.

Engine Drawing No. 10

4-9-20 (Spec.)

1 **Gauge of Road** 4' 8½" Play ⅜"

Wheelbase, Rigid 12'0" Driving 12'0" Total 27'7"

Total wheelbase, eng. and tend. {Actual 48' 1½" / Limited to ---

Rails 45 pounds per yard

Curves ---

Limits, Height --- Width ---

2 **Weight** (approximate) in working order, Total 144,000 pounds

On F. tr'k. 18,000 lbs., Drivers 108,000 lbs., B. tr'k 18,000 lbs.

Tractive power 27,000 lbs., Ratio of adhesion 4.

Work'g St'm Pres. 180 lbs., Service Freight

Fuel Oil (See sup. 5 etc.)

Boiler Steel Thick 11/16" Bill 8910

Front Tube Sheet ½" Thick

Boiler, Diam. 70" Plan Straight Top.

{Allowable st'm pres. 180 lbs. / With Factor of Safety of 4.84 **Tested to** 200 / 240 lbs. steam pres. / lbs. water pres.

Longitud. seams Butt jointed, double covering strips.

3 **Dome,** diam. 33" s. Central

Firebox Steel Combustion chamb. None

Firebox, length 89-11/16" Width 41" Depth F. 68" B. 59½"

4 Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" diam.

Water space, Front 4" Sides 3" Back 3"

Water space frame Double Riveted

Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O. S.

Radial stays 1" diam. Sling stays front {Three Rows B. L. W. Expansion Stays.

Button heads below crown on Eight central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues None

Tubes #12 W. G. Charcoal Iron or Steel (B. L. W. Option)

Tube ends Swaged for copper ferrules, fire box ends.

Number 263 Diam. 2" Length 12'1"

Heating Surface {Flues --- Combus. Chamb. --- Total 1795

{Tubes 1655 Fire Box 140 Fire Brick Tubes ---

Grate area 25.5 Ratio to Heating Surface 1: 70.2

Superheater ---

6 **Fire Brick** arch None

Fire box lined with fire brick, for oil burning.

Fire brick pavement in pan.

6 **Grates** None

Ash Pan, Dampers Front and Back

Throttle Balance Pos. Dome

7 Dry pipe Steel

Superheater None

Smokebox extension None Cleaning hole and cap None

Spark ejector or Japper None

Netting and deflect. plates None

Exhaust nozzles Double Low

Cleaning Pipe with

Stack Straight Dia. 18"

Gen. as Photo. 6039 {Except to have rolled steel engine truck wheels.

Engine Drawing No. 10

4-9-20 (Spec.)

Safety Valves Two Crosby 3" Open K.O. 11357-28

Safety valves None with relief lever, Set to 180 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Maker: Ashcroft

Steam gauge stand Iron **Clock** None

Water Gauge One B. L. W., Ironclad 9 **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock ¾" above highest part of crown

Lubricator steam valve To have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front

Cleaning Plugs One plug above fire door

Firebox, Corners diagonal, and sides

Crown, Two each side and two back

Waist, One under front

Front tube sheet, One Fusible plug One

Pump None

Injectors Two Simplex (Spec.) No 9

Injectors, Pos. Right and left Steam pipes Copper

Pipes, Check Steel Feed Steel Overflow Steel

Check B. L. W. Pos. Right and left

Steam Heat None

8 **Cab** Steel

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron located on Boiler

Back Bumper Bar Steel Back drawbar height 35½"

Pilot Wood, with step each side Pushing shoes None

Front Bumper Yellow Pine Bumper plate With

Steps Hand holds, etc. to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Auto.

Signal fixtures Iron on Bumper

9 **Headlight** Two Round Case 18" Reflector,

Headlight, Nos. on sides With Hd'l't step With

Lamp shelf None Nosing ---

Bell 92 pounds

Sand Box Two Diam. 31" Body Iron Painted Pipes Iron

Sanding Valve Leach Air, Train A-1 in each box, to sand front and back.

Dome casing Iron Painted

Boiler Jacket #18 Soft Steel Plt. Bands Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

P. M. Stewart

SPECIFICATION FOR LOCOMOTIVES 12-30 ♯ E 80 June 1920.

200

FOR Mount Hood Railroad

NW

199

Frames Cast Steel

Cylinders, Diam. 18" Stroke 24"

St'm ports, Length 19.63" Width 1-3/16" Bridges ---

Exh. ports, Length --- Width --- Valve lead ⅛"

Valve travel 1⅜" Steam lap 1 3/16" Exhaust clearance ---

Eccentric crank throw 11⅜" By-pass valve None

10 S. F. Lubr. Detroit triple No. 22 bulls eye. (Spec.)

Cyl'r heads Cast Iron Lubr. pipes of iron under jacket.

Cyl'r casings Iron Pcd. Head covers Steel Painted

St'm chest castings --- Covers ---

St'm chest valves 8" Diam. Piston Type.

Met. pkg. {Foster Pond Valve Mfgrs. United States, King Type. (Not Spec.)

Pistons Heads of Cast Iron with rings of Cast Iron Sprung In.

Guides Laird type, Steel Oil cups Needle

Crossheads Cast Steel with bearings of Bronze

Wrist Pins Steel Rod cups Plunger

Valve Motion Walschaerts

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All valve motion work to be bushed

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Bronze

Drivers, O. S. Diam. 1½" Cen. diam. 38"

Wheel centers:- Main, cast steel, others cast iron.

11 **Tires** Steel Held by Shrinkage and Shoulder

Tires, Flanged, Pos. Front and Back Size 3" x 5½"

Tires, Plain, Pos. Intermediate Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = 3/16" total

Driving Boxes Cast Steel

Journals, Diam. 7½" Length 8"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing Bolster, Center Bearing

To swing 14" each side of cen., Cen. pin liners None

Journals, Diam. 6½" Length 7½" Boxes Cast Iron

Wheel hub liners Brass (See Sup. 21)

Wheels, Diam. 28" Tread ½" Kind Solid Forged Rolled Steel

Tires None Cen. diam. --- Size ---

Tires held by --- Wheel rims 2½" thick

Back Engine Truck Two Wheeled Swing Bolster, Side Bearing

To swing 14" each side of cen., Cen. pin liners None

Journals, Diam. 6½" Length 7½" Boxes Cast Iron

Wheel hub liners Brass (See Sup. 21)

Wheels, Diam. 28" Tread ½" Kind Solid Forged Rolled Steel

Tires None Cen. diam. --- Size ---

Tires held by --- Wheel rims 2½" thick

Brake, position On all driving and tender wheels.

Operating Parts { Engine, sch. No. 6 ET Westg. combined auto. and straight air. / Eng. Tr'k, sch. ---

Foundation Parts { Drivers, sch. W-1 American O. S. Equalized / Eng. Tr'k, sch. ---

Air pump Two 9½" Pos. Both Left Side

Train connections Front and Back

Train signal, sch. None

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1552

Weight, with fuel and water, about 97,500 pounds

Tender to be weighed: Yes

Tank {Oil 1500 Gallons, Bill 5333 Oil / Water 2500 5332 Water

Tank "U" shape, straight top.

Tool Boxes of hard wood, top.

Frame Steel 6" and 8" channels with bumpers of wood and steel plate

Front Drawbar height 31½"

Pilot None Pushing shoes None

Back drawhead, center above rail 33½"

Coupler M. C. B. Auto.

Steps hand holds etc. to conform to I. C. C. requirements.

Step across rear of tender.

Steps and hand holds on all corners

Trucks Square knot iron equalized frames with built-up steel bolsters.

Springs Half Elliptic, B. L. W.

Journals, Diam. 3½" Length 7"

Wheels, Diam. 28" Tread ½" Kind Chilled Cast Iron Plate

Tires None Cen. diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6 ET Westg. auto. and straight air with 10"x12" cylinder.

List of tools, sch. 31 One pair breaking frogs

Photo sch. None Inspection B. L. W.

To be weighed Yes Material spec'ns B. L. W.

Certificate of boiler test Three copies of B. L. W. form 1036

Junior taws to 4-1-20 Shipment On own wheels

Brass shop finish, No 1

Machine shop finish D-165

Patents B. L. W. Feed Water Strainer, Pats. Sept. 1, 1903 (cast on)

Property plates None

Painting, style 291, Olive Green and Aluminum

Mark on tank sides: Mount Hood Railroad Company

Road Nos. Pos. Road Nos. Name None

F. No. Plate 11

Cab Sides

Back of Tank

Actual Dimensions of Loco. Extreme height over all 14' 6"

Extreme Width: Cab boards 9' 11" ; Cylinders or valve motion 9' 5"

Length outside face front bumper of engine to face of tender wedge = 32' 8"

Length face of tender wedge to outside face back bumper of tender = 31' 7"

Total length outside face front bumper of engine to outside face back bumper of tender = 64' 3"

SPECIFICATION FOR LOCOMOTIVES 12 30 ½ E 80

FOR Mount Hood Railroad

HW

201

200

1 Loco. for operation in Oregon.

2 Endeavor to keep weight on drivers down to 108,000 pounds. Throw remainder if possible, on trucks.

3 Auxiliary Dome - None

4 Crown and side sheets of fire box in one sheet.

5 Fuel oil with gravity of 14, and flash not less than 150.

6 Oil burning arrangement, B. L. W. Standard, with burner in front end of fire box.
Royalty, if any, payable by The B. L. W.

7 Steam pipe connections to valve chambers to be outside of smoke box.

8 Engineers seat to be B. L. W. Standard.

9 Headlight Equipment to be Schroeder Electric with Incandescent headlights.

10 Lubricator located so as to be visible to both engineer and fireman.

11 Detroit flange lubricators, to be applied to front of front drivers.

12 If whistle is applied in side of dome, road number to appear on front sand box: If whistle is not applied in side of dome, the number is to appear on dome instead of on sand box.

21 FOR HEREAFTER: Raise question about applying hub liners to front and back engine truck wheels. (R.S.McC. 6-19-20)

For Hereafter: Back engine truck bolster to be made of cast steel, and more clearance to be provided between back engine truck frame and back equal beam. (See 12/30½ E 49 etc.) R.S.McC. 4-8-21.

THE BALDWIN LOCOMOTIVE WORKS {As Specn. C-7285, Dup. 12 30 ¼ E 80. Except where otherwise specified.

Memorandum Spec'n 22027.

SPECIFICATION FOR LOCOMOTIVES 12 30 ¼ E 84.

W.M.S.

FOR Mount Hood Railroad Company.

H.N.B.

Gen. as Photo. 7509, {Except with two sand boxes, air brakes, and solid rolled steel engine buck wheels.

Engine Drawing No. 10

3-28-22.

Gauge of Road 4' 8½" Play ⅜", {except ⅝" for main and inter. drivers.

Wheelbase, Rigid 12' 0" Driving 12' 0" Total 27' 7"

Total wheelbase, eng. and tend. {Actual 48' 9½" / Limited to ---

Rails, 45 pounds per yard.

Curves 24 degrees. (See sup. 41)

Limits, Height --- Width ---

Weight (approximate) in working order, Total 139,000 pounds.

On F. tr'k 14,500 lbs., Drivers 107,000 lbs., B. tr'k 17,500 lbs.

Tractive power 27,000 lbs., Ratio of adhesion 3.96

Work'g St'm Pres. 180 lbs., Service Logging.

Fuel Oil, with gravity of 14.

Boiler Steel. Thick ⅞" Bill 9554.

Front Tube Sheet ½" Thick

Boiler, Diam. 70" Plan Straight top.

Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.

With Factor of Safety of 5.32 240 lbs. water pres.

Longitud. seams butt jointed, with double covering strips.

Main dome, One piece type. Auxiliary dome, None.

Dome, diam. 33" Pos. Forward of fire box.

Firebox Steel. Combustion chamb. None.

Firebox, length 89⅝" Width 41" Depth F. 68" B. 59⅜"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Double Riveted

Water space stays ⅞" diam. with 3/16" holes 1½" deep from O. S.

Radial stays 1" diam. Sling stays front {Three rows B. L. W. Expansion stays.

Button Heads below crown on Eight central rows to suit fuel oil.

Crown bars None. Placed --- above crown

Crown bolts ---

Flues ---

Tubes No. 12 B.W.G. Charcoal iron or steel, (B.L.W. Option)

Tube ends Swaged for copper ferrules, fire box ends.

Number 263 Diam. 2" Length 12' 1"

Heating Surface Flues --- Combus. Chamb. --- Total 1792⁵⁶

Tubes 1652⁵⁶ Fire Box 140⁵⁶ Fire Brick Tubes ---

Grate area 25.5⁵⁶ Ratio to Heating Surface 1: 70.2

Superheater ---

Fire Brick Arch, None.

Fire box lined with fire brick for oil burning.

Fire brick pavement in pan.

Grates None.

Ash Pan, Dampers Front and back.

Throttle Balance. Pos. Dome.

Dry pipe Steel.

Superheater None.

Smoke box to have short extension.

Smokebox extension Short Cleaning hole and cap None.

Spark ejector or hopper None.

Netting and deflect. plates None.

Exhaust nozzles Double, Lor.

Cleaning Pipe, with.

Stack Straight. Dia. 18"

Safety Valves Two Crosby 3" Open. (Spec)

Safety valves None with relief lever, Set to 180 pounds.

Whistle One B. L. W. Plain.

Steam Gauge One iron 7". Maker: Crosby. (Spec)

Steam gauge stand Iron. **Clock** None.

Water Gauge One Nathan Reflex **Cab Lamps** Electric.

Gauge Cocks Three back, Surface valve None.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W., Pos: Front.

Cleaning Plugs One plug above fire door.

Firebox, Corners diagonal and sides.

Crown, Two each side and two back.

Waist, One under front. One fusible plug extra.

Front tube sheet. One. Fusible plug One.

One filling plug in top of boiler.

Pump None.

Injectors Two Simplex (Spec) No. 9

Injectors, Pos. Right and left. Steam pipes Copper.

Pipes, Check Steel. Feed Steel. Overflow Steel.

Check Nathan reversible. Pos. Right and left.

Steam Heat None.

Cab Steel.

Engineer's seat to be Baldwin Standard.

Cab boards to be covered with wood.

Cab boards Steel. Nosing T-Iron.

Running boards Steel. Nosing T-Iron.

Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 35¼"

Pilot Steel.

Front Bumper Cast steel. Bumper plate With.

Steps Hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Auto.

Signal fixtures Iron on bumper.

Headlight Two round case 18" Reflector,

Headlight, Nos. on sides With. H'dlt step With.

Lamp shelf None. Nosing ---

Bell 92 pounds.

Sand Box Two Diam. 31" Body Iron painted. Pipes Iron.

Sander (Spec) Leach air, trap A-1, in each box, to sand front and back.

Dome casing Iron painted, with pressed steel top and bottom rings.

Boiler Jacket #18 Soft steel ptd. Bands Iron. Style 9

Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

H. K. Harwick May 1922

SPECIFICATION FOR LOCOMOTIVES 12 30 ¼ E 84.

FOR Mount Hood Railroad Company

H.N.B.

203

202

Frames Cast steel.

Cylinders, Diam. 18" Stroke 24"

Steam ports, Length 19.63" Width 1-3/16" Bridges ---

Exh. ports, Length --- Width --- Valve bead ⅛"

Valve travel 4½" Steam lap 1 3/16" Exhaust clearance ---

Eccentric crank throw 11⅞" By-pass valve None.

(Spec) Lubr. Detroit triple no. 22 Bull's Eye.

Cyl. heads Cast iron. Lubr. pipes of iron under jacket.

Cyl. casings Iron painted. Head covers Steel painted.

Steam chest casings --- Covers ---

Steam chest valves 8" diam., Piston type.

Main pkg. (Spec) Ipston rods Valve stems United States, King type.

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron, rings of cast iron sprung in.

Guides Laird type, steel. Oil cups Needle.

Crossheads Cast steel, with bearings of bronze.

Wrist Pins Steel. Rod cups Plunger.

Valve Motion Walschaerts.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be hard case hardened or to have hardened bushings.

All valve motion work to be bushed.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Bronze.

Drivers, O. S. Diam. 44" Cen. diam. 38" centers cast steel.

Tires Steel, (Sup 37) Held by Shrinkage and shoulder.

Tires, Flanged, Pos. All. Size 3" x 5½"

Tires, Plain, Pos. None. Size ---

Lateral play between driving boxes and wheel hubs = (See sup. 39)

Driving Boxes Cast steel, with grease cellars.

Journals, Diam. 7½" Length 8"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearings.

To swing 4½" each side of cen., Cen. pin liners None.

Journals, Diam. 4½" Length 7½" Boxes Cast iron.

Wheel hub liners Brass, on face of box next to hub of wheel.

Wheels, Diam. 28" Tread --- Kind Solid forged rolled steel.

Tires None. Cen. diam. --- Size ---

Tires held by --- Wheel rims, 2½" thick x 5½" wide.

Back Engine Truck Two Wheeled Swing bolster, side bearing.

To swing 5⅜" each side of cen., Cen. pin liners None.

Journals, Diam. 4½" Length 7½" Boxes Cast iron.

Wheel hub liners Brass, on face of box next to hub of wheel.

Wheels, Diam. 28" Tread --- Kind Solid forged rolled steel.

Tires None. Cen. diam. --- Size ---

Tires held by --- Wheel rims, 2½" thick x 5½" wide.

Brake, position On all driving and tender wheels.

Operating Parts { Engine, sch. No. 6 ET. Westg. combined auto. and straight air. / Eng. Tr'k, sch. ---

Foundation Parts { Drivers, sch. WN-1-BC, American O.S. equalized. / Eng. Tr'k, sch. ---

Air pump Two 9½" Pos. Both left side.

Train connections Front and back.

Train signal, sch. None.

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1714 {Tender to be weighed: Yes.

Weight, with fuel and water about 76,000 lbs.

Tank {Oil, 1500 5333 / Water, 3500 Capacity Bill 5306

Tank "U" shape, straight top.

Tool Boxes of wood, top.

Frame Steel, 6" and 8" channels, with bumpers of wood and steel plate.

Front Drawbar height 31¾"

Pilot None.

Back drawhead, center above rail 33½"

Coupler M. C. B. Auto.

Steps, hand holds, etc., to conform to I. C. C. requirements

Steps across rear, also steps and hand rails on all corners.

Trucks Vulcan side frames with bolsters of cast steel.

Springs Elliptic, B. L. W.

Journals, Diam. 4½" Length 8"

Wheels, Diam. 28" Tread 4½" Kind Chilled cast iron plate.

Tires Bone. Cen. diam. --- Size ---

Tires held by ---

Safety chains Single.

Brake Position On all wheels.

Brake sch. No. 6 ET. Westinghouse automatic and straight air, with 10" x 12" tender brake cylinders.

List of tools, sch. 160. One pair wrecking frogs. (See sup. 2-13-28)

Photo sch. None. Inspection B. L. W., except for boiler.

To be weighed No. Material specns B. L. W., except for boiler. (See sup. 4-10-27)

Certificate of boiler test (See sup. 2-29)

Junior laws to 4-1-20 Shipment On own wheels.

Brass shop finish, No. 1.

Machine shop finish D-165.

B. L. W. Patents None

Property plates B. L. W., for engine and tender.

Painting, style 291, Olive green and aluminum.

Lettering, etc., to be similar to that on 12 30 ¼ E 80.

Mark on tank sides:- Mount Hood Railroad

Classification mark on cab panel below the road number } 4-4 18/24-107

Road Nos. Pos. Road Nos. Name None.

F. No. plate. 1

Dome sides.

Cab sides.

Back of tank.

Actual Dimensions of Loco. Extreme height over all 14' 6"

Extreme Width: Cab boards 9' 11". Cylinders or valve motion 9' 5"

Length outside face front bumper of engine to face of tender wedge 32' 8½"

Length face of tender wedge to outside face back bumper of tender 21' 7½"

Total length outside face front bumper of engine to outside face back bumper of tender 54' 3⅜"

SPECIFICATION FOR LOCOMOTIVES 12 30 ½ E 84

FOR Mount Hood R.R. Co.

J.S.W. 1.31.29

1 Boilers to be built to conform to the Locomotive Boiler Code of the American Society of Mechanical Engineers (1921) or to the requirements of the State of Oregon must be inspected during construction and upon completion by an authorized inspector.

2 A data report, on forms furnished by the above mentioned state shall be forwarded to the proper official before the boiler leaves the builder's works.

3 A hydrostatic test shall be applied equal to 1¼ times Boiler pressure. (Follows B.L.W. practice of 1½ times Boiler pressure)

4 The material entering into the construction shall conform to the following specifications:-

Boiler and Fire Box Steel & Material for One-piece Dome	A.S.M.E. Spec. Page 11
Boiler Rivet Steel	A. S. M. E. Spec. Page 15
Boiler Rivet Iron	A. S. M. E. Spec. Page 31
Boiler Brace Iron	A. S. M. E. Spec. Page 37
Boiler Staybolt Iron	A. S. M. E. Spec. Page 34
Boiler Tubes	A. S. M. E. Spec. Page 40, except as modified by paragraph L-18 Loco. Boiler Code of 1921.

5 Tubes 2" and 2¼" diam. to be No. 12 B.W.G. up to 200 pounds pressure, and No. 11 B.W.G. for pressure over 200 pounds.

6 All boiler and fire box steel and material for one-piece dome shall be marked by the manufacturer with the heat number, name of manufacturer, grade and lowest tensile strength in the manner and location described on B.L.W. Marking Card 6859. This marking card should be ordered on the card sheet and on the store room sheet for boiler steel, and for material for one-piece dome. Smoke box steel may conform to B. L. W. specification.

7 The minimum factor of safety shall be 4½ (1921) Longitudinal seams shall be of butt and double strap construction.

8 In addition to B.L.W. practice, the maximum pitch of staybolts for 5/16" plates, should not be more than given in table:-

Stays Diam.	Pressure	5/16" Plate Pitch
7/8"	160 lbs.	4.41"
7/8"	180 lbs.	4.16"
7/8"	190 lbs.	4.05"
7/8"	200 lbs.	3.95"
1"	225 lbs.	3.72"

9 Welded braces shall not be subjected to a fibre stress in excess of 6,600 lbs. per sq. in. For method of calculating these stresses, see Trac. 34108.

10 Stress in staybolts shall not exceed 7,500 lbs. per sq. in.

11 The minimum thickness of tube sheets shall be as follows:-

Outside diam. of tube sheet	Minimum thickness
42" or less	3/8"
Over 42" to 54" inclusive	7/16"
Over 54"	1/2"

When a tube sheet is not circular in form (i.e. fire box tube sheet) the least dimension of such sheet shall determine its thickness.

12 Dome:- One-piece domes may be used for all pressures, but shall not be located over the fire box on boilers above 48" barrel diameter. B. L. W. three-piece domes may be used for pressures up to and including 180 lbs. provided the vertical seam is fire welded. Above 180 lbs., the vertical seam must be of the double butt construction.

13 The outside end of solid staybolts 14" and less in length (excluding stays in large radius of crown) shall be drilled with a hole at least 3/16" diam. to a depth extending at least ½" beyond the inside of the plates.

15 The thickness of the wrapper sheet should be checked to see that it conforms to paragraph L 43 A and L 43 B before ordering material for boiler.

16 In bracing tube sheets and back head, follow paragraph L 45 and order only the stay cards that have been made to meet these requirements.

17 All holes for injector checks, whistle and safety valves when screwed into boiler, and all holes in boiler barrel, fire box, roof sheet, and all unstayed surfaces when the diameter is over 3¼" and exceeds 4½ times the thickness of the plate must be reinforced with a liner or flange riveted to the boiler. The thickness of the liner or flange must be at least 75% of the thickness of the plate and the rivets must have a shearing strength of at least 52% of the tensile strength of the metal removed.

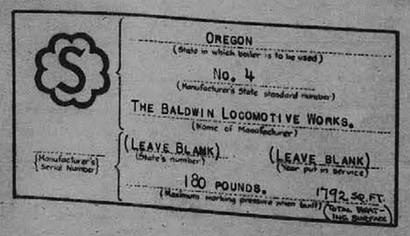
18 Each boiler must be provided with a connection ¼" pipe size for attaching Inspector's Test Gauge.

19 Safety valves must be ordered to meet the requirements of the A.S.M.E. Boiler Code and must be plainly stamped by the manufacturer per B. L. W. marking card #6858. This Marking Card should be specified on Store Room Sheet.
Safety valve elbows or fittings connecting several valves must have an opening equal to be combined area of all the valves.

20 There shall be not less than eight brass washout plugs located as follows:-
One or more in barrel of boiler.
One or more each side of roof sheet above level of crown.
One or more in back head at or about line of crown sheet.
One above fire door.
Four in lower part of water leg, at corners.
Screw plugs must have at least four full threads in sheet.

21 Shop Practice:- Rivet holes except for attaching stay feet and T-iron to heads shall be drilled full size with plates, butt straps and heads bolted up in place: or they may be punched out not to exceed ¼" less than full size for plates over 5/16" in thickness, and ⅛" less than full size for plates 5/16" and under, and then drilled or reamed to full size with plates, butt straps and heads bolted up in position. The tube holes may be drilled full size, or they may be punched not to exceed ⅛" less than full size, and then drilled, reamed or finished full size with rotating cutter.

22 Upon completion, each boiler shall be stamped in the presence of the authorized inspector, with the words as arranged below. The height of the letters and figures shall not be less than ¼" The location of the stamp shall be on the back head above a plug hole.



SPECIFICATION FOR LOCOMOTIVES 12 30½ E 84

FOR Mount Hood Railroad Company

205

204

FKD

26 Locomotive to be operated in Oregon.

27 Boiler to meet A. S. M. E. Code. (See sup. 1 to 22)

28 Boiler to be inspected by Hartford Steam Boiler Inspection and Insurance Company.

29 Certificates of Boiler Test: Three copies B. L. W. form 1036, and five copies B. L. W. 1915.

30 Oil burning arrangement to be Baldwin Standard with burner in front end of fire box.
Royalty, if any, payable by The B. L. W.

31 Steam pipe connections to steam chests to be outside of smoke box.

32 Injector checks to have flange connections to boiler.

33 Pilot to be same style as for 10 34 E 2113.

34 Headlight equipment to be Schroeder electric, with incandescent headlights.

35 Lubricator to be located so as to be visible to both the engineer and fireman.

36 Main rod stubs to have three bolts through strap and adjustable wedge.
Parallel rods to have solid ends and brasses (no strap).

37 Driving tires from The Standard Steel Works.

38 Detroit flange lubricator to be applied to front and rear drivers.

39 Lateral play between driving boxes and wheel hubs including lateral play in pedestal fits 7/32 total.

40 Front engine truck to have cast steel bolster.

41 Swing of front and back engine trucks to be checked to make sure they will negotiate 24 degree curves easily.

42 Lateral play between front engine truck boxes and wheel hubs including lateral play in pedestal fits 5/16 total.

43 Back engine truck to have cast steel bolster.

44 Lateral play between back engine truck boxes and wheel hubs including lateral play in pedestal fits 5/16 total.

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-9461 Sup. 6 36 D 218

Memorandum Spec'n 20,080

SPECIFICATION FOR LOCOMOTIVES 6 36 D 320

EE/ **FOR** The New Jersey Zinc Company

HW.

Gen. as Photo. 5385

Engine Drawing No. 25

3.27.20

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"
Total wheelbase, eng. and tend. Actual 42'4½" / Limited to ---.

21 **Curves** 15 degrees No. 7 Frogs.
Rails, 80 pounds.
Limits, Height --- Width ---
Weight (approximate) in working order, Total 146,000 pounds
On F. tr'k --- lbs., Drivers 146,000 lbs., B. tr'k --- lbs.

Tractive power 35,400 lbs., Ratio of adhesion 4.1
Work'g St'm Pres. 185 lbs., Service Switching
Fuel Soft coal and buckwheat coal.

1 2 22 **Boiler** Steel Thick 21/32" Bill 9017
5 Front Tube Sheet ½" Thick
Boiler, Diam. 66" Plan Straight Top.
3 Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.
6 With Factor of Safety of 5.07 **Tested to** 300 lbs. water pres.
6.18 Longitud. seams (See Sup. 25)

5 **Dome,** diam. 29" Pos. Central

2 5 **Firebox** Steel Combustion chamb. None
Firebox, length 107⅞" Width 100" Depth F. 61" B. 53"
10 Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening Two 16" diam. Crown and sides in one sheet.
Water space, Front 4" Sides 3½" Back 3½"
Water space frame Double Riveted
7 24 7 Water space stays ⅜" diam. with 3/16" holes 12" deep from C.S.
7 Radial stays 1" diam. Sling stays front { Two rows B.L.W. / Expansion Stays
Button heads below crown on Eight central rows
Crown bars None Placed --- above crown
Crown bolts ---

H Flues ---
18 **Tubes** #12 W. G. Seamless Steel for 320 only (A/C error)
Tube ends Swaged for copper ferrules, fire box ends.
Number 306 Diam. 2" Length 11' 0"

Heating, Flues --- Combus. Chamb. --- Total 1920
Surface Tubes 1749 Fire Box 171 Fire Brick Tubes ---
Grate area 75 Ratio to Heating Surface 1: 25.6
Superheater ---

Fire Brick Arch, None

Grates Rocking bars and drop plate
Ash Pan, Dampers Back Only

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

5 **Smokebox** extension With Cleaning hole and cap L.S. Only
Spark ~~diectors~~ hopper With
Netting and deflect. plates With

Exhaust nozzles Double, High

Stack Straight Dia. 18"

8 (Spec) **Safety Valves** Two Coale 3" Open
16 Safety valves both with relief lever, Set to 185 pounds
8 **Whistle** One B. L. W. Plain

8 9 **Steam Gauge** One iron 7" Maker: Ashcroft (Not Spec)
Steam gauge stand Iron **Clock** None
8 Glass water gauge to be placed on the right side.
8 **Water Gauge** One Klinger **Cab Lamps** To burn oil
8 **Gauge Cocks** Three Back Surface valve None
Lowest gauge cock 3" above highest part of crown
Lubricator steam valve To have separate dry pipe to dome
8 **Blower Valve** B. L. W.

8 **Blow off Cock** One B. L. W. Pos: Front
17 **Cleaning Plugs**
Firebox, Corners, diagonal, and sides
Crown, Two R. S. Three L. S. and four back
Waist, One under front
Front tube sheet, One 10 fusible plug One

Pump None

Injectors Two Sellers, class "N" (Spec) No. 9½
Injectors, Pos. R. and L. Steam pipes Copper
8 15 Pipes, Check Iron Feed Iron Overflow Iron
Check B. L. W. with stop valve Pos. R. and L.

Steam Heat None

Cab Steel

Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

Black **Back Bumper** Bar Steel Back drawbar height 31"
Spring buffer between engine and tender.

Pilot None Pushing shoes At front
Front Bumper Cast Steel Bumper plate With
Steps across front, with hand rail.
Steps, hand holds, etc. to conform to I.C.C. requirements.
Front Drawhead, Center above rail 34½"
Coupler Sharon M.C.B. auto. shown in N.M.Co's catalogue
No. 2445 page 54.

Signal fixtures Iron on Bumper

Headlight Two Round case 16" Reflector, To burn Kerosene
Headlight, Nos. on sides With Hdlt stop With
Lamp shelf None Nosing ---

Bell 92 pounds
Sand Box Two Diam. 28" Body Iron Painted Pipes Iron
Sander (Spec) Leach air, trap A-1 in each box to sand front and back.

Dome casing Iron Painted

Boiler Jacket #22 soft steel ptd. Bands Iron Style 9
Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

E. Steele June 1920 207

SPECIFICATION FOR LOCOMOTIVES 6 36 D 320

FOR The New Jersey Zinc Company

HW

Frames Cast Steel

Cylinders, Diam. 21" Stroke 26"
St'm ports, Length 19" Width 1⅝" Bridges 1⅝"
Exh. ports, Length 19" Width 3" Valve lead ¼"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 11-9/16" By-pass valve None
(Spec) S. F. Lubr. Detroit triple No. 22 Bull's eye.
Cyl'r heads Cast Iron Lubr. pipes of iron under jacket.
Cyl'r casings Iron ptd. Head covers Steel ptd.
St'm chest casings Iron ptd. Covers Steel ptd.
St'm chest valves Richardson balanced with vacuum valves
(Not Spec) Mint pkg. Piston rods Valve stems **United States, King type.**
Piston rods to be keyed to crosshead.
Pistons heads of cast iron with rings of cast iron sprung in
28 **Guides** Steel Oil cups Needle
Crossheads Cast steel with bearings of cast iron, tinned.
Wrist Pins Steel Rod cups Plunger
Parallel rods to have solid ends.

29 **Valve Motion** Walschaerts
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.
Driving wheel hub liners Brass for main wheels only
Drivers, O. S. Diam. 51" Cen. diam. 44"
Centres:—main cast steel, others cast iron.
Tires Steel Held by Shrinkage and shoulder
Tires, Flanged, Pos. Front and back Size 3½" x 5½"
Tires, Plain, Pos. Middle Size 3½" x 6½"
Lateral play between driving boxes and wheel hubs = 3/16" total
Driving Boxes Steeled cast iron
Journals, Diam. 9" Length 11"

Springs. Make Railway Steel Spring Co's.

Front Engine Truck None Wheeled ---
To swing --- each side of cen. Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck None Wheeled ---
To swing --- each side of cen. Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels.
Operating Engine, sch. No. 6 ET Westg. combined auto. and
Parts Eng. Trk. sch. --- straight air
Foundation Drivers, sch. WM-2 American O.S. Equalized
Parts Eng. Trk. sch. ---
Air pump One 11" Pos. L.S.
Train connections Front and back
Train signal, sch. None
Air reservoir to have large capacity and to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1550
Weight, with fuel and water, about 90,000 pounds.
Tender to be weighed: Yes
Tank 4,500 Gallons. Bill 5322
Tank "U" shape, sloping back. Fuel capacity 8 tons.

Tool Boxes Hard wood, top.

Frame Steel, 10" channels, with bumpers of cast steel.
Spring buffer between engine and tender.
Front Drawbar height 28½"
Pilot None Pushing shoes Cast in rear bumper
Back drawbeam, center above rail 34½"
Coupler Sharon M.C.B. auto. shown in N.M.C.Co's catalogue
No. 2445 page 54.
Steps, hand holds, etc. to conform to I.C.C. requirements.
Steps across rear with hand rails, also steps on sloping back of tank.

Trucks all metal arch bar type, with steel bolsters.

Springs Elliptic, Railway Steel Spring Company's.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate
Tires None Cen. diam. --- Size ---
Tires held by ---
Safety chains Single

Brake Position On all wheels
Brake sch. No. 6 ET Westinghouse automatic and straight air, with 12" x 12" tender brake cylinder.

List of tools, sch. 29
Photo sch. None Inspection B.L.W. except for boiler (Sup. 1 to 23 30)
To be weighed No Material specns B.L.W. except for boiler (sup. 4)
26 Certificate of boiler test Three copies of B.L.W. form 1036
Junior laws to 5.22.20 Shipment on own wheels.

Brass shop finish, No. 1
Machine shop finish D-165

B.L.W. Patents Feed Water Strainer, Patented Sept. 1, 1903 (cast on)

Property plates None

Painting, style --- Black, no striping.
Lettering etc. in yellow, Standard Railroad Block type as pencil sketch (herewith)
31 Mark on sides of cab and tank { The N. J. Z. Co. (of Pa.)

Road Nos. Pos. Road Nos Name None
F. No. Plate 17
F. Sand box
Cab sides
Sides of tank Ass Back

Actual Dimensions of Loco. Extreme height over all 15'0"
Extreme Width: Cab boards 10'3½" Cylinders ~~over valve casings~~ 10'1"
Length outside face front bumper of engine to face of tender wedge 29'8⅝"
Length face of tender wedge to outside face back bumper of tender 25'1"
Total length outside face front bumper of engine to outside face back bumper of tender 54'9⅝"

SPECIFICATION FOR LOCOMOTIVES 6 36 D 320

FOR THE NEW JERSEY ZINC COMPANY

RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF PENNSYLVANIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
2 7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (i. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜". (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S
PENNSYLVANIA (State in which boiler is to be used)
10 (Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS (Name of manufacturer)
(LEAVE BLANK) (State's number) (Manufacturer's serial number)
(LEAVE BLANK) (Year put in service)
200 LBS. (Maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVES 6 36 D 320

FOR THE NEW JERSEY ZINC COMPANY

MW

209
208

21 ONE GRADE OF 1%, 1500 FT. LONG AGAINST LOAD. LENGTH OF HAUL, 2 MILES. ONE GRADE OF 1% WITH CURVE OF 6 DEGREES COMPENSATED.

22 LOCOMOTIVE FOR OPERATION IN PENNSYLVANIA.

23 BOILER TO MEET THE A.S.M.E. CODE (SEE SUP. 1 YR)
BOILER TO BE INSPECTED AND TESTED BY THE FIDELITY CASUALTY COMPANY, OF NEW YORK. ADVISE THEM AS SOON AS BOILER IS READY FOR INSPECTION.

24 WRAPPER SHEET TO HAVE A LARGE RADIUS, AND WATER LEG TO BE MADE WIDER AS RECOMMENDED BY MR. T. H. WALKER.

25 LONGITUDINAL SEAMS BUTT JOINTED DOUBLE COVERING STRIPS, OCTUPLE RIVETED.

26 FLEXIBLE STAYBOLTS TO BE TATE, 433 - 1" DIAM. APPLIED IN BREAKING ZONE, AS SHOWN ON BLUE PRINTS OF BOILER, B. L. W. CARD 11842 MARKED IN INK.

27 IN CONNECTION WITH DESIGN OF FIREBOX AND APPLICATION OF STAYS, GIVE CONSIDERATION TO MR. J. M. BURN'S REPORT OF 3-18-20, AND MR. T. H. WALKER'S PENCIL RECOMMENDATIONS DATED 3.23.20, AND MARKED BOILER PRINTS, ALL HEREWITH.

28 GUIDE KNEE TO BE FASTENED TO GUIDE BAR SLAB WITH FOUR (4) BOLTS INSTEAD OF WITH TWO (2).

29 REVERSE LINK BEARING OIL CUP TO BE PLACED LOWER ON REVERSE LINK BEARING REDUCING DISTANCE FROM CUP TO LINK TRUNNION.

30 MR. F. WOOLLVEN, DOMESTIC SALES DEPARTMENT, TO BE NOTIFIED SUFFICIENTLY IN ADVANCE OF TIME BOILER WILL BE READY FOR TESTING, SO RAILWAY CO. MAY SEND REPRESENTATIVE TO MAKE INSPECTION AND WITNESS THE TEST.

31 BOTH THE MARK ON SIDES OF CAB AND ON SIDES OF TANK SHOULD HAVE THE WORDS OF PA. ENCLOSED IN BRACKETS.

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-5577, Dup. 6 32 D 1065 to 1069, except where otherwise specified.

Memorandum Spec'n 20125

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1146 to 1148. Gen. as Photo. 5539.

FOR New Orleans Public Belt Railroad. **Engine Drawing No. 96.**

HNW. 8-16-20

Gauge of Road 4' 8½" Play ⅜" except ⅞" for F.& B.Drivers.
Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"
Total wheelbase, eng. and tend. {Actual 43' 0" / Limited to ---

Curves 43 degrees.

Limits, Height 14' 3" Width {10' 1" over cylinders, / 10' 2" over cab boards.
Weight (approximate) in working order, Total 130,000 pounds.
On F. tr'k ---- lbs., Drivers 130,000 lbs., B. tr'k ---- lbs.

Tractive power 29,400 lbs., Ratio of adhesion 4.42
Work'g St'm Pres. 200 lbs., Service Switching.
Fuel Soft coal.

1. **Boiler** Steel. Thick 11/16" Bill 9277.
Front Tube Sheet ½" Thick
Boiler, Diam. 64" Plan Straight top.
{Allowable st'm pres. 200 lbs. / With Factor of Safety of 5.02} **Tested to** {220 lbs. steam pres. / 267 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips.

Dome, diam. 29" Pos. Central.
Main dome, one-piece type. Auxiliary dome, None.

1a. **Firebox** Steel. Combustion chamb. None.
Firebox, length 96-3/16" Width 41" Depth F. 66" B. 63½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" diam.
Water space, Front 4" Sides 3½" Back 3½"
1b. Water space frame Single Riveted
Water space stays 1" diam. (See sup. 5)
Radial stays 1⅛" diam. Sling stays front {Two rods B. L. W. / Expansion stays.
Button heads below crown on Eight central rows
Crown bars None. Placed --- above crown
Crown bolts ---

Flues No. 9 B.W.G. Hot rolled seamless steel.
Tubes No. 11 B.W.G. Hot rolled seamless steel.
Tube ends Swaged for copper ferrules, fire box ends.
Number {21 / 143} Diam. {5½" / 2"} Length 10' 6"

Heating Surface {Flues 315 sq. ft. / Tubes 780 sq. ft.} Combus. Chamb. --- Total 1241 sq. ft. / Fire Box 146 sq. ft. Fire Brick Tubes ----
Grate area 27.4 sq. ft. Ratio to Heating Surface 1: 45.4
Superheater 252 sq. ft.

Fire Brick Arch, Security Arch on two tubes 3" O.S. diam. x 3/16" thick.

Grates Rocking bars with drop plates at back.
6. **Ash Pan,** Dampers Front and back.

Throttle to have auxiliary drifting valve.
Throttle Balanced Pos. Dome.
Dry pipe Steel.

Superheater Schmidt type. (See sup. 7a)

9. **Smokebox** extension With. 8. Cleaning hole and cap L. S. Only.
Spark ejector or hopper With.
Netting and deflect. plates With.

Exhaust nozzles Single high.

10. **Stack** Straight. Dia. 18"

Safety Valves Two Ashton, 3" Muffled.
Safety valves None with relief lever, Set to 200 pounds.
Whistle One B. L. W. (See sup. 11)

Steam Gauge One iron, 7". Maker: Ashton.
Steam gauge stand Iron. **Clock** None.

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric.
Gauge Cocks Three back. Surface valve None.
Lowest gauge cock 3¼" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One Southern Packless, Pos: Right side.
12. **Cleaning Plugs** One plug above fire door.
Firebox, Corners, diagonal.
Crown, Two each side and two back.
Waist, One under front.
Front tube sheet. One Fusible plug One

Pump None.

Injectors Two Edna, type D. (Spec) No. 9.
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check "Edna" No. 6 Figure No. 120. Pos. Right and left.

Steam Heat None.

Cab Steel, lined with wood. Ventilator in cab roof.

13. Cab boards Steel. Nosing T-iron.
Running boards Steel. Nosing T-iron.
Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 34½"

Pilot None.
14. **Front Bumper** Open-hearth cast steel Bumper plate None.
Steps across front of engine, with hand rails.
Steps, hand holds, etc., to conform to I. C. C. requirements.
Front Drawhead, Center above rail 33½"
Coupler Sharon M. C. B. Automatic, with 13" knuckles with National Malleable Castings Co's coupler pocket having extension floor.
Signal fixtures Iron on bumper.
Headlight equipment to be Pyle National Electric, type "K-2" incandescent with 100 watt lamps.
Headlight Two round case 18" Reflector,
Headlight, Nos. on sides With. H'd'l't step With.
Lamp shelf None. Nosing

Bell 92 pounds.
Sand Box Two Diam. 28" Body Iron painted. Pipes Iron.
Sander Leach air trap A-1, in each box. to sand
Dome casing Iron painted.

Boiler Jacket #22 soft steel ptd. Bands Iron. Style 9
Boiler Lagging Johns-Manville 85% magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

R. Searing Dec 1920

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1146 to 1148.

FOR New Orleans Public Belt Railroad.

HNW.

4. 15. **Frames** Cast steel.

16. **Cylinders,** Diam. 19" Stroke 24"
St'm ports, Length 30.95" Width 1⅞" Bridges ---
Exh. ports, Length --- Width --- Valve lead ⅛"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ----
Eccentric crank throw 13" By-pass valve None.
S. F. Lubr. (Spec) "Edna" Five feed "F" No. 1914.
Cyl'r heads Cast iron. Lubr. pipes of copper under jacket.
Cyl'r casings Soft steel ptd. Head covers Steel painted.
17. St'm chest casings ---- Covers ----
St'm chest valves Piston type, 12" diam., inside admission.
Met. pkg. (Spec) Piston rods / Valve stems Paxton-Mitchell.
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron, with rings of cast iron sprung in. National Malleable Casting Co's coupler pocket having extension floor.
Guides Alligator type, steel. Oil cups Needle.
Crossheads Cast steel, with bearings of brass.
21. **Wrist Pins** Steel. Rod cups Compression grease cups.
Parallel rods to have solid ends.

Valve Motion Walschaerts.
{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be / well case hardened or to have hardened bushings.
Ragonnet Power Reverse Gear covered by Extra Order No. 25350 dated 11-17-20
All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners Brass, pressed into face of all drivers.
Drivers, O. S. Diam. 50" Cen. diam. 44"
Wheel centers:- Main, cast steel; Others, cast iron.
22. **Tires** Steel. Held by Shrinkage and shoulder.
Tires, Flanged, Pos. All. Size 3" x 5/16"
Tires, Plain, Pos. None. Size ---
Lateral play between driving boxes and wheel hubs = 3/16" total.
Driving Boxes Cast steel.
Journals, Diam. 8½" Length 9"

Springs. Make Standard Steel Works.

Front Engine Truck None. Wheeled ----
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck None. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels.
Operating Parts: Engine, sch. No. 6 ET. Westg. combined auto. and straight air.
Eng. Tr'k, sch. ----
Foundation Parts: Drivers, sch. NW-2- American outside equalized.
Eng. Tr'k, sch. ----
23. Air pump Two 9½" Pos. Both left side.
Train connections Front and back.
Train signal, sch. None.

Tender Eight Wheeled, Drawing No. 1648.
Weight, with fuel and water, about 100,000 pounds.
Tender to be weighed: Yes.
31. **Tank** 5,000 Gallons, Bill 5578
Tank "U" shape, sloping back. Fuel capacity, 6½ tons.

Tool Boxes One steel, Pos: Top.

Frame Steel, 10" channels. (See sup. 33-c)

34. Front Drawbar height 34⅜"
Pilot None.
Back drawhead, center above rail 33½"
Coupler Sharon M.C.B. Automatic with 13" knuckle, with National Malleable Casting Co's coupler pocket having extension floor.
Steps across back of tender with hand rail, and steps on sloping back of tank, to conform to I.C.C. requirements.
Trucks Arch bar type, with bolsters of cast steel.

Springs Elliptic, from Standard Steel Works.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4¼" Kind Chilled cast iron plate.
Tires None. Cen. diam. --- Size ---
Tires held by ---
Safety chains Single.

36. **Brake** Position On all wheels.
Brake sch. No. 6 ET. Westinghouse ~~combined~~ auto. and straight air, with 10" x 12" tender brake cylinders.

List of tools, sch. 29. (See sup. 24)
Photo sch. None. Inspection B. L. W. (See Sup 2)
To be weighed Yes. Material specns B. L. W. (See Sup 22)
Certificate of boiler test Three copies B. L. W. form 1036.
Junior laws to 10-11-20 Shipment On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

B. L. W. Patents } None.

Property plates B. L. W., for engine and tender.

Painting, style 291, Olive green and aluminum.

Mark on tank sides: PUBLIC BELT RAILROAD

Road Nos. Pos.	Road Nos.	Name
F. No. Plate.	20 to 22.	None.
F. Sand box.		
Back of tank.		

Actual Dimensions of Loco. Extreme height over all 14' 0⅜"
Extreme Width: Cab boards 9' 9" ; Cylinders ~~or valve motion~~ 9' 9"
Length outside face front bumper of engine to face of tender wedge 29' 11"
Length face of tender wedge to outside face back bumper of tender 24' 6½"
Total length outside face front bumper of engine to outside face back bumper of tender 54' 5½"

SPECIFICATION FOR LOCOMOTIVES: 6 32 D 1146 TO 1148.

FOR:- NEW ORLEANS PUBLIC BELT RAILROAD.

HNW.

1 LOCOMOTIVE FOR OPERATION IN NEW ORLEANS, LOUISANA.

2 INSPECTION BY THE BALDWIN LOCOMOTIVE WORKS, BUT PURCHASER WILL INSPECT LOCOMOTIVES AFTER DELIVERY.
INSPECTORS WILL BE ASSIGNED BY THE PUBLIC BELT RAILROAD OF NEW ORLEANS, TO INSPECT AND TEST LOCOMOTIVES.
NO LOCOMOTIVE WILL BE ACCEPTED WHICH HAS NOT BEEN INSPECTED AND TESTED BY AN AUTHORIZED AGENT OR INSPECTOR OF THE PUBLIC BELT RAILWAY OF NEW ORLEANS.

3 ALL ROYALTIES TO BE PAID BY THE B. L. W.

4 FIRE BOX TO BE SET ON TOP OF FRAMES WITH 2" BLOCKS BETWEEN BOTTOM OF MUD RING AND TOP RAIL OF FRAME.

5 STAYBOLTS TO BE AMERICAN FLEXIBLE BOLTS, SCREWED AND RIVETED TO INSIDE AND OUTSIDE SHEETS SO AS TO BE VISIBLE AND ACCESSIBLE; ~~EXCEPT~~ ABOUT 200 TATE FLEXIBLE STAYBOLTS TO BE APPLIED IN BREAKING ZONE OF FIRE BOX.
ALL STAYBOLTS TO BE EXPOSED.

6 ASH PAN TO BE AS SHOWN ON B. L. W. TRACING 29302.
ASH PAN TO BE MADE WITH TIGHT BOTTOM OF CONTINUOUS SHEET WITH ARRANGEMENT FOR BLOWING OUT ASHES THROUGH DOOR IN REAR OF PAN BY MEANS OF WATER, TAPPED FROM WATER LEG, ARRANGED WITH SUITABLE VALVE CONNECTION AND PERFORATED PIPE OUTLET IN FRONT END OF BOX.
ASH PAN DAMPERS NOT LOWER THAN 19" ABOVE RAIL.

7 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPECIFICATION NO. O-14904, DATED OCT. 18TH, 1920, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTION TO STEAM CHESTS.
ROYALTY PAYABLE BY THE B. L. W.

8 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

9 PARTICULAR ATTENTION TO BE PAID TO FRONT END ARRANGEMENT, TO ELIMINATE THROWING OF SPARKS.

10 STACK TO BE RY. CO'S STANDARD WITH ORNAMENTAL TOP.

11 WHISTLE TO HAVE VALVE MADE OF TROPENAS METAL.

12 ONE WASHOUT PLUG IN EACH SIDE OF FIRE BOX AT BOTTOM, AS RY. CO'S BLUE PRINT SKETCH (HEREWITH)
ONE WASHOUT PLUG IN EACH BACK CORNER OF FIRE BOX AND SO PLACED AS TO BE READILY REMOVABLE WITHOUT DISCONNECTING THE APRON.

13 RUNNING BOARDS TO BE COVERED WITH WOOD 1" THICK IN CAB.

14 SPRING BUFFER WITH ROUND CHAFING IRON BETWEEN ENGINE AND TENDER.
LATERAL MOTION ON ENGINE DRAWBAR CASTING BETWEEN ENGINE AND TENDER TO BE INCREASED 1½" OVER THAT PROVIDED ON RY. CO'S PREVIOUS LOCOS., NOS. 15 TO 19, B. L. W. CLASS 6 32 D 1065 TO 1069.

15 ENGINE FRAMES TO BE THOROUGHLY BRACED WITH LATERAL AND DIAGONAL BRACING BETWEEN FRAMES.

16 CYLINDERS TO BE FITTED WITH BUSHINGS, SUITABLE FOR SUPERHEATED STEAM.

17 VALVE CHAMBER TO BE FITTED WITH BUSHINGS, SUITABLE FOR SUPERHEATED STEAM.

18 STEAM CHEST VALVES TO HAVE VACUUM VALVES.

21 MAIN RODS STUB ENDS AND SIDE RODS TO BE MADE EXTRA HEAVY.

22 DRIVING TIRES TO BE OF HARDEST "C" GRADE, OIL HEAT TREATED STEEL, FROM STANDARD STEEL WORKS.

23 AIR RESERVOIRS: ONE UNDER RUNNING BOARD ON LEFT SIDE NEAR FRONT AND ONE BETWEEN FRAMES.
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

24 TOOL EQUIPMENT TO INCLUDE THE FOLLOWING:-
- 2 JACK SCREWS AND LEVERS.
- 1 PINCH BAR.
- SUITABLE WRENCHES TO FIT ALL BOLTS AND NUTS ON LOCO.
- 2 MONKEY WRENCHES.
- 1 SET DRIVING BOX PACKING TOOLS.
- 1 MACHINIST'S HAMMER.
- 1 SOFT HAMMER.
- 3 COLD CHISELS.
- 1 ENGINEER'S TORCH.
- 2 NO. 4 BUDA CAR REPLACERS.

TENDER

31 LINDSTROM SYPHON PIPE TANK VALVE AS WESTERN RAILWAY EQUIPMENT CO'S PRINT 14-1365.

32 COMBINATION BRACKETS TO BE PROVIDED FOR FLAGS AND LAMPS ON REAR OF TENDER ON EACH CORNER AT TOP.

33 TENDER FRAME TO HAVE 1½" TRUSS ROD ARRANGED LONGITUDINALLY.

34 FRONT BUMPER OF WOOD REINFORCED WITH STEEL PLATE.
SPRING BUFFER WITH ROUND CHAFING IRON BETWEEN ENGINE AND TENDER.
LATERAL MOTION ON ENGINE DRAWBAR CASTING BETWEEN ENGINE AND TENDER TO BE INCREASED 1½" OVER THAT PROVIDED ON RY. CO'S PREVIOUS LOCOS., NOS. 15 TO 19, B. L. W. CLASSIFICATION 6 32 D 1065 TO 1069.

35 TENDER BACK BUMPER OF OPEN HEARTH CAST STEEL WITH PUSHING SHOES CAST IN.

36 TENDER BRAKE WORK TO BE KEPT HIGH ABOVE RAILS.

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SPECIFICATION FOR LOCOMOTIVES 6 32 D 1146 TO 1148

FOR NEW ORLEANS PUBLIC BELT RAILROAD

Specification for Type A Double Loop Superheater O-14904 DATED OCT. 18, 1920.

BOILER TUBES	143 in number 2" o.d. 10 ft 6 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	21 in number 5½" o.d. #9 B.W.G. cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card 1912-M
BOILER FLUE SETTING	⅛ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beadcd. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card 1137 Card 5221
TUBE SHEET LAYOUT	
UNITS	21 units 14" o.d. #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in. Card 10773
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card 1052
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card 1064-L
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A Card
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card 10266-F
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card 1323
STEAM PIPE JOINT RINGS	Of cast iron. Card 10022
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units Card 10809
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause prater to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 1149-H Card 1067
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card NONE
PYROMETER	Model No. Pyrometer Card
PYROMETER ARRANGEMENT	Generally in accordance with Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration Card 4123-F
S. H. ARRANGEMENT	In accordance with
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 50% more than the working pressure of the boiler.

DAMPER	Card 1956-F	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 1072
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 2L-11440	S. H. PIPE BAND	Card 1988
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1235-H R&L.	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1234 AND 1226	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O. S.)	Card 1223 AND 1148	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 1275-J R&L.	DEFLECTING PLATE HANDLE	Card 1467
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3274	DEFLECTING PLATE CLAMP	Card 10809-A

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6721.

Memorandum Spec'n 20130.

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3585 and 3586.

GP/ **FOR** Norfolk & Portsmouth Belt Line Railroad Company.

HNW.

Gen. as Photo. 6569, {except to have regular American type cab.

Engine Drawing No. 104.

8-24-20.

Gauge of Road 4' 8½" Play ⅜" except ⅞" for F. & B. Drivers.

Wheelbase, Rigid 15' 6" Driving 15' 6" Total 23' 8"

Total wheelbase, eng. and tend. {Actual 56' 7" {Limited to ----

Curves ---

Limits, Height --- Width --

Weight (approximate) in working order, Total 169,000 pounds.

On F. tr'k 18,000 lbs., Drivers 151,000 lbs., B. tr'k ---- lbs.

Tractive power 35,600 lbs., Ratio of adhesion 4.25

Work'g St'm Pres. 190 lbs., Service Freight.

Fuel Soft coal.

1. **Boiler** Steel. (Sup. 9) Thick 1 1/16" Bill 9274.

Front Tube Sheet ½" Thick

Boiler, Diam. 70" Plan Straight top.

{Allowable st'm pres. 190 lbs. **Tested to** {210 lbs. steam pres.

{With Factor of Safety of 4.85 {254 lbs. water pres.

Longitud. seams butt jointed, double covering strips, sextuple

10. riveted.

Dome, diam. 33" Pos. Central.

Safety Valves Two Consolidated 3", One muffled.

Safety valves None with relief lever. Set to {190 pounds muffled.

Whistle One B. L. W. plain. {193 pounds open.

Steam Gauge One Iron 7" Maker: Ashcroft.

Steam gauge stand Iron. **Clock** None.

Water Gauge (See sup. 24) 3. **Cab Lamps** Electric.

Gauge Cocks Three back. Surface valve None.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One Crane, 1½" Pos: Front.

Cleaning Plugs One plug above fire door.

Firebox, Corners diagonal, sides and back.

Crown, Three each side and four back.

Waist, One under front.

Front tube sheet. One. Fusible plug None.

Washout plugs of brass with 1½" square heads.

Pump None.

Firebox Steel. (Sup. 9) Combustion chamb. None.

Firebox, length 122-15/16" Width 38½" Depth F. 67½" B. 64½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 4" Back 4"

Water space frame Single. Riveted

Water space stays 1" diam. (See sup. 11 &c)

Radial stays 1" diam. Sling stays front {Three rods B. L. W. Expansion stays.

Button heads below crown on six central rows

Crown bars None. Placed --- above crown

Crown bolts ---

Injectors Two Sellers, Class "N", (Spec) No. 9½

Injectors, Pos. (See sup. 25) Steam pipes (See sup. 25)

2. Pipes, Check Copper. Feed Iron. Overflow Iron, (Sup. 25)

Check Nathan, type 280-A (See sup. 26) Pos. (See sup. 26)

Steam Heat None.

Flues No. 7 B. W. G. Seamless steel.

Tubes No. 10 B. W. G Charcoal iron. (See sup. 13)

Tube ends Swaged for copper ferrules, fire box ends.

Number 26 Diam. 2" Length 13' 9"

165

Heating Surface {Flues 500 sq. ft. Combus. Chamb. --- Total 1862 sq. ft.

{Tubes 1181 sq. ft. Fire Box 181 sq. ft. Fire Brick Tubes ---

Grate area 32.7 sq. ft. Ratio to Heating Surface 1: 57.

Superheater 420 sq. ft.

Fire Brick Arch, None.

Cab Steel.

Cab boards Steel. Nosing T-Iron.

Running boards Steel, roughened. Nosing T-Iron.

Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 33¾"

Grates Table bars, (See sup. 14)

Ash Pan, Dampers Front and back. (See sup. 15)

Throttle to have auxiliary drifting valve.

16. **Throttle** Balance. Pos. Dome.

Dry pipe Wrought iron, at least ¼" thick.

Superheater Schmidt type, (See sup. 20 &b)

23. **Smokebox** extenstion With. 22. Drawing hole and cap L. S. Only.

Spark ejector or hopper With.

Netting and deflect. plates With.

Smoke box to have M. M. type, standard self-cleaning front end.

Exhaust nozzles Single high, with tip 5/16" diam.

Stack (See sup. Dia. 16"

Pilot None.

29. **Front Bumper** Steel plate. Bumper plate With.

1. **Steps** Still steps for switching service at front of engine.

Steps, hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 3½" engine light.

29. **Coupler** Sharon M. C. B. Automatic with 6" x 8" shank in extended floor pocket.

Signal fixtures Iron on bumper.

30. **Headlight** Two round case 18" Reflector,

Headlight, Nos. on sides With. H'dl't stop With.

Lamp shelf None. Nosing ----

Bell 92 pounds.

Sand Box One Diam. 31" Body Iron painted. Pipes Iron.

Sander (Spec) Graham-White Perfect, manufactured by the White American Locomotive Sander Co., Inc., Roanoke, Va. (See sup. 32)

Dome casing Iron painted, with pressed steel top and bottom rings.

33. **Boiler Jacket** #18 Soft steel pto. Bands Iron. Style 9 and 14.

Boiler Lagging Magnesia sectional.

Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

M. Gamer Jan-1921

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3585 and 3586. Furnish prints, (See sup. 5)

FOR Norfolk and Portsmouth Belt Line Railroad Co.

HNW.

Frames Cast steel.

Cylinders, Diam. 21" Stroke 28"

St'm ports, Length 22.16" Width 1½" Bridges ----

Exh. ports, Length ---- Width ---- Valve lead ¼"

Valve travel 5½" Steam lap 1" Exhaust clearance ----

Eccentric crank throw 15-27/32" By-pass valve None.

S. F. Lubr. (Spec) Nathan five feed No. 31 Bull's Eye, (Sup. 34)

Cyl'r heads Cast iron. Lubr. pipes of copper under jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

35. St'm chest casings ---- Covers ----

St'm chest valves 10" diam., Piston type.

Met. pkg. (Spec) (Piston rods / Valve stems) (See sup. 37)

Pistons Heads of cast iron. (See sup. 37)

Guides Alligator type, steel. Oil cups Needle.

Crossheads Cast steel, with bearings of cast iron, tinned.

Wrist Pins Steel. Rod cups for grease.

Parallel rods to have solid ends.

Valve Motion Walschaerts.

{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be {well case hardened or to have hardened bushings.

Ragonnet Power Reverse Gear, (See sup. 38)

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Brass.

Drivers, O. S. Diam. 56" Cen. diam. 49", centers cast steel.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. 1st, 2nd, & 4th pairs. Size 3½" x 5½"

Tires, Plain, Pos. 3rd (Main) pair. Size 3½" x 6"

Lateral play between driving boxes and wheel hubs = 3/16" total.

39. **Driving Boxes** Cast steel.

Journals, Diam. 9½" Length 10"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing.

To swing 3½" each side of cen., Cen. pin liners None

Journals, Diam. 5" Length 10" Boxes Cast iron.

Wheel hub liners None.

Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.

Tires None. Cen. diam. --- Size ---

Tires held by ----

Back Engine Truck None. Wheeled ----

To swing ---- each side of cen., Cen. pin liners ----

Journals, Diam. ---- Length ---- Boxes ----

Wheel hub liners ----

Wheels, Diam. ---- Tread ---- Kind ----

Tires ---- Cen. diam. ---- Size ----

Tires held by ----

Brake, position On all driving and tender wheels.

Operating Parts {Engine, sch. No. 6 ET. Westg. combined auto. and straight air.

{Eng. Tr'k, sch. ----

Foundation Parts {Drivers, sch. WN-2, American outside equalized.

{Eng. Tr'k, sch. ----

Air pump Two 9½" Pos. Both left side of barrel of boiler.

Train connections Front and back. {Air pump to have

Train signal, sch. None. {U. S. King type packing.

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1635.

Weight, with fuel and water, about 120,000 pounds.

Tender to be weighed: Yes.

Tank 6,000 Gallons: Bill 5560

Tank "U" shape, straight top. Fuel capacity, 8 tons.

Coal gates of steel at front, as Ry. Co's print.

Tool Boxes Hard wood, top.

Frame Steel, 12" channels, with bumpers of wood reinforced with channel.

Front Drawbar height 31½"

Pilot None.

Back drawhead, center above rail 34½", engine light.

Coupler Sharon M. C. B. Automatic, with Miner friction draft gear, class A-18, and with Farlow two-key attachments.

Sill steps for switching service at rear of tender.

Steps hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, B. L. W.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.

Tires None. Cen. diam. ---- Size ----

Tires held by ----

Safety chains Single.

Brake Position On all wheels.

Brake sch. No. 6 ET. Westg. auto. and straight air, with 12" x 12" tender brake cylinders.

* {Box for fire extinguisher hose to be hung under left side of {tender frame between the trucks.

List of tools, sch 29.

6. Photo sch. No. 2. Inspection (See sup. 2 etc)

To be weighed Yes. Material specifications B. L. W. (except see sup. 9)

Certificate of boiler test Three copies B. L. W. form 1036.

Junior laws to 11-1-20 Shipment On own wheels, under steam.

28. Brass shop finish, No. 1.

Machine shop finish D-165.

7. **Painting,** style 248, Dark green and color.

8. Mark on Cab sides, above road numbers: Belt Line

Mark on tank sides: N. & P. B. L. R. R.

	Road Nos. Pos	Road Nos.	Name None.
F. No. Plate.		16	
Sand Box.		17	
Cab Panel.			
Back of Tank.			

Actual Dimensions of Loco. Extreme height over all 13' 10½"

Extreme Width: Cab boards 9' 7", Cylinders or valve motion 8' 8½"

Length outside face front bumper of engine to face of tender wedge 35' 10½"

Length face of tender wedge to outside face back bumper of tender 26' 3"

Total length outside face front bumper of engine to outside face back bumper of tender 62' 1¾"

SPECIFICATION FOR LOCOMOTIVES:- 10 36 E 3585 AND 3586.

FOR:- NORFOLK AND PORTSMOUTH BELT LINE RAILROAD COMPANY.

HNW.

1 LOCOMOTIVE TO OPERATE UNDER I. C. C. JURISDICTION.

2 MATERIAL, SUCH AS BOILER PLATE, STAYBOLT IRON, TUBES, RIVETS, AXLES, STEEL CASTINGS, ETC., ENTERING INTO CONSTRUCTION OF THESE LOCOS. WILL BE INSPECTED AT THE MANUFACTURER'S WORKS, IN ACCORDANCE WITH THE SPECIFICATIONS CALLED FOR IN THE CONTRACT, I.E., AS SPECIFIED. THIS INSPECTION WILL BE HANDLED IN THE SAME MANNER AS FOR P.R.R. LOCOS., I.E., THE MATERIAL WILL BE SAMPLED AT THE PLANTS OF THE MANUFACTURERS AND TEST PIECES SENT TO ALTOONA FOR PHYSICAL AND CHEMICAL TEST, AS MAY BE REQUIRED.

3 TWO COPIES OF ORDERS FOR MATERIALS TO BE SENT TO MR. E. M. WARING, ENGINEER OF TESTS, PENNA R. R., ALTOONA, PA.

4 DURING THE CONSTRUCTION OF THE LOCOMOTIVES, THE ASSEMBLING OF PARTS WILL BE UNDER THE SUPERVISION OF ONE OF THE P.R.R. LOCOMOTIVE INSPECTORS, WHO WILL FOLLOW THE LOCOMOTIVES IN DETAIL FROM START TO COMPLETION, SIMILAR TO PRACTICE IN THE ERECTION OF LOCOS. FOR P.R.R. BUILT AT OUTSIDE PLANTS.

5 FURNISH ONE SET OF BLUE PRINTS FOR THE USE OF THE INSPECTORS TO MR. F. M. WARING, ENGINEER OF TESTS, PENNA. R. R., ALTOONA, PENNSYLVANIA.

6 FRAMED PHOTOGRAPH OF LOCO. TO BE SENT TO MR. H. H. PARKER, M. M., AT PORTSMOUGH, VA.

7 STRIPING TO BE SIMILAR TO Ry. Co's PHOTO. (HEREWITH) EXCEPT TO BE MODIFIED TO SUIT STRAIGHT TOP TANK.
TANK TO HAVE YELLOW OR IMITATION GOLD STRIPE $\frac{1}{2}$" WIDE, WITH WHITE STRIPE $\frac{1}{2}$" WIDE. CAB TO HAVE TWO SMALLER STRIPES.

8 MARKING TO BE IN ROMAN LETTERS, 8" HIGH ON TANK AND 3$\frac{1}{2}$" HIGH ON CAB. THE MARK ON CAB TO BE SLIGHTLY CIRCULAR AS SHOWN ON PHOTOGRAPH.
MARKING AS STENCILS FURNISHED BY Ry. Co.

9 BOILER STEEL TO CONFORM TO P. R. R. CO'S SPECIFICATION I-C.
FIRE BOX STEEL TO CONFORM TO P. R. R. CO'S SPECIFICATION I-C.

10 MAIN DOME, ONE PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

11 RIGID STAYBOLTS TO BE OF ULSTER SPECIAL SEAMLESS HOLLOW IRON AS FURNISHED BY JOS. T. RYERSON & CO., CHICAGO, ILL.

12 TATE FLEXIBLE STAYBOLTS, ABOUT 350 IN NUMBER, TO BE APPLIED IN BREAKING ZONE.

13 TUBES (2") TO BE PURCHASED FROM PARKESBURG IRON CO., PARKESBURG, PENNSYLVANIA.

14 GRATE BARS TO BE COUPLED IN TWO SECTIONS, FRONT AND BACK HALF TO BE OPERATED SEPARATELY, WITH EASE, FROM BACK HEAD OF BOILER.
GRATE TO BE MADE TO OPEN SUFFICIENTLY WIDE TO PERMIT THE KNOCKING OF THE FIRE AND CLINKERS.
DROP PLATES TO BE OMITTED.

15 ASH PANS TO HAVE SLIDE BOTTOMS AND TO BE DROPPED AS FAR FROM THE MUD RING AS POSSIBLE, TO PROVIDE THE GREATEST AMOUNT OF AIR AREA.
ASH PAN HOLES TO BE CUT IN SIDES OF PAN AND COVERED WITH NETTING TO PROVIDE ADDITIONAL AIR OPENINGS.

16 THROTTLE VALVE:- BALDWIN STANDARD BALANCED VALVE AND RIGGING WITH LEVER ON BACK HEAD OF BOILER.
STAND PIPE IN DOME TO BE IN TWO SECTIONS, BOLTED TOGETHER SO AS TO PERMIT ENTERING BOILER WITHOUT REMOVING ENTIRE STAND PIPE.

20 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPEC. O-15080, DATED DEC. 9, 1920, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBER.
ROYALTY PAYABLE BY THE B. L. W.

21 PATENT PLATES (HEREWITH) COVERING SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO SUPERHEATER DAMPER CYLINDER.

22 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

23 SMOKE BOX TO BE CAST IRON, THREE PIECE TYPE, WITH CENTER BASE BOLTED SECURELY TO SMOKE BOX AND BOTTOM SECTION TO ACT AS PETTICOAT PIPE. BOTTOM SECTION OF STACK TO BE LOCATED 15" ABOVE TOP OF EXHAUST PIPE NOZZLE TIP.

24 WATER GAUGE TO BE JERGUSON IMPROVED, TYPE "Y" REFLEX.
WATER GAUGE TO HAVE 5" OF GLASS VISIBLE.

25 INJECTORS TO BE LOCATED ONE ON RIGHT SIDE AND ONE ON LEFT SIDE OF BOILER, EASILY ACCESSIBLE TO ENGINEER AND FIREMAN.
INJECTOR STEAM PIPE TO BE OF HEAVY COPPER 2" DIAMETER.
INJECTOR OVERFLOW PIPES TO BE PIPED INTO ASH PAN, LEFT OVERFLOW INTO FRONT PAN AND RIGHT OVERFLOW INTO REAR PAN.

26 INJECTOR CHECK TO BE BOLTED TO EACH SIDE OF BOILER.
CHECKS TO HAVE TAPER SEATED INNER VALVE INSTEAD OF THE FLAT SEAT USUALLY FURNISHED.

27 NATHAN FIRE EXTINGUISHER TO BE LOCATED ON LEFT SIDE, SECURELY BOLTED TO FRAME UNDER THE CAB AND PROVIDED WITH 100 FEET OF HOSE WITH 1 1/16" SMOOTH BORE NOZZLE AS SHOWN IN NATHAN BULLETIN No. 19, (SEE *. SHEET 2)

28 COPPER PIPES ON ENGINE TO BE POLISHED, AND NOT PAINTED.

29 COUPLER CASTING TO BE SECURED TO FRONT BUMPER BY FOUR BOLTS NOT LESS THAN 1$\frac{1}{2}$" DIAMETER.

30 TURBO GENERATOR TO BE TYPE RE-3, 500 WATT, 32 VOLT, AS FURNISHED BY THE SUNBEAM ELECTRIC MANUFACTURING CO., FORMERLY SCHROEDER HEADLIGHT AND GENERATOR CO.

31 CAB TO BE WIRED FOR INCANDESCENT LIGHTS, ONE TO BE LOCATED BEHIND THE LUBRICATOR, ONE FOR THE STEAM AND AIR GAUGES, ONE FOR THE WATER GAUGES, AND ONE ON THE BACK OF CAB TO LIGHT UP THE COAL SPACE.

32 SAND BOX TO BE EQUIPPED WITH FRONT AND BACK SAND PIPES.

33 BOILER LAGGING AND JACKET THAT COVERS RIGID STAYBOLTS TO BE IN SECTIONS, SO THAT IT CAN BE REMOVED IN SECTIONS WITHOUT THE NECESSITY OF CUTTING WHEN APPLYING NEW STAY BOLTS.

34 LUBRICATOR TO BE AS SHOWN IN NATHAN BULLETIN No. 12.

35 STEAM CHEST VALVE CHAMBER BUSHINGS TO BE HUNT SPILLER GUN IRON.

36 STEAM CHEST VALVE PACKING RINGS TO BE HUNT SPILLER GUN IRON.

37 PISTON HEAD PACKING RINGS OF HUNT SPILLER GUN IRON.
PACKING FOR PISTON RODS AND VALVE STEMS TO BE U.S. KING TYPE FOR 10 36 E 3585 ONLY; AND PAXTON-MITCHELL METALLIC FOR 10 36 E 3586 ONLY.

38 RAGONNET POWER REVERSE GEAR, TYPE "B", COVERED BY EXTRA ORDER No. 25449, DATED 11-29,20.

39 DRIVING BOXES TO BE PACKED WITH WOOLEN WASTE AND OIL.

216 217

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3585 AND 3586.

FOR NORFOLK & PORTSMOUTH BELT LINE R. R. Co.

Specification for Type A Double Loop Superheater O-15080, DATED DECEMBER 9TH, 1920.

BOILER TUBES	165 in number 2" o. d. 13 ft 9 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-25-18.
BOILER FLUES	26 in number 5½" o. d. 7 BWG of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 ..... Card 10912-E.
BOILER FLUE SETTING	⅜ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections ..... Card 1136
TUBE SHEET LAYOUT	..... Card 50054
UNITS	26 units 13 o. d. 43 BWG ..... Pipes in accordance with the American Society for Testing Materials Specification A-25-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide ..... Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints ..... Card 1043
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A ..... Card 10695
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls ..... Card 10154-F.
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place ..... Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units ..... Card SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing ..... Card NL-11436.
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer ..... Card 1067
PYROMETER	Model No. ..... Pyrometer NONE ..... Card
PYROMETER ARRANGEMENT	Generally in accordance with ..... Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration ..... Card
S. H. ARRANGEMENT	In accordance with ..... Card 40580.
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 11331-J	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 11327	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1304
DAMPER CYL. PIPING DIAGRAM	Card 2-11442	S. H. PIPE BAND	Card 1988
DAMPER CYL. SUPPORT	Card 10553-A	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1068-G	TYPE OF RETURN BENDS	FORGED.
DAMPER SHAFT ARM	Card 1074-C	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O. S.)	Card 1326-H	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 1275-G	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINK	Card 11177-C	DEFLECTING PLATE STUDS	Card 10309
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A.
DAMPER CYL. PIPE CONN. CO.	11-11437		

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6498.

Memorandum Spec'n 20084.

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1143. Gen. as Photo. 2220

N.W.M.

FOR Norton Company, **Engine Drawing No.** 110

HNW. Norchester, Mass. 3-31-20

Gauge of Road 4' 8½" Play 2"

Wheelbase, Rigid 10' 0" Driving 10' 0" Total 10' 0"

Total wheelbase, eng. and tend. Actual ---- Limited to ----

Curves ----

Limits, Height ---- Width ----

Weight (approximate) in working order, Total 123,000 pounds.

On F. tr'k --- lbs., Drivers 123,000 lbs., B. tr'k ---- lbs.

Tractive power 27,250 lbs., Ratio of adhesion 4.4

Work'g St'm Pres. 185 lbs., Service Switching.

Fuel Soft coal.

Boiler Steel. Thick 9/16" Bill 9083

Front Tube Sheet ½" Thick

Boiler, Diam. 54" Plan Straight top.

Allowable st'm pres. 185 lbs. **Tested to** 205 lbs. steam pres

With Factor of Safety of 5.3 278 lbs. water pres.

Longitud. seams Butt jointed, double covering strips, sextuple riveted.

Dome, diam. 25" Pos. Central.

Main dome, one-piece type. Auxiliary dome, None.

Firebox Steel. Combustion chamb. None.

Firebox, length 78" Width 39¼" Depth F. 54⅝" B. 53⅛"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 13" x 18"

Water space, Front 4" Sides 4" Back 4"

Water space frame Single. Riveted

Water space stays ⅞" diam with 3/16" holes 14" deep from O.S.

Radial stays 1" diam. Sling stays front Two rows B. L. W.

Button heads below crown on six central rows Expansion stays.

Crown bars None. Placed --- above crown

Crown bolts --

Flues ---

Tubes No. 12 B.W.G. Charcoal iron or steel (B.L.W. Option).

Tube ends Swaged for copper ferrules, fire box ends.

Number 160 Diam. 2" Length 10' 9"

Heating Surface Flues --- Combus. Chamb. --- Total 991.5

Tubes 893.5 Fire Box 98 Fire Brick Tubes ---

Grate area 21.2 Ratio to Heating Surface 1: 47.

Superheater

Fire Brick Arch, On studs.

Grates Rocking bars with drop plate.

Ash Pan, Dampers Front and back.

Throttle Balance. Pos. Dome.

Dry pipe Steel.

Superheater None.

Smokebox extension With. Cleaning hole and cap L.S. only.

Spark ~~arrester~~ hopper With.

Netting and deflect. plates With.

Exhaust nozzles Double, high.

Stack Straight. Dia. 18"

Safety Valves Two Coale 2½" Open. (Not Spec)

Safety valves Both with relief lever. Set to 185 pounds.

Whistle One B. L. W. Plain.

Steam Gauge One Iron 6½" Maker: Ashcroft.

Steam gauge stand Iron. **Clock** None.

Water Gauge One B.L.W. Ironclad. **Cab Lamps** To burn oil.

Gauge Cocks Three-back. Surface valve None.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.

Cleaning Plugs

Firebox, Corners diagonal and sides.

Crown, One each side and two back.

Waist, One under front.

Front tube sheet One. Fusible plug One.

Pump None.

Injectors Two Monitor (Not Spec) No. 7

Injectors, Pos. Right and left. Steam pipes Copper.

Pipes, Check Iron. Feed Iron. Overflow Iron.

Check B.L.W., with stop valve. Pos. R. and L.

Steam Heat None.

Cab Wood.

Ventilator in cab roof.

Cab boards Wood. Nosing None.

Running boards Wood. Nosing None.

Hand rail Iron. Located on Tank.

Back Bumper Oak.

Pilot None.

Front Bumper Oak. Bumper plate None.

Steps Across front and rear, with hand rails.

Steps, hand holds, etc., to conform to I.C.C. requirements.

F & B. Drawhead, Center above rail 33½"

Coupler M. C. B. Automatic.

Signal fixtures None.

Headlight Two round case 16" Reflector, To burn Kerosene.

Headlight, Nos. on sides With. H'd'l't step With.

Lamp shelf None Nosing ----

Bell 92 pounds.

Sand Box Two Diam. 31" Body Iron painted. Pipes Iron.

Sander (Not Spec) Leach air, trap A-1, in each box, to sand front and back.

Dome casing Iron painted.

Boiler Jacket #22 Soft steel ptd. Bands Iron. Style 9

Boiler Lagging Magnesia Sectional.

THE BALDWIN LOCOMOTIVE WORKS

Chas. Combs. July 1920

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1143.

FOR Norton Company.

HNW.

Frames Cast steel.

Cylinders, Diam. 19" Stroke 24"

St'm ports, Length 16" Width 1½" Bridges, 1"

Exh. ports, Length 16" Width 2½" Valve lead 1/16"

Valve travel 5¼" Steam lap ¾" Exhaust clearance ---

Eccentric (Not Spec) throw 5" By-pass valve None.

S. F. Lubr. Nathan triple Bull's Eye.

Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

St'm chest casings Iron painted. Covers Steel painted.

St'm chest valves Richardson balanced, with vacuum valves.

Met. pkg. (Not Spec) piston rods, valve stems United States, King type.

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron with rings of cast iron sprung in.

Guides Laird type, steel. Oil cups Needle.

Crossheads Cast steel, with bearings of cast iron, tinned.

Wrist Pins Steel. Rod cups Plunger, forged on.

Parallel rods to have solid ends.

Valve Motion Stephenson.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners None.

Drivers, O. S. Diam. 50" Cen. diam. 44", centers cast iron.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. Front and back. Size 3" x 5½"

Tires, Plain, Pos Middle. Size 3" x 6½"

Lateral play between driving boxes and wheel hubs - 3/16" total.

Driving Boxes Steeled cast iron.

Journals, Diam. 9" Length 10"

Springs. Make B. L. W.

Front Engine Truck None. Wheeled --

To swing -- each side of cen., Cen. pin liners --

Journals, Diam. -- Length -- Boxes --

Wheel hub liners --

Wheels, Diam. -- Tread -- Kind --

Tires -- Cen. diam. -- Size --

Tires held by --

Back Engine Truck None. Wheeled --

To swing -- each side of cen., Cen. pin liners --

Journals, Diam. -- Length -- Boxes --

Wheel hub liners --

Wheels, Diam. -- Tread -- Kind --

Tires -- Cen. diam. -- Size --

Tires held by --

Brake, position On all wheels. (No tender).

Operating Engine, sch. No. 6 ET. Westc. combined auto. and straight air.

Parts Eng. Tr'k. sch. ---

Foundation Drivers, sch. No. 2, American outside equalized.

Parts Eng. Tr'k. sch. ---

Air pump One 9½" Pos. Left Side

Train connections Front and back.

Train signal, sch. None.

Tender None.

Tank 1,400 Gallons. Bill 5408

Saddle tank over top of boiler.

Fuel box on rear extension of engine frame, back of cab.

Capacity, 1½ tons.

Boiler to conform to Massachusetts State Law. (Sup. 11 etc)

Boiler to be inspected by the Hartford Steam Boiler Inspection and Insurance Company. (Sup. 11 etc)

List of tools, sch. 29. 11.20

Photo sch. None.

To be weighed No.

Certificate of boiler test three copies B. L. W. form 1036.

Junior laws to 7.1.20. Shipment On own wheels.

Brass shop finish, No. 1.

Machine shop finish D-165.

Inspection B. L. W., except (See 5 above)

Material specs B.L.W., except (See 4 above)

B.L.W. Patents None

Property plates None.

Painting, style 220, Olive green and gold.

Lettering, etc., to be in gold leaf.

Mark on tank sides: Norton Company

Road Nos. Pos. Road Nos. None.

F. No. plate. 1

Dome.

Back of fuel box.

Actual Dimensions of Loco. Extreme height over all - 13' 0½"

Extreme Width Over cab boards - 9' 3"

Over cylinders or valve motion - 9' 1"

Length outside face of front bumper to outside face of back bumper of engine 28' 1"

MASSACHUSETTS STATE REQUIREMENTS FOR BOILERS.

SPECIFICATION FOR LOCOMOTIVES:- 6 32 D 1143

FOR:- NORTON COMPANY.

NUB.

1220

1 BOILERS TO BE BUILT TO CONFORM TO THE REQUIREMENTS OF THE STATE OF MASSACHUSETTS, MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE, SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL,	MASS. CODE PAGE 41.
MATERIAL FOR ONE PIECE DOME,	MASS. CODE PAGES 41 AND 49.
BOILER RIVET STEEL,	MASS. CODE PAGE 41.
BOILER BRACE IRON,	MASS. CODE PAGE 78.
BOILER STAYBOLT IRON,	MASS. CODE PAGE 78.

5 ALL BOILER STEEL SHALL BE OF FIREBOX STEEL. ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B. L. W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B. L. W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE, (1918). LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B. L. W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS SHOULD NOT BE MORE THAN GIVEN IN THE TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4⅛"	4⅜"
7/8"	180	3 15/16"	4⅛"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3½"	4¼"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 5,000 POUNDS PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, (SEE TRACING 34108).

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 6,500 POUNDS PER SQ. IN. IF GREATER, TENSILE NOT MORE THAN 62,000 POUNDS, YIELD NOT LESS THAN 1/2 TENSILE STRENGTH, ELONGATION (IN 8") NOT LESS THAN 28%.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET:	MINIMUM THICKNESS:
42" OR LESS.	3/8"
OVER 42" TO 54", INCLUSIVE.	7/16"
OVER 54" TO 72", INCLUSIVE.	1/2"
OVER 72"	9/16"

WHEN TUBE SHEET IS NOT CIRCULAR IN FORM (I.E., FIRE BOX TUBE SHEETS) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 POUNDS, PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 POUNDS, THE VERTICAL SEAMS MUST BE OF DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8" AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIAMETER, TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

13 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN FOLLOWING TABLE:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" AND 1¼"	1½" AND 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½"	11½"	8"
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NUMBER OF THREADS.	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

14 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼" PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

15 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 POUNDS, IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜" (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 POUNDS, AND FUSIBLE PLUG CARD 4219 FOR 175 POUNDS AND LESS.) TO PROJECT NOT LESS THAN 1".

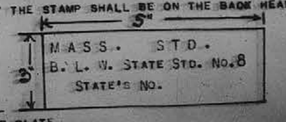
16 EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER. THE FEED WATER TO DISCHARGE BELOW THE LOWEST SAFE WATER LINE. FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS.

17 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE MASSACHUSETTS BOILER CODE, AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER, AS PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON THE STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

18 THERE SHALL NOT BE LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD, OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

19 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE, OR THEY MAY BE PUNCHED OUT, NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN POSITION. THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE, AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER. EDGES TO BE CHAMFERED TO A 1/16" RADIUS.

20 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE:



BRASS OR COPPER PLATE.

THE BALDWIN LOCOMOTIVE WORKS } Dup. 6 32 D 1143, same extras, except where otherwise specified.

Memorandum Spec'n 23036

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1157.

Gen. as Photo. 2220.

Engine Drawing No. 110.

3-1-23.

FOR NORTON COMPANY. (WKS)

HNW. WORCESTER, MASS.

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 10' 0" Driving 10' 0" Total 10' 0"

Total wheelbase, eng. and tend. {Actual ---- / Limited to ----

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 123,000 pounds.

On F. tr'k --- lbs., Drivers 123,000 lbs., B. tr'k ---- lbs.

Tractive power 27,250 lbs., Ratio of adhesion 4.4

Work'g St'm Pres. 185 lbs., Service SWITCHING.

Fuel SOFT COAL.

Boiler STEEL. Thick 9/16" Bill 9083

Front Tube Sheet ½" Thick

Boiler, Diam. 54" Plan STRAIGHT TOP.

Allowable st'm pres. 185 lbs. **Tested to** 205 lbs. steam pres.

With Factor of Safety of 5.3 **Tested to** 278 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS, SEXTUPLE RIVETED.

Dome, diam. 25" Pos. CENTRAL.

MAIN DOME, ONE-PIECE TYPE. AUXILIARY DOME, NONE.

Firebox STEEL. Combustion chamb. NONE.

Firebox, length 78" Width 39¼" Depth F. 54⅞" B 53¼"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 13" x 18"

Water space, Front 4" Sides 4" Back 4"

Water space frame SINGLE Riveted

Water space stays ⅜" DIAM. WITH 3⅛" HOLES 1¼" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front {TWO ROWS B. L. W. / EXPANSION STAYS.

Button heads below crown on SIX central rows

Crown bars NONE. Placed --- above crown

Crown bolts ---

Flues ---

Tubes No. 12 B.W.G. CHARCOAL IRON OR STEEL, (B.L.W. OPTION).

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 160 Diam. 2" Length 10' 9"

Heating Surface	Flues ---	Combus. Chamb. ---	Total 991.5
	Tubes 893.5	Fire Box 98	Fire Brick Tubes ---
Grate area 21.2	Ratio to Heating Surface 1: 47.		
Superheater ---			

Fire Brick ARCH, ON STUDS.

Grates ROCKING BARS AND DROP PLATE.

Ash Pan, Dampers FRONT AND BACK.

Throttle BALANCE. Pos. DOME.

Dry pipe STEEL.

Superheater NONE.

Smokebox extension WITH. Cleaning hole and cap L.S. ONLY.

Spark ~~ejector~~ hopper WITH.

Netting and deflect. plates WITH.

Exhaust nozzles DOUBLE, HIGH.

Stack STRAIGHT. Dia. 18"

Safety Valves TWO COALE 2½" OPEN. (Not Spec)

Safety valves BOTH with relief lever, Set to 185 POUNDS.

Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 6¾" MAKER: ASHCROFT. (Spec)

Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE B.L.W. IRONCLAD. **Cab Lamps** TO BURN OIL.

Gauge Cocks THREE BACK. Surface valve NONE.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE B. L. W. Pos: FRONT.

Cleaning Plugs

Firebox. CORNERS DIAGONAL, AND SIDES.

Crown, ONE EACH SIDE AND TWO BACK.

Waist. ONE UNDER FRONT.

Front tube sheet, ONE Fusible plug ONE.

Pump NONE.

Injectors TWO MONITOR. (Not Spec) No. 7.

Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.

Pipes, Chuck IRON. Feed IRON. Overflow IRON.

Check B. L. W., WITH STOP VALVE. Pos. RIGHT AND LEFT.

Steam Heat NONE.

Cab WOOD.

VENTILATOR IN CAB ROOF.

Cab boards WOOD. Nosing NONE.

Running boards WOOD. Nosing NONE.

Hand rail IRON. Located on TANK.

Back Bumper OAK.

Pilot NONE. Pushing shoes

Front Bumper OAK. Bumper plate WITH.

Steps ACROSS FRONT AND REAR, WITH HAND RAILS.

STEPS, HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

F. & B. Drawhead, Center above rail 33½"

Coupler M. C. B. AUTOMATIC.

Signal fixtures NONE.

Headlight TWO ROUND CASE 16" Reflector, To burn KEROSENE.

Headlight, Nos. on sides WITH. H'dl't step WITH.

Lamp shelf NONE. Nosing ---

Bell 92 POUNDS.

Sand Box (Not Spec) TWO Diam. 31" Body. IRON PAINTED. Pipes IRON.

Sander LEACH AIR, TRAP A-1, IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED.

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON. Style 9.

Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

J. V. Arclin. June 1923

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SPECIFICATION FOR LOCOMOTIVES 6 32 D 1157.

FOR NORTON COMPANY. (WKS)

HNW.

Frames CAST STEEL.

Cylinders, Diam. 19" Stroke 24"

St'm ports, Length 16" Width 1¼" Bridges 1"

Exh. ports, Length 16" Width 2½" Valve lead 1/16"

Valve travel 5½" Steam lap ¾" Exhaust clearance ---

Eccentric crank throw 5" (Not Spec) By-pass valve NONE.

S. F. Lubr. NATHAN TRIPLE BULL'S EYE.

Cyl'r heads CAST IRON. LUBR. PIPES OF IRON UNDER JACKET.

Cyl'r casings IRON PAINTED. Head covers STEEL PAINTED.

St'm chest casings IRON PAINTED. Covers STEEL PAINTED.

St'm chest valves (Not Spec) RICHARDSON BALANCED, WITH VACUUM VALVES.

Met. pkg. (Piston rod / valve stem) UNITED STATES, KING TYPE.

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.

Guides LAIRD TYPE, STEEL. Oil cups NEEDLE.

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL. Rod cups PLUNGER, FORGED ON.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON.

Links, sliding blocks, pins, fitting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE.

Drivers, O. S. Diam. 50" Cen. diam. 44", CENTERS CAST IRON.

Tires STEEL. Held by SHRINKAGE AND SHOULDER.

Tires, Flanged, Pos. FRONT AND BACK. Size 3" x 5½"

Tires, Plain, Pos. MIDDLE. Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = (See Sup.

Driving Boxes STEELED CAST IRON.

Journals, Diam. 9" Length 10"

Springs. Make B. L. W.

Front Engine Truck NONE. Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck NONE. Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL WHEELS, (NO TENDER).

Operating {Engine, sch. No. 6 ET. Westg. COMBINED AUTO. AND STRAIGHT AIR. / Parts Eng. Tr'k, sch. ---

Foundation {Drivers, sch. 2-AMERICAN OUTSIDE EQUALIZED. / Parts Eng. Tr'k, sch. ---

Air pump ONE 9½" Pos. LEFT SIDE.

Train connections FRONT AND BACK.

Train signal, sch. NONE.

A-1 Tender Iron.

A-2 **Tank** 1,400 Gallons, Bill 5408

SADDLE TANK OVER TOP OF BOILER.

A-3 FUEL BOX ON REAR EXTENSION OF ENGINE FRAME, BACK OF CAB. CAPACITY, 1½ TONS.

A-4 BOILER TO CONFORM TO MASSACHUSETTS STATE LAW, (Sup. 1, &c)

A-5 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO., (See Sup. 1, &c).

A-6 CERTIFICATE OF BOILER TEST:- THREE COPIES B. L. W. FORM 1036 AND FIVE COPIES MASSACHUSETTS STATE FORM No. 141-C.

A-7 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

Hereafter:- Provide ample clearance on all parts of Valve Motion.
Approved - J. Hoppin, G.M.P. & D.

List of tools, sch. 158

Photo sch. NONE. Inspection B.L.W., EXCEPT (SEE A-5 ABOVE)

To be weighed YES. Material spec'ns B.L.W., (EXCEPT SEE A-4 ABOVE)

Certificate of boiler test (SEE SUP. A-6 ABOVE)

Junior laws to 7.1.20. Shipment ON OWN WHEELS.

Brass shop finish, No. 1.

Machine shop finish D-165.

B. L. W. Patents NONE.

Property plates NONE.

Painting, style 220, OLIVE GREEN AND GOLD.

LETTERING, ETC., IN GOLD LEAF, SAME AS FOR 6 32 D 1143.

Mark on TANK SIDES: NORTON COMPANY

Road Nos. Pos. Road Nos. Name NONE.

F. No. PLATE. 2

F. SAND BOX.

BACK OF FUEL BOX.

Actual Dimensions of Loco. Extreme height over all = 13' 0½"

Extreme Width {Over cab boards = 9' 1⅝" / Over cylinders or valve motion = 9' 1⅝"

Length outside face of front bumper to outside face of back bumper of engine = 28' 1"

October 1, 1935.

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Mr. T. J. Costello

Please note on Specification for locomotive, Class 6 32 D 1157.

The boiler conforms to the Ohio rules, except there is no washout plug above the fire door.

Mr. C. O. Myers, Chief of Boiler Inspection, Ohio, agreed to authorize the use of the boiler in Ohio, after the washout plug above the fire door has been applied and an Ohio standard number assigned to the boiler.

Ohio Standard No. 64 was assigned to the boiler and B. L. W. certified that the boiler conforms to the Ohio rules, except as noted, on the Ohio State form prepared by Hartford Steam Boiler I. & I.Co. Form handed to Mr. T. E. Knox, President of Thos. F. Carey Co., Inc., 120 Liberty St., New York City on September 30, 1935.

R S McConnell
for
Vice President
in charge of Engineering

RSMcC:GR

MASSACHUSETTS STATE REQUIREMENTS FOR BOILERS.

SPECIFICATION FOR LOCOMOTIVES:- 6 32 D 1157

FOR:- NORTON COMPANY

HNW.

1 BOILERS TO BE BUILT TO CONFORM TO REQUIREMENTS OF THE STATE OF MASSACHUSETTS, (1921), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDERS WORKS.

3 HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1¼ TO 1½ TIMES THE MAXIMUM ALLOWABLE WORKING PRESSURE.

4 MATERIALS ENTERING INTO CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL,	MASS. CODE, PAGE 42.
MATERIAL FOR ONE-PIECE DOME,	MASS. CODE, PAGES 42 AND 88.
BOILER RIVET STEEL,	MASS. CODE, PAGE 48.
BOILER BRACE IRON,	MASS. CODE, PAGE 75.
BOILER STAYBOLT IRON,	MASS. CODE, PAGE 75.
BOILER TUBES,	MASS. CODE, PAGE 83.

5 ALL BOILER STEEL SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE-PIECE DOME SHALL BE MARKED BY MANUFACTURER WITH HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH, IN THE MANNER AND LOCATION DESCRIBED BY B. L. W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND [illegible] FOR ONE-PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 DOME:- ONE-PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX. B. L. W. THREE-PIECE DOMES MAY BE USED, THE VERTICAL SEAMS MUST BE OF THE DOUBLE BUTT CONSTRUCTION.
ALL BOILERS TO HAVE LINERS UNDER DOME FOR REINFORCEMENT.

7 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE.
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.
SEAMS MUST BE BASED ON CRUSHING STRENGTH OF STEEL AT 95000 POUNDS, AND SHEARING STRENGTH OF STEEL RIVETS 42000 POUNDS SINGLE SHEAR, 78000 POUNDS DOUBLE SHEAR; IRON RIVETS 38000 POUNDS SINGLE SHEAR AND 70000 POUNDS DOUBLE SHEAR.
SPECIAL SEAMS WITH RIVET LAP FROM EDGE OF PLATE INCREASED.

8 IN ADDITION TO B. L. W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS SHOULD NOT BE MORE THAN GIVEN IN THE TABLE.

STAY DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4-3 1/16"	4-3 1/16"
7/8"	180	3-15/16"	3-15/16"
7/8"	190	3-7/8"	3-7/8"
7/8"	200	3-3/4"	3-3/4"
1"	225	4-1/8"	4-1/8"

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 6,500 POUNDS PER SQ. IN. OUTSIDE ENDS OF SOLID STAYBOLTS, 8" AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE NOT LESS THAN 3/16" DIAM., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

10 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS, IN EXCESS OF 6,000 POUNDS PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRACING 3H10C.

11 MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM OF TUBE SHEET;	MINIMUM THICKNESS
42" OR LESS.	3/8"
OVER 42" TO 54", INCLUSIVE,	7/16"
OVER 54" TO 72", INCLUSIVE,	1/2"
OVER 72".	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM, (I.E., FIRE BOX TUBE SHEET), THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

12 TUBES UP TO 2¼" DIAM. TO BE NO. 13 B. W. G. UP TO 175 POUNDS. TUBES UP TO 2½" DIAM. TO BE NO. 12 B. W. G. FOR OVER 175 POUNDS. ALL TUBES TO BE BEADED AT BOTH ENDS.

13 OPENINGS IN BOILER FOR THREADED PIPE CONNECTIONS 1" DIAM. OR LARGER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENINGS AS SHOWN IN THE FOLLOWING TABLES:-

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" AND 1¼"	1½" AND 2"	2½" TO 4
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NUMBER OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NUMBER OF THREADS.	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

14 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼" PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

15 FUSIBLE PLUG MUST BE APPLIED AND MUST PROJECT NOT LESS THAN 1". THE PLUG MUST BE FILLED WITH 99% PURE TIN.
FUSIBLE PLUG B. L. W. CARD 4965 TO BE APPLIED.

16 EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER. THE FEED WATER TO DISCHARGE BELOW THE LOWEST SAFE WATER LINE. FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS.

17 THERE SHALL NOT BE LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD, OR ABOUT LINE OF CROWN SHEET.
FOUR IN LOWER PART OF WATER LEGS ALSO, WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

MASSACHUSETTS STATE REQUIREMENTS FOR BOILERS.

SPECIFICATION FOR LOCOMOTIVES:- 6 32 D. 1157

FOR:- NORTON COMPANY

HNW.

1224

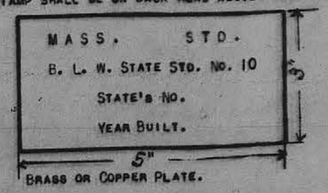
21 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE MASSACHUSETTS BOILER CODE, AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER, PER B. L. W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON THE STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.
SAFETY VALVES SHOULD NOT BE LESS IN DIAMETER THAN SHOWN IN TABLE FOR GRATE AREA AND BOILER PRESSURES AS NOTED:-

DIAM. OF VALVES:-	OVER 100 TO 150 LBS. PRES.	OVER 150 TO 200 LBS. PRES.	OVER 200 LBS. PRES.
1" FOR GRATE AREA,	3.25	3.5	3.75
1¼" " " "	5.00	5.5	5.75
1½" "	7.25	8.0	8.50
2" "	13.00	14.0	15.00
2½" "	20.00	22.0	23.00
3" "	29.00	31.5	33.25
3½" "	39.50	43.0	45.25
4" "	51.50	56.0	59.00
4½" "	65.00	71.0	74.25
5" "	80.00	88.0	92.25

SAFETY VALVES SHALL NOT EXCEED 5" DIAM. THE SEATS SHALL BE BEVELED AT AN ANGLE OF ABOUT 45 DEGREES. THEY SHALL BE DESIGNED WITH A SUBSTANTIAL LIFTING DEVICE SO THE VALVE MAY BE LIFTED FROM ITS SEAT BY THE SPINDLE NOT LESS THAN ONE EIGHTH OF THE DIAM. OF THE VALVE WHEN THE PRESSURE ON THE BOILER IS 75% OF THAT AT WHICH THE SAFETY VALVE IS SET TO BLOW OFF.

22 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE, OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN POSITION. THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE, AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER. EDGES TO BE CHAMFERED TO A 1/16" RADIUS.

23 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼" LOCATION OF STAMP SHALL BE ON BACK HEAD ABOVE A PLUG HOLE:-



BRASS OR COPPER PLATE.

The boiler conforms to the Ohio rules except there is no inspector's plug when the fire door has been applied and an Ohio standard number assigned to the boiler. Ohio Standard No 64 was assigned to the boiler and I am satisfied that the boiler conforms to the Ohio rules except as noted on the Ohio State form prepared by Hartford Steam Boiler Ins. Co. Form handed to Mr. E. E. Kay, President of Thomas Carey Jr. Inc., 120 Liberty St., New York City on Sept 30. 1925.

E.S.M.co 10/1/25

THE BALDWIN LOCOMOTIVE WORKS DUP. 8 32 D 796, WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20108.

SPECIFICATION FOR LOCOMOTIVES 8 32 D 805.

RD **FOR** NORWOOD & ST. LAWRENCE RAILROAD COMPANY.

W

Gen. as PHOTO. 5524.

Engine Drawing No. 76.

6-8-20.

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 12' 0" Driving 12' 0" Total 20' 3"
Total wheelbase, eng. and tend. {Actual 49' 4¾" / Limited to ----

Curves ---

Limits, Height --- Width ---
Weight (approximate) in working order, Total 122,000 POUNDS.
On F. tr'k 18,000 lbs., Drivers 104,000 lbs., B. tr'k ---- lbs.

Tractive power 25,500 lbs., Ratio of adhesion 4.08
Work'g St'm Pres. 180 lbs., Service PASS. AND FREIGHT.
Fuel SOFT COAL.

Boiler STEEL. Thick 9/16" Bill 9198
Front Tube Sheet ½" Thick
Boiler, Diam. 58" Plan EXTENDED WAGON TOP.
{Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.37 **Tested to** 200 lbs. steam pres. / 270 lbs. water pres.
Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS, 90% SEAMS.

Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL. Combustion chamb. NONE.
Firebox, length 89⅝" Width 41¾" Depth F. 63½" B. 61"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening 16" DIAM. WITH FRANKLIN AUTOMATIC FIRE DOOR.
Water space, Front 4" Sides 3" Back 3"
Water space frame SINGLE Riveted
Water space stays ⅞" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O. S. FLEXIBLE STAYS, 350 TATE IN BREAKING ZONE.
Radial stays 1" DIAM. Sling stays front {TWO ROWS B. L. W. EXPANSION STAYS.
Button heads below crown on FOUR central rows
Crown bars NONE. Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 W. G. CHARCOAL IRON OR STEEL.
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 244 Diam. 2" Length 11' 9"

Heating Surface {Flues --- Combus. Chamb. --- Total 1622⁰ / Tubes 1490⁰ Fire Box 132⁰ Fire Brick Tubes
Grate area 25.1 Ratio to Heating Surface 1: 64.6
Superheater ----

Fire Brick NONE.

Grates ROCKING BARS AND DROP PLATES.
Ash Pan, Dampers FRONT AND BACK.

Throttle BALANCE. Pos. DOME.
Dry pipe STEEL.

Superheater NONE.

Smokebox extension WITH. Cleaning hole and cap L. S. ONLY.
Spark ~~ejector or~~ hopper WITH.
Netting and deflect. plates WITH.

Exhaust nozzles DOUBLE HIGH.

Stack CAST IRON, STRAIGHT. Dia. 18"
STACK TO BE SAME AS SHOWN ON PHOTO. 3904.

Safety Valves TWO COALE 3" OPEN. (Not Spec)
Safety valves BOTH with relief lever, Set to 180 POUNDS.
Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (Not Spec)
Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE B.L.W. IRONCLAD. **Cab Lamps** ELECTRIC.
Gauge Cocks THREE BACK. Surface valve NONE.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve WITHOUT separate line pipe to dome
Blower Valve B. L. W.

Blow off Cock ~~ONE TWO~~ B. L. W. POS: - FRONT.
Cleaning Plugs
Firebox, CORNERS DIAGONAL.
Crown, TWO RIGHT SIDE, THREE LEFT SIDE AND TWO BACK.
Waist, ONE UNDER FRONT.
Front tube sheet, ONE. Fusible plug ONE.
ONE WASHOUT PLUG EACH SIDE OF BOILER AHEAD OF BACK FLUE SHEET AND JUST ABOVE TOP ROW OF FLUES.
Pump NONE.
LOCOMOTIVE TO OPERATE IN STATE OF NEW YORK AND MUST COMPLY WITH ALL REQUIREMENTS OF THE INTERSTATE COMMERCE COMMISSION AND PUBLIC SERVICE COMMISSION, SECOND DISTRICT, NEW YORK STATE.
BOILER TO CONFORM TO THE A. S. M. E. CODE (Sup. 1 to 19)
Injectors TWO SELLERS, CLASS N (Spec) No. 8½
Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.
Pipes, Check IRON. Feed IRON. Overflow IRON.
Check B. L. W. WITH STOP VALVE. Pos. R. AND L.
TWO 2" GLOBE VALVES ON INJECTOR BRANCH PIPES.

Steam Heat WITH.

Cab STEEL.
CAB TO HAVE VESTIBULE IN ACCORDANCE WITH NEW YORK STATE LAWS.

Cab boards WOOD. Nosing NONE.
Running boards WOOD. Nosing NONE.
Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 33"

Pilot WOOD. Pushing shoes NONE.
Front Bumper OAK. Bumper plate WITH.
Steps HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"
Coupler M. C. B. AUTO.

Signal fixtures IRON ON BUMPER.

HEADLIGHT EQUIPMENT TO BE SUNBEAM TYPE RE-3 ELECTRIC.
Headlight TWO ROUND CASE 18" Reflector,
Headlight, Nos. on sides WITH. Hinge stop WITH.
Lamp shelf NONE. Nosing ----

Bell 92 POUNDS.
Sand Box TWO Diam. 28" Body IRON PTD. Pipes IRON.
Sanding (Not Spec) LEACH AIR, TRAP A-1, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED.

Boiler Jacket #22 SOFT STEEL PTD Bands IRON. Style 9
Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

J.V. CARROLL Nov. 1920.

SPECIFICATION FOR LOCOMOTIVES 8 32 D 805.

FOR NORWOOD & ST. LAWRENCE RAILROAD COMPANY.

W

Frames CAST STEEL.

Cylinders, Diam. 19" Stroke 24"
St'm ports, Length 20⅜" Width 1¼" Bridges 3⅜"
Exh. ports, Length --- Width --- Valve lead 3/16"
Valve travel 5¼" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 10⅜" By-pass valve NONE.
S. P. Lubr. (Not Spec) NATHAN TRIPLE BULL'S EYE.
Cyl'r heads CAST IRON. LUBR. PIPES OF IRON UNDER JACKET.
Cyl'r casings IRON PAINTED. Head covers STEEL PAINTED.
St'm chest casings ---- Covers ----
St'm chest valves 9½" DIAM., PISTON TYPE, INSIDE ADMISSION.
Mat. pkg. (Not Spec) {PISTON RODS / VALVE STEMS} UNITED STATES, KING TYPE.

Pistons CAST IRON RINGS SPRUNG INTO SOLID HEADS.
Guides STEEL. Oil cups NEEDLE.
Crossheads CAST STEEL WITH BEARINGS OF CAST STEEL TINNED.
Wrist Pins STEEL. Rod cups PLUNGER.
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS.
{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners NONE.
Drivers, O. S. Diam. 52" Cen. diam. 46" CENTERS CAST IRON.
WHEEL CENTERS TO HAVE BRONZE HUB LINERS.
Tires STEEL. Held by SHRINKAGE AND SHOULDER.
Tires, Flanged, Pos. ALL. Size 3" x 5½"
Tires, Plain, Pos. NONE. Size ----
Lateral play between driving boxes and wheel hubs = 3/16" TOTAL.
Driving Boxes CAST STEEL.
Journals, Diam. 8" Length 8½"

Springs. Make B. L. W.

Front Engine Truck TWO Wheeled SWING BOLSTER CENTER BEARING.
To swing 4" each side of cen., Cen. pin liners NONE.
Journals, Diam. 5" Length 8½" Boxes CAST IRON.
Wheel hub liners NONE.
Wheels, Diam. 28" Tread --- Kind CAST IRON, SPOKE CENTER.
Tires STEEL. Cen. diam. 23" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating {Engine, sch. No. 6 ET. WESTINGHOUSE COMBINED AUTO. AND STRAIGHT AIR.
Parts {Eng. Tr'k, sch. ---
Foundation {Driv'g s. sch. M-2 AMERICAN O. S. EQUALIZED.
Parts {Eng. Tr'k, sch. ---
Air pump ONE 8½" C. Pos. LEFT SIDE.
Train connections FRONT AND BACK.
Train signal, sch. L
AIR RESERVOIR TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1625
Weight, with fuel and water, about 100,000 POUNDS.
TENDER TO BE WEIGHED: YES.
Tank 5,000 Gallons, S.H. 5516
TANK "U" SHAPE WITH STRAIGHT TOP. FUEL CAPACITY 8 TONS.

Tool Boxes OF HARD WOOD, TOP.

Frame STEEL, 10" CHANNELS, WITH BUMPERS OF WOOD AND STEEL PLATE.
Front Drawbar height 32"
Pilot NONE.
Back drawhead, center above rail 33½"
Coupler M. C. B. AUTO.

Steps HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, B. L. W.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4¼" Kind CHILLED CAST IRON PLATE.
Tires NONE. Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE.

Brake Position ON ALL WHEELS.
Brake sch. No. 6 ET. WESTINGHOUSE AUTOMATIC AND STRAIGHT AIR WITH 12" x 12" TENDER CYLINDERS.

BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.
List of tools, sch. 29
Photo sch. NONE. Inspection B. L. W. EXCEPT FOR BOILER. (See * ob...
To be weighed YES. Material spec'ns B. L. W., EXCEPT FOR BOILER (See...
Certificate of boiler test THREE COPIES B. L. W. FORM 1086.
Junior laws to 9-15-20. Shipment ON OWN WHEELS.

Brass shop finish, No. 1.
Machine shop finish D-165.

B. L. W. {
Patents {NONE.

Property plates B. L. W. FOR ENGINE AND TENDER.

Painting, style 291. OLIVE GREEN AND ALUMINUM.

Mark on TANK SIDES: NORWOOD & ST. LAWRENCE R. R.

Road Nos. Pos. Road Nos. Name NONE.
F. No. PLATE. 209
CAB SIDES.
BACK OF TANK.

Actual Dimensions of Loco. Extreme height over all 14' 2"
Extreme Width: Cab boards 9' 10", Cylinders or valve motion 9' 8"
Length outside face front bumper of engine to face of tender wedge = 30' 1"
Length face of tender wedge to outside face back bumper of tender = 24' 9"
Total length outside face front bumper of engine to outside face back bumper of tender = 54' 10"

SPECIFICATION FOR LOCOMOTIVES 8 32 D 805

FOR NORWOOD & ST. LAWRENCE RAILROAD COMPANY

RTL

227
226

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF NEW YORK MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝". (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEETS. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S.

NEW YORK
(State in which boiler is to be used)

3
(Manufacturer's State standard number)

THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)

(LEAVE BLANK) (Builder's number)

(LEAVE BLANK) (Year put in service)

(Manufacturer's serial number)

180 LBS.
(Maximum working pressure when built)

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-7016.

Memorandum Spec'n 21005

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3600

as/ FOR THE PEOPLES NATURAL GAS COMPANY.

DAR

Gen. as PHOTO. 6214 EXCEPT TO OMIT AUXILIARY DOME.

Engine Drawing No. 105

2-21-21.

Gauge of Road 4' 8½" Play 2" (EXCEPT SEE SUP. 22)
Wheelbase, Rigid 14' 0" Driving 14' 0" Total 22' 0"
Total wheelbase, eng. and tend. {Actual 49' 11½" / Limited to ---
RAILS, 70 LBS. PER YARD.
Curves 16 DEGREES COMBINED WITH 3⅜ GRADES.

Limits, Height --- Width ---
Weight (approximate) in working order, Total 160,000 POUNDS.
On F. tr'k 17,000 lbs., Drivers 143,000 lbs., B. tr'k --- lbs.

Tractive power 37,050 lbs., Ratio of adhesion 3.83
Work'g St'm Pres. 190 lbs., Service FREIGHT.
Fuel COAL.

1. **Boiler** STEEL. Thick 13/16" Bill 9360
Front Tube Sheet ½" Thick
Boiler, Diam. 66" Plan STRAIGHT TOP.
{Allowable st'm pres. 190 lbs. / With Factor of Safety of 5.87} Tested to {210 lbs. steam pres. / 254 lbs. water pres.
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.
AUXILIARY DOME, NONE.
Dome, diam. 29" Pos. CENTRAL.

3. **Firebox** STEEL. Combustion chamb. NONE.
4. Firebox, length 8'-3 13/16" Width 60" Depth F. 62½" B. 49⅛"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
5. Firedoor opening ONE OVAL 13" x 18"
Water space, Front 4" Sides 4" Back 4"
Water space frame DOUBLE. Riveted
6. Water space stays ⅜" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O.S.
Radial stays 1" DIAM. Sling stays front {TWO ROWS B.L.W. EXPANSION STAYS.
Button heads below crown on EIGHT central rows
Crown bars NONE. Placed --- above crown
Crown bolts ---

Flues No. 9 B.W.G. STEEL.
Tubes No. 12 B.W.G. CHARCOAL IRON.
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number {24 / 152} Diam. {2⅝" / 2"} Length 13' 7"

Heating Surface {Flues 458.6 / Tubes 1074.6} Combus. Chamb. --- Total 1652.6
Fire Box 120.0 Fire Brick Tubes ---
Grate area 35.1 Ratio to Heating Surface 1: 47.2
Superheater 382.0

Fire Brick ARCH, NONE.

Grates TABLE GRATES WITH DROP PLATES.
7. **Ash Pan,** Dampers BACK ONLY.

THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.
Throttle BALANCE Pos. DOME.
Dry pipe STEEL.

Superheater SCHMIDT TYPE (SEE SUP. 8 ETC)

Smokebox extension WITH 10. Cleaning hole and cap L.S. ONLY.
Spark ejector or hopper NONE
Baffling and deflect. plates WITH
Exhaust nozzles SINGLE, HIGH.
Stack STRAIGHT Dia. 15"

(NOT SPEC) **Safety Valves** TWO CONSOLIDATED 2" OPEN, TYPE RK. (SEE SUP. 12)
Safety valves NONE with relief lever, Set to 190 POUNDS.
Whistle ONE B.L.W. PLAIN (SEE SUP. 12)

Steam Gauge ONE IRON 7" MAKER: ASHCROFT.
Steam gauge stand IRON. **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD. **Cab Lamps** ELECTRIC.
Gauge Cocks THREE BACK Surface valve NONE
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B.L.W.

Blow off Cock ONE B.L.W. POS: FRONT.
Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.
Firebox, CORNERS DIAGONAL, SIDES AND BACK.
Crown, TWO EACH SIDE AND FOUR BACK.
Waist, ONE UNDER FRONT.
Front tube sheet, TWO Fusible plug NONE.

Pump NONE.

Injectors TWO ONES, TYPE "A" (SPEC) No. 8
Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.
Pipes, Check IRON. Feed IRON. Overflow IRON.
Check HANCOCK Pos. RIGHT AND LEFT.

Steam Heat NONE.

Cab STEEL.

CAB BOARDS TO BE COVERED WITH WOOD.
Cab boards STEEL. Nosing T-IRON.
Running boards STEEL. Nosing T-IRON.
Hand rail IRON. Located on BOILER.

13. **Back Bumper** BAR STEEL. Back drawbar height 33".

Pilot NONE.
1. **Front Bumper** CAST STEEL. Bumper plate WITH.
Steps (SEE SUP. 14)

Front Drawhead, Center above rail 33½".
Coupler SHARON M.C.B. AUTOMATIC (SEE SUP. 15)

Signal fixtures IRON ON BUMPER.
HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, INCANDESCENT, WITH GOLDEN GLOW HEADLIGHTS.
Headlight TWO ROUND CASE 14" Reflector
Headlight, Nos. on sides WITH H'dl't step NONE.
Lamp shelf NONE. Nosing ---

Bell 92 POUNDS. BELL RINGER: (SEE SUP. 16)
17. **Sand Box** ONE (SPEC) Diam. 31" Body IRON PAINTED. Pipes IRON.
Sander LEACH AIR, TRAP A-10, DOUBLE, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON. Style 9.
Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

E. H. KALBACH April 1921

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3600

FOR THE PEOPLES NATURAL GAS COMPANY.

DAR

18. **Frames** CAST STEEL.

Cylinders, Diam. 21" Stroke 26"
St'm ports, Length 25" Width 1½" Bridges ---
Exh. ports, Length --- Width --- Valve lead ¼"
Valve travel 5¾" Steam lap 1" Exhaust clearance ---
Eccentric crank throw 1⅜" By-pass valve NONE.
S. F. Lubr. DETROIT FIVE-FEED No. 42 BULL'S EYE.
Cyl'r heads CAST IRON. LUBR. PIPES OF IRON UNDER JACKET.
Cyl'r casings IRON PAINTED Head covers STEEL PAINTED.
St'm chest casings --- Covers ---
St'm chest valves 10" DIAM. PISTON TYPE.
Mot. pkg. (SPEC) PISTON RODS CRESCENT. VALVE STEMS

19. **Pistons** HEADS OF CAST IRON, RINGS OF CAST IRON, SPRING IN.
Guides ALLIGATOR TYPE, STEEL. Oil cups NEEDLE.
Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.
20. **Wrist Pins** STEEL. Rod cups FOR GREASE, FOR ALL RODS.

Valve Motion WALSCHAERTS
21. Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboltts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened

Wearing Bearings MAKE, B.L.W.
Driving wheel hub liners BRONZE.
22. **Drivers,** O. S. Diam. 50" Cen. diam. 44" CENTERS CAST STEEL.

23. **Tires** STEEL. Held by SHRINKAGE AND SHOULDER.
Tires, Flanged, Pos. ALL. Size 3" x 5½".
Tires, Plain, Pos. NONE. Size ---
Lateral play between driving boxes and wheel hubs - (SEE SUP. 24)
18. **Driving Boxes** CAST STEEL, WITH GREASE CELLARS.
Journals, Diam. {MAIN 8½" / OTHERS 8"} Length 12" / 10"

Springs. Make, B.L.W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING.
25. To swing 3" each side of cen., Cen. pin liners NONE.
Journals, Diam. 5½" Length 10" Boxes CAST IRON.
Wheel hub liners NONE.
Wheels, Diam. 30" Tread --- Kind CAST IRON SPOKE CENTER.
Tires STEEL. Cen. diam. 29" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating Parts: Engine, sch. No. 6 ET WESTG. COMBINED AUTO. AND STRAIGHT AIR. Eng. Tr'k. sch. ---
Foundation Parts: Drivers, sch. WH-2 AMERICAN O.S. EQUALIZED. Eng. Tr'k. sch. ---
Air pump TWO 9½" Pos. BOTH LEFT SIDE.
Train connections FRONT AND BACK.
Train signal, sch. NONE
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

31. **Tender** EIGHT Wheeled, Drawing No. 1659.
Weight, with fuel and water, about 80,000 POUNDS.
TENDER TO BE WEIGHED: YES.
31. **Tank** 3800 Gallons, Bill 5626.
TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 6 TONS.

Tool Boxes WOOD, TOP.

Frame STEEL, 8" AND 10" CHANNELS, WITH BUMPERS OF WOOD REINFORCED WITH STEEL PLATE.
38. Front Drawbar height 33".
Pilot NONE.
Back drawhead, center above rail 33½".
Coupler SHARON M.C.B. AUTOMATIC, WITH WESTINGHOUSE FRICTION DRAFT GEAR.

Steps (SEE SUP. 32)

Trucks ARCH BAR TYPE, WITH BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B.L.W.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4⅛" Kind DAVIS CAST STEEL.
Tires NONE. Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE.

Brake Position ON ALL WHEELS.
Brake sch. No. 6-ET WESTG. AUTO. AND STRAIGHT AIR WITH 10" x 12" TENDER BRAKE CYLINDER.

List of tools, sch 158.
Photo sch. No. 2 Inspection B.L.W.
To be weighed YES. Material specns B.L.W.
Certificate of boiler test THREE COPIES B.L.W. FORM 1036.
Junior laws to 3-15-21 Shipment ON OWN WHEELS.

Brass shop finish, No. 1.
Machine shop finish D-165.

Property plates FOR ENGINE AND TENDER AS B.L.W. TRACING 44591, TO READ: THE PEOPLES NATURAL GAS COMPANY OWNER AND LESSOR

Painting, style 291, OLIVE GREEN AND ALUMINUM.

Mark on TANK SIDES MORGANTOWN & WHEELING

Road Nos. Pos. Road Nos. Name NONE.
F. No. PLATE 100
CAB SIDES
BACK OF TANK

Actual Dimensions of Loco. Extreme height over all 15' 3½"
Extreme Width: Cab HANDLES 10' 7" Cylinders --- valve motion 10' 0"
Length outside face front bumper of engine to face of tender wedge 31' 10½"
Length face of tender wedge to outside face back bumper of tender 23' 4½"
Total length outside face front bumper of engine to outside face back bumper of tender 55' 3"

Patents: B. L. W. NONE.

SPECIFICATION FOR LOCOMOTIVES: 10 36 E 3600.

FOR: THE PEOPLES NATURAL GAS COMPANY.

DAR.

1 LOCOMOTIVE FOR SERVICE ON MORGANTOWN & WHEELING RY. IN WEST VIRGINIA, AND SUBJECT TO I.C.C. REQUIREMENTS.

2 BOILER WORK TO RECEIVE PARTICULAR ATTENTION.

3 FIRE BOX TO SLOPE TOWARDS FRONT OF ENGINE.

4 FIRE BOX CROWN AND SIDES TO BE IN ONE SHEET.

5 FIRE DOOR TO BE FRANKLIN, BUTTERFLY TYPE.

6 (SPEC) TATE FLEXIBLE STAYBOLTS OF ULSTER IRON, ABOUT 350 IN NUMBER, IN BREAKING ZONE.

7 ASH PAN TO BE HOPPER TYPE.

8 SUPERHEATER TO BE IN ACCORDANCE WITH LOCOMOTIVE SUPERHEATER CO'S. SPECIFICATION C-15859 DATED 3-2-21, SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBER. ROYALTY PAYABLE BY THE B.L.W.

9 PATENT PLATE(HEREWITH) FROM THE SUPERHEATER CO., COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

10 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

11 FRONT END ARRANGEMENT TO BE M.M. SELF CLEANING TYPE.

12 WHISTLE AND SAFETY VALVE SET ON SIDE OF DOME TO BE BELOW TOP LINE OF STACK.

13 B.L.W. SPRING BUFFER BETWEEN ENGINE AND TENDER.

14 STEPS ACROSS FRONT OF ENGINE WITH SUITABLE HANDRAILS. STEPS, HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

15 COUPLER AT FRONT OF ENGINE TO HAVE EXTENDED SHELF TO SUPPORT SWING HEAD COUPLER.

16 VILOCO AIR BELL RINGER, MANUFACTURED BY H. VISSERING CO.

17 SAND BOX TO HAVE EXTRA LARGE CAPACITY.

18 WEDGES AND GIBS OF BRASS WITH STRAIGHT WEDGE BOLTS.

19 PISTON RODS TO BE KEYED TO CROSSHEADS.

20 MAIN RODS TO HAVE OPEN END STRAPS. PARALLEL RODS TO HAVE SOLID ENDS.

21 ALL PINS IN VALVE GEAR TO BE BUSHED.

22 MAIN AND INTERMEDIATE DRIVERS TO BE SET IN 1/8" ON EACH SIDE, I.E. MAKE TRACK PLAY 1".

23 DETROIT FLANGE OILER TO BE APPLIED TO FRONT AND REAR DRIVING TIRES.

24 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 7/32" TOTAL.

25 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 5/16" TOTAL.

TENDER

31 FLANGE AROUND TOP OF TANK TO REAR OF COAL SPACE. FROM COAL SPACE TO END OF TANK, OMIT FLANGE AND PUT RAIL AROUND REAR OF TANK. THIS RAIL TO BE SAME HEIGHT AS TOP OF FLANGE.

32 STEPS ACROSS REAR OF TENDER WITH HANDRAILS. STEPS, HAND HOLDS ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

33 B.L.W. SPRING BUFFER BETWEEN ENGINE AND TENDER.

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SPECIFICATION FOR LOCOMOTIVES 10 36 E 3600

FOR THE PEOPLES NATURAL GAS COMPANY.

Specification for Type A Double Loop Superheater SPECN. C-15859 DATED MARCH 2ND, 1921.

BOILER TUBES	152 in number 2 o.d. 13 ft. 7 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be bended over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	24 in number 5" O.D. #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. ....Card	1523-H
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. ....Card	1136
TUBE SHEET LAYOUT	....Card	5363
UNITS	24 units 1½ o.d. #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide....Card	10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints....Card	1043
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A ....Card	10695
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls....Card	AT 3x8 10466
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place....Card	1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units....Card	SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing....Card	HC-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer....Card	1067
PYROMETER	Model No. ....Pyrometer....Card	NONE
PYROMETER ARRANGEMENT	Generally in accordance with....Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration....Card	
S. H. ARRANGEMENT	In accordance with....Card	40007-G
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 1097-B	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1225-A	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 2L-11442	S. H. PIPE BAND	Card 1986
DAMPER CYL. SUPPORT	Card 10553-H	SPACING OF BANDS & SUPPORTS	Card 10797
DAMPER SHAFT	Card 1068	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1240-B	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O. S.)	Card 1148	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I. S.)	Card 10306-Q	DEFLECTING PLATE HANDLE	Card 1427
DAMPER SHAFT LINK	Card 10756-T	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A

DAMPER CYL. PIPE CONN. CARD 1L-11437

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-6638

Memorandum Spec'n 20127

SPECIFICATION FOR LOCOMOTIVES 4 28 C 75

FOR P { DEPARTMENT OF PUBLIC WORKS, BUREAU OF WATER, CITY OF PHILADELPHIA.

8-23-20 Gen. as PHOTO. 5547 **Engine Drawing No.** 22

Gauge of Road 4' 8½" Play ⅜"
Wheelbase, Rigid 7' 6" Driving 7' 6" Total 7' 6"
Total wheelbase, eng. and tend. { Actual --- Limited to ---

{ **Curves** SHARPEST GRADE AND CURVE COMBINED IS EQUAL TO 36 DEGREES CURVE AND 2% GRADE. RAILS 80 POUNDS.
Limits, Height --- Width ---
Weight (approximate) in working order, Total 100,000 POUNDS
On F. tr'k --- lbs., Drivers 100,000 lbs., B. tr'k --- lbs.

Tractive power 21,220 lbs., Ratio of adhesion 4.7
Work'g St'm Pres. 180 lbs., Service SWITCHING
Fuel SOFT COAL

Boiler STEEL Thick 9/16" Bill 9243
Front Tube Sheet ½" Thick
Boiler, Diam. 52" Plan STRAIGHT TOP
Allowable st'm pres. 180 lbs. Tested to { 200 lbs. steam pres. 270 lbs. water pres.
With Factor of Safety of 5.39
Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS
AUXILIARY DOME, NONE
Dome, diam. 25" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE
Firebox, length 105-15/16" Width 41 3/8" Depth F. 54" B. 52½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening 16" DIAM.
Water space, Front 3" Sides 3" Back 3"
Water space frame SINGLE Riveted
Water space stays ⅜" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S.
Radial stays 1" DIAM. Sling stays front { TWO ROWS B. L. W. EXPANSION STAYS.
Button heads below crown on SIX central rows
Crown bars NONE Placed --- above crown
Crown bolts ---

Flues NONE
Tubes #12 B.W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 154 Diam. 2" Length 12' 9"

Heating Surface { Flues --- Combus. Chamb. --- Total 1091.0
Tubes 1021.0 Fire Box 70.0 Fire Brick Tubes ---
Grate area 16.0 Ratio to Heating Surface 1: 68.2
Superheater ---

Fire Brick ARCH: NONE

Grates ROCKING BARS AND DROP PLATE
Ash Pan, Dampers RIGHT AND LEFT

Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap NONE
Spark ejector or hopper WITH
Netting and deflect. plates WITH

Exhaust nozzles DOUBLE, HIGH

Stack STRAIGHT Dia. 14"

Safety Valves TWO CONSOLIDATED 1½" OPEN. (NOT SPEC)
Safety valves BOTH with relief lever, Set to 180 POUNDS
Whistle ONE B. L. W. PLAIN

Steam Gauge ONE IRON 7" MAKER: ASHCROFT
Steam gauge stand IRON Clock NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** TO BURN OIL
Gauge Cocks THREE - BACK Surface valve NONE
Lowest gauge cock ¾" above highest part of crown
Lubricator steam valve WITHOUT separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock ONE B. L. W. POS: FRONT
Cleaning Plugs
Firebox, CORNERS DIAGONAL
Crown, ONE RIGHT SIDE, TWO LEFT SIDE AND TWO BACK
Waist, ONE UNDER FRONT
Front tube sheet ONE 10 Handle plug ONE

Pump NONE

Injectors TWO MONITOR (NOT SPEC) No. 7
Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER
Pipes, Check IRON Feed IRON Overflow IRON
Check B. L. W. WITH STOP VALVE Pos. RIGHT AND LEFT

Steam Heat NONE

Cab STEEL

Cab boards STEEL Nosing T-IRON
Running boards STEEL Nosing T-IRON
Hand rail IRON Located on TANK

Back Bumper OAK

Pilot NONE
Front Bumper OAK Bumper plate WITH
Steps ACROSS FRONT AND BACK OF ENGINE WITH HAND RAILS.
STEPS, HAND HOLDS ETC. TO CONFORM TO I. C. C. REQUIREMENTS.
F & B. Drawhead, Center above rail 33½"
Coupler M. C. B. AUTOMATIC

Signal fixtures NONE

Headlight TWO ROUND CASE 16" Reflector, To burn KEROSENE
Headlight, Nos. on sides WITH H'dl't step WITH
Lamp shelf NONE Nosing ---

Bell 85 POUNDS
Sand Box TWO Diam. 28" Body IRON PAINTED Pipes IRON
Sander HAND, IN EACH BOX, TO SAND FRONT AND REAR.

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9
Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS
H.B. Lickett Nov-1920

SPECIFICATION FOR LOCOMOTIVES 4 28 C 75

FOR P { DEPARTMENT OF PUBLIC WORKS, BUREAU OF WATER CITY OF PHILADELPHIA.

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Frames CAST STEEL

Cylinders, Diam. 17" Stroke 24"
Saddle parts, Length 16" Width 12" Thickness 1"
Exhaust parts, Length 16" Width 2½" Vertical 3/3"
Valve travel 4½" Steam lap ⅞" Exhaust clearance ---
Exhaust clearance from 4½" By-pass valve NONE
(NOT SPEC) NATHAN DOUBLE No. 8 BULLS EYE
Cylinder heads CAST IRON LUBR. PIPES OF IRON UNDER JACKET.
Cylinder casings IRON PAINTED Jacket covers STEEL PAINTED
Steam chest casings IRON PAINTED Jacket covers STEEL PAINTED
Steam chest valves RICHARDSON BALANCED, WITH VACUUM VALVES
(NOT SPEC) Valve rods UNITED STATES, KING TYPE
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON, WITH RINGS OF CAST IRON SPRUNG IN.
Guides LAIRD TYPE, STEEL Guide yokes NEEDLE
Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.
Wrist Pins STEEL Main rod PLUNGER, FORGED ON
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON
Links, sliding blocks, pins, lifting links and eccentric rods to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be U.S. Standard.
All finished movable nuts or steel or wrought iron case hardened.

Wearing Bearings B. L. W.
Driving wheel tire liners NONE
Drivers, O. S. Diam. 50" Centers 44" CENTERS CAST IRON

Tires STEEL Held by SHRINKAGE AND SHOULDER
Tires, Engine Pos. ALL 3" x 5"
Tires, Tender Pos. NONE ---
Lateral play, between driving boxes and wheel tires 3/16" TOTAL
Driving Boxes STEELED CAST IRON
Journals, Diam. 8½" Length 9"

Springs, Make B. L. W.

Front Engine Truck NONE Wheels ---
Turning --- Each side of ctr. Center bearing ---
Journals, Diam. --- Length --- Boxes ---
Wheel tire liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Center diam. --- Size ---
Tires fitted by ---

Back Engine Truck NONE Wheels ---
To swing --- each side of ctr. Center bearing ---
Journals, Diam. --- Length --- Boxes ---
Wheel tire liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Center diam. --- Size ---
Tires fitted by ---

Brake, position ON ALL WHEELS (NO TENDER)
Operating { Engine "S" AMERICAN STEAM
Parts { Eng. Trk. ---
Foundation { Drivers, sch. WV-2 AMERICAN
Parts { Eng. Trk. sch. ---
Air pump --- Pos. ---
Train connections ---
Train signal, sch. ---

Tender NONE

Tank 1200 Builders Bill 5530
SADDLE TANK OVER TOP OF BOILER AND EXTENDING TO FRONT END OF SMOKE BOX EXTENSION.

FUEL BOX TO EXTEND THE FULL WIDTH ACROSS BACK END OF ENGINE, WITH CAPACITY OF 2200 POUNDS.

LOCO. TO OPERATE AT LARDNER'S POINT PUMPING STATION, PHILA.
★ BOILER TO MEET THE LAWS OF PENNSYLVANIA AND PHILADELPHIA, AND TO CONFORM TO THE A. S. M. E. CODE. (SEE SUP. 1 ETC.)
✳ BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION & INSURANCE CO. (SEE SUP. 1 AND 19)

List of tools sent 26
Photo sent No. 2 Inspection B. L. W. (EXCEPT SEE ✳ ABOVE)
Tender weighed NO Material specified B.L.W. (EXCEPT SEE SUP. 4)
2 Certificate of boiler test THREE COPIES B. L. W. FORM 1036
Diameter lays on 8-23-20 Shipment ON OWN WHEELS

Brass shop finish, No. 1
Machine shop finish D-165

B. L. W. No.
Patents NONE

Property plates NONE

Painting, Color 220, OLIVE GREEN AND ALUMINUM

Marked TANK SIDES: BUREAU OF WATER

Road Nos. Pos. Road Nos. Name NONE
F. No. PLATE 3
CAB PANEL
BACK OF FUEL BOX

Actual Dimensions of Loco. Extreme height over all 13' 8½"
Extreme Width { Over cab boards 8' 11½"
Over cylinders ~~valve chambers~~ 8' 11"
Length, outside face of front bumper to { 27' 0"
right face of back bumper of engine

SPECIFICATION FOR LOCOMOTIVES 4 28 C 75

FOR DEPARTMENT OF PUBLIC WORKS, BUREAU OF WATER, CITY OF PHILADELPHIA

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1 BOILER TO BE OPERATED IN THE STATE OF PENNSYLVANIA
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND-ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL / MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 32
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	⅞"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝", (i. E., USE FUSIBLE PLUG CARD 4114 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER,

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6858.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S

PENNSYLVANIA
(State in which boiler is to be used)
No. 33
(Manufacturer's State Standard Number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of Manufacturer)
(LEAVE BLANK) (State's number)
(LEAVE BLANK) (Year put in service)
(Manufacturer's Serial Number)
180 LBS.
(Maximum working pressure when built)

THE BALDWIN LOCOMOTIVE WORKS As Spec'n C-5736

Memorandum Spec'n 20025

SPECIFICATION FOR LOCOMOTIVES 8 26 D 214

W.O.

FOR Rodman Lumber Company.

Gen. as Photo. 3772 {Except to have Stephenson valve motion.

Engine Drawing No. 47

2.11.20

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 10' 6" Driving 10' 6" Total 17' 8"

Total wheelbase, eng. and tend. {Actual 46' 2½" / Limited to ---

Curves 16 degrees Grades, 3%.

Rails, 50 pounds.

Limits, Height --- Width---

Weight (approximate) in working order. Total 99,000 pounds.

On F. tr'k 16,000 lbs., Drivers 83,000 lbs., B. tr'k --- lbs.

Tractive power 19,500 lbs., Ratio of adhesion 4.25

Work'g St'm Pres. 180 lbs., Service Logging

Fuel Wood.

Boiler Steel Thick ⅝" Bill 8924

Front Tube Sheet ½" Thick

Boiler, Diam. 54" Plan Extended Wagon Top.

{Allowable st'm pres. 200 lbs. **Tested to** {220 lbs. steam pres.

{With Factor of Safety of 4.8 {267 lbs. water pres.

Longitud. seams Butt jointed, double covering strips.

Dome, diam. 29" Pos. Forward of Fire Box.

Firebox Steel Combustion chamb. None

Firebox, length 70-3/16" Width 42⅜" Depth F. 58⅜" B. 56⅜"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

Firedoor opening 16" diam.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays ⅞" diam. with 3/16" holes 1½" deep from O.S.

Radial stays 1" diam. Sling stays front {Two rows B. L. W. / Expansion Stays

Button heads below crown on Eight central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues---

Tubes #12 W.G. Charcoal Iron or Steel (B.L.W. Option)

Tube ends Swaged for copper ferrules, fire box ends.

Number 212 Diam. 2" Length 10' 2"

Heating Surface {Flues --- Combus. Chamb. --- Total 1224

{Tubes 1119 Fire Box 105 Fire Brick Tubes ---

Grate area 20.6 Ratio to Heating Surface 1 : 60

Superheater ---

Fire Brick Arch-None

Grates Plain Bars and Dead Plate.

Ash Pan, Dampers Front and Back.

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater None

Smoke box to have short extension.

Smokebox extension Short Cleaning hole and cap None

Spark ejector or hopper None

Netting and deflect. plates None

Exhaust nozzles Double - Low

Cleaning Pipe-With

Stack Pushton Improved Dia. 16"

Safety Valves Two Star 2½" - One muffled.

Safety valves None with relief lever, Set to {180 lbs. muffled.

Whistle One B. L. W. Plain {183 lbs. open.

Steam Gauge One Iron 7" Maker: Star (Not spec)

Steam gauge stand Iron **Clock** None

Water Gauge One B. L. W. Ironclad **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome.

Blower Valve B. L. W.

Blow off Cock One Everlasting Pos: Front

Cleaning Plugs One filling plug in top of boiler.

Firebox, Corners diagonal, and back.

Crown, Two each side and two back.

Waist, One under front

Front tube sheet, One Fusible plug One

Pump None

Injectors Two Sellers, Class "N" (Not spec) No. 7½

Injectors, Pos. Right and Left Steam pipes Copper

Pipes, Check Steel Feed Steel - Overflow Steel

Check Sellers, combined with stop valves Pos. R. and L.

Steam Heat None

Cab Steel, ventilator in Cab Roof.

Cab boards Steel

Running boards Steel Nosing T-Iron

Hand rail Iron Nosing T-Iron

Located on Boiler

Back Bumper Bar Steel Back drawbar height 32½"

Pilot Wood Pushing shoes None

Front Bumper Oak Bumper plate With

Steps hand holds, etc. to conform to I.C.C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M.C.B. Auto. with slotted knuckle.

Signal fixtures Iron on bumper.

Headlight One Round Case 18" Reflector,

Headlight, Nos. on sides With H'd'l't step With

Lamp shelf None Nosing ---

Bell 85 pounds.

Sand Box One Diam. 28" Body Iron Painted Pipes Iron

Sander Watters (Not spec) Air Double, to sand front of front and back of main drivers.

Dome casing Iron Painted.

Boiler Jacket #22 Soft Steel Pto. Bands Iron Style 9

Boiler Lagging Magnesia Sectional on fire box.

Lagging B. L. W. Plastic Magnesia from stock on barrel.

THE BALDWIN LOCOMOTIVE WORKS

F. I. Bird May-1920

SPECIFICATION FOR LOCOMOTIVES 8 26 D 214

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235

FOR Rodman Lumber Company

HW.

Frames Cast Steel

Cylinders, Diam. 16" Stroke 24"

St'm ports, Length 15" Width 1½" Bridges 1"

Exh. ports, Length 15" Width 2½" Valve lead 1/16"

Valve travel 5" Steam lap ¾" Exhaust clearance ---

Eccentric crank throw 4½" By-pass valve None

S. F. Lubr. Detroit Triple (Not spec) 22 Bulls Eye, with oil control valve

Cyl'r heads Cast Iron. Lubr. pipes of iron under jacket.

Cyl'r casings Iron Painted Head covers Steel Painted

St'm chest casings Iron Painted Covers Steel Painted

St'm chest valves Richardson Balanced, with Vacuum Valves.

Met. pkg. (Not spec) Piston rods / Valve stems United States, King Type.

Pistons Cast Iron Ring sprung into solid head.

Guides "Alligator" type, Steel Oil cups Needle

Crossheads Cast Steel, with bearings of cast iron, tinned.

Wrist Pins Steel Rod cups Plunger, forged on rods.

Parallel rods to have solid ends.

Valve Motion Stephenson.

{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be / well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners None

Drivers, O. S. Diam. 48" Cen. diam. 42" centers cast iron.

Tires Steel Held by Shrinkage and Shoulder.

Tires, Flanged, Pos All Size 3" x 5½"

Tires, Plain, Pos. None Size ---

Lateral play between driving boxes and wheel hubs = 3/16" total

Driving Boxes Cast Iron

Journals, Diam. 7" Length 8"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing

To swing 3" each side of cen., Cen. pin liners None

Journals, Diam. 4½" Length 7½" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 28" Tread 4½" Kind Chilled Cast Iron Plate

Tires None Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck None Wheeled ---

To swing --- each side of cen. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels.

Operating {Engine, sch. No. 6 ET Westg. combined auto. and

Parts {Eng. Tr'k. sch. --- straight air.

Foundation {Drivers, sch. --- American O. S. Equalized.

Parts {Eng. Tr'k, sch ---

Air pump One 9½" Pos. L. S.

Train connections Front and Back

Train signal, sch. "L"

Air Reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1520 {Tender to be

Weight, with fuel and water, about 70,000 lbs. {Weighed: Yes

Tender to be of the long, low design.

Tank 3,500 Gallons, Bill 5262

Tank "U" shape, straight top. Fuel capacity 3 compts.

Syphon connection to left side of tank.

Tool Boxes hard wood, top.

Wood rack around top of tank.

Frame Steel, 6" and 8" channels, with bumpers of wood and steel plate.

Front Drawbar height 30½"

Pilot None Pushing shoes None

Back drawhead, center above rail 33½"

Coupler M. C. B. Auto. with slotted knuckle.

Steps hand holds etc. to conform to I.C.C. requirements.

Trucks Arch bar type with cast steel bolsters.

Springs Elliptic, B. L. W.

Journals, Diam. 4½" Length 8"

Wheels, Diam. 30" Tread 4½" Kind Chilled Cast Iron Plate.

Tires None Cen. diam. --- Size---

Tires held by ---

Safety chains Single

Brake Position On all wheels.

Brake sch No. 6 ET Westg. Auto. and straight air with 10"x12" cylinder.

List of tools, sch. 27 One pair wrecking frogs.

Photo sch. None Inspection B. L. W.

To be weighed Yes Material specifns B. L. W.

Certificate of boiler test: Three copies of B. L. W. form 1036

Junior laws to 3-25-20 Shipment On own wheels.

Brass shop finish, No. 1

Machine shop finish D-165

Patents {Feed Water Strainer, Patented September 1, 1903 {Cast on

Property plates B. L. W., for engine and tender.

Painting, style 291, Olive Green and Aluminum.

Mark on Cab Panels and Tank Sides: O. V.

Road Nos. Pos. Road Nos. Name None

F. No. Plate 12

Sand Box

Back of Tank

Actual Dimensions of Loco. Extreme height over all 14' 1"

Extreme Width: Cab boards 9' 0" ; Cylinders or valve motion 8' 8"

Length outside face front bumper of engine to face of tender wedge 26' 8½"

Length face of tender wedge to outside face back bumper of tender 25' 0"

Total length outside face front bumper of engine to outside face back bumper of tender 51' 8½"

SPECIFICATION FOR LOCOMOTIVES 8 26 D 214

FOR RODMAN LUMBER COMPANY.

HW.

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1 LOCO. FOR OPERATION IN FLORIDA.
DETAILS TO CONFORM TO ALL I. C. C. REQUIREMENTS.

2 E. W. VANDUSEN CO'S. STEAM JET PUMP #7 UNDER CAB BOARD ON LEFT SIDE WITH 2½" PIPE CONNECTION TO TANK AND 3" SUCTION PIPE. OMIT HOSE CONNECTION AS PURCHASER HAS HOSE IN STOCK.

3 HEADLIGHT EQUIPMENT TO BE PYLE-NATIONAL ELECTRIC TYPE-"K-2." WITH INCANDESCENT HEADLIGHT. HEADLIGHT CASE TO BE DRESSEL.

4 THIS LOCO. IS TO LEAVE EDDYSTONE WITH THE BALDWIN LOCOMOTIVE WORKS' PROPERTY PLATES APPLIED TO ENGINE AND TENDER. BUT TO PROVIDE FOR A POSSIBLE CHANGE IN FINANCIAL ARRANGEMENTS, WE ARE TO PROVIDE ANOTHER SET OF PROPERTY PLATES READING: "RODMAN LUMBER COMPANY" WHICH ARE TO BE DRILLED TO MATCH THE B. L. W. PROPERTY PLATES SO THAT A SUBSTITUTION CAN BE MADE IF SUBSEQUENTLY ARRANGED AND NO FURTHER DRILLING WILL BE NECESSARY.
THESE RODMAN LUMBER COMPANY PROPERTY PLATES ARE TO BE GIVEN TO MR. TAPLEY WHO WILL INSTRUCT OUR ENGINEER REGARDING THEM.

THE BALDWIN LOCOMOTIVE WORKS DUP. OF 4 20 C 38 AND 39, WITH SAME EXTRAS, EXCEPT WHERE OTHER WISE SPECIFIED.

Memorandum Spec'n 20134

SPECIFICATION FOR LOCOMOTIVES 4 20 C 59

RD

FOR JOHN A. ROEBLING'S SONS COMPANY

HW.

Gen. as PHOTO. 2086

Engine Drawing No. 7

9-1-20

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 6' 0" Driving 6' 0" Total 6' 0"
Total wheelbase, eng. and tend. {Actual ---, Limited to ---

Curves --- GRADES, 4%

Limits, Height --- Width ---
Weight (approximate) in working order, Total 52,000 POUNDS.
On F. tr'k --- lbs., Drivers 52,000 lbs., B. tr'k --- lbs.

Tractive power 10950 lbs., Ratio of adhesion 4.75
Work'g St'm Pres. 160 lbs., Service SWITCHING
Fuel SOFT COAL

22 **Boiler** STEEL Thick 7/16" Bill 9226
5 Front Tube Sheet ½" Thick
Boiler, Diam. 38" Plan STRAIGHT TOP
3 Allowable st'm pres. 160 lbs. **Tested to** 180 lbs. steam pres.
6 With Factor of Safety of 6.50 240 lbs. water pres.
Longitud. seams DOUBLE RIVETED.

5 **Dome,** diam. 23½" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE
Firebox, length 43 1/16" Width 33⅜" Depth F. 40" B. 38¼"
Firebox, Tube ⅜" Crown 5/16" Sides 5/16" Back 5/16"
Firedoor opening 16" DIAM. CROWN AND SIDES ONE SHEET
Water space, Front 3½" Sides 3" Back 3"
Water space frame SINGLE Riveted
7 Water space stays ⅝" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front ---
Button heads below crown on --- central rows
Crown bars NONE Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 W.G. IRON OR SEAMLESS STEEL
Tube ends SWAGED FOR COPPER FERRULES, FIREBOX ENDS.
Number 104 Diam. 1½" Length 9'1½"

Heating Surface {Flues ---, Tubes 369⁰, Combus. Chamb. ---, Fire Box 45⁰, Total 414⁰, Fire Brick Tubes ---
Grate area 10.⁰ Ratio to Heating Surface 1: 41
Superheater ---

Fire Brick ARCH, NONE

Grates ROCKING BARS AND DROP PLATES
Ash Pan, Dampers FRONT AND BACK

Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater NONE

Smokebox extenstion WITH Cleaning hole and cap R.S. AND UNDER.
Spark ejector or hopper NONE
Netting and deflect. plates WITH

Exhaust nozzles DOUBLE HIGH

Stack STRAIGHT Dia. 12"

9-1-20 (NOT SPEC)
16 **Safety Valves** TWO CROSBY 2½" OPEN
Safety valves BOTH with relief lever, Set to 160 AND 165 POUNDS
Whistle B. L. W. PLAIN

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (NOT SPEC)
Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** TO BURN OIL
Gauge Cocks THREE BACK Surface valve NONE
Lowest gauge cock 3" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock ONE B.L.W. POS: RIGHT SIDE
17 **Cleaning Plugs**
Firebox, CORNERS, SIDES AND BACK.
Crown, TWO BACK
Waist, ONE UNDER FRONT
Front tube sheet ONE 18 Fusible plug ONE

Pump NONE

Injectors TWO HANCOCK (NOT SPEC) No. 5
Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER
Pipes, Check IRON Feed IRON Overflow IRON
15 Check B.L.W. WITH STOP VALVE Pos. R. AND L.

Steam Heat NONE

Cab WOOD ONE TOOL BOX ON RIGHT SIDE UNDER CAB.
COAL BOX IN L.S.OF CAB, CAPACITY 16 CU. FT.

Cab boards WOOD Nosing ANGLE IRON
Running boards WOOD Nosing ANGLE IRON
Hand rail IRON Located on TANK

Back Bumper OAK

Pilot NONE Pushing shoes FRONT AND BACK
Front Bumper OAK Bumper plate NONE
Steps FRONT AND BACK
GRAB IRONS FRONT AND BACK. PIN BOX, FRONT.
F. & B. Drawhead, Center above rail 19" (SEE BELOW)
Coupler M.C.B. FRONT AND BACK, ALSO LONG DRAWBAR UNDER COUPLER.
HEIGHT FROM RAIL TO CENTRE OF LONG DRAWBAR UNDERNEATH M.C.B. COUPLER, 19"
Signal fixtures NONE

Headlight TWO ROUND OASE 12" Reflector, To burn KEROSENE
Headlight, Nos. on sides WITH H'd'l't step NONE
Lamp shelf NONE Nosing NONE

Bell 85 POUNDS, ON FRONT SAND BOX.
Sand Box TWO Diam. 19" Body IRON PAINTED Pipes IRON
Sander HAND, TO SAND FRONT AND BACK OF DRIVERS.

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9
Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

Jos. WOLF Nov. 1920

SPECIFICATION FOR LOCOMOTIVES 4 20 C 59

FOR JOHN A. ROEBLING'S SONS COMPANY

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Frames CAST STEEL

Cylinders, Diam. 13" Stroke 20"
St'm ports, Length 12" Width 1" Bridges ⅞"
Exh. ports, Length 12" Width 2" Valve lead 1/16"
Valve travel 4" Steam lap 5/8" Exhaust clearance ---
Eccentric throw 3½" By-pass valve NONE
S. F. Lubr. (NOT SPEC) DETROIT TRIPEE No. 21 BULL'S EYE
Cyl'r heads CAST IRON LUBR. PIPES OF COPPER, UNDER JACKET
Cyl'r casings IRON PTD. Head covers STEEL PAINTED
St'm chest casings IRON PTD. Covers STEEL PAINTED
St'm chest valves BALANCED WITH VACUUM VALVES
Met. pkg. (NOT SPEC) PISTON RODS, VALVE STEMS UNITED STATES, KING TYPE

Pistons HEADS OF CAST IRON, WITH RINGS OF CAST IRON SPRUNG IN
Guides STEEL Oil cups NEEDLE
Crossheads CAST STEEL, WITH BEARINGS OF BRASS.
Wrist Pins STEEL Rod cups PLUNGER

Valve Motion STEPHENSON.
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.
Driving wheel hub liners NONE
Drivers, O. S. Diam. 42" Cen. diam. 36" CENTRES CAST IRON

Tires STEEL Held by SHRINKAGE AND SHOULDER
Tires, Flanged, Pos. ALL Size 3" x 5½"
Tires, Plain, Pos. NONE Size ---
Lateral play between driving boxes and wheel hubs = 3/16" TOTAL
Driving Boxes CAST IRON
Journals, Diam. 6½" Length 8"

Springs, Make B.L.W.

Front Engine Truck NONE Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck NONE Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVERS, (NO TENDER)
Operating {Engine, sch. WESTINGHOUSE STRAIGHT AIR, ONLY (SEE SUP. 25)
Parts {Eng. Tr'k, sch. ---
Foundation {Drivers, sch. W-1 AMERICAN O. S. EQUALIZED
Parts {Eng. Tr'k, sch. ---
Air pump ONE 8" Pos. LEFT SIDE
Train connections FRONT AND BACK
Train signal, sch. NONE
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender NONE

21 **Tank** 650 Gallons, Bill 2493
SADDLE TANK LOCATED ON BOILER.

22 LOCOMOTIVE FOR OPERATION IN NEW JERSEY.

23 BOILER TO CONFORM TO THE A.S.M.E. CODE (SEE SUP. 1 TO 19)

24 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

25 WESTINGHOUSE STRAIGHT AIR BRAKE TO CONSIST OF THE FOLLOWING:-

1 - 8" COMPRESSOR	Pc. 11379
1 - No. 5A GOVERNOR	Pc. 24974
1 - 1" STEAM VALVE	Pc. 17941
MAIN RESERVOIR ABOUT 25000 TO 30000 CUB. INS. CAPACITY	
1 - S3 BRAKE VALVE	Pc. 2626
1 - C6 REDUCING VALVE	Pc. 18482
1 - 1" MAIN RESERVOIR COCK	Pc. 11905
1 - 5" DUPLEX GAUGE MAIN RESERVOIR BRAKE COCK	Pc. 23334
1 - EL SAFETY VALVE SET AT 53#	Pc. 10526

List of tools, sch. 26
Photo sch. NONE Inspection B.L.W. EXCEPT FOR BOILER. (SUP. 24)
To be weighed YES Material specifns B.L.W. EXCEPT FOR BOILER (SUP. 25)
Certificate of boiler test THREE COPIES B.L.W. FORM 1036
Junior laws to 9-27-20 Shipment ON OWN WHEELS.

Brass shop finish, No 1
Machine shop finish D-165

B. L. W. {NONE
Patents

Property plates NONE

Painting, style 223, OLIVE GREEN AND ALUMINUM

LETTERING TO BE SAME AS FOR 4 20 C 38 ETC.
Mark on TANK SIDES: JOHN A. ROEBLING'S SONS CO.

Road Nos. Pos. Road Nos. Name NONE
F. No. PLATE 18
DOME

Actual Dimensions of Loco. Extreme height over all 10'10½"
Extreme Width {Over cab boards 8'1"
Over cylinders or FRONT BUMPER 8'5"
Length outside face of front bumper to outside face of back bumper of engine 22'2"

SPECIFICATION FOR LOCOMOTIVES 4 20 C 59

FOR ROEBLING'S SONS COMPANY, JOHN. A.

RTL

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1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF NEW JERSEY MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMTRER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADES IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6850. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ⅛" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ¼" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS: AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S

NEW JERSEY
(State in which boiler is to be used)
6
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (State's number) (LEAVE BLANK) (Year put in service)
(manufacturer's Serial number) 160 LBS.
(Maximum working pressure when built)

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6834, Dup. 6 32 D 1082, except where otherwise specified.

Memorandum Spec'n 20141.

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1149. Gen. as Photo. 5948, except to have bell ringer and electric headlights.

FOR Rogers-Brown Iron Co. **Engine Drawing No.** 111.

HNW. 9-23-20.

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"
Total wheelbase, eng. and tend. Actual 38' 7" Limited to ----

Curves 16 degrees.

Limits, Height --- Width ---
Weight (approximate) in working order, Total 121,000 pounds.
On F. tr'k --- lbs., Drivers 121,000 lbs., B. tr'k --- lbs.

Tractive power 29,500 lbs., Ratio of adhesion 4.1
Work'g St'm Pres. 185 lbs., Service Switching.
Fuel Soft coal.

Boiler Steel. Thick ⅝" Bill 9300
Front Tube Sheet ½" Thick
Boiler, Diam. 62" Plan Straight top.
Allowable st'm pres. 185 lbs. **Tested to** 205 lbs. steam pres.
With Factor of Safety of 5.02 278 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips.
Dome to be one-piece type. Auxiliary dome - None.
Dome, diam. 29" Pos. Central.

Firebox Steel. Combustion chamb. None.
Firebox, length 88" Width 40⅞" Depth F. 60½" B. 57½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening 16" diam. Crown and sides in one sheet.
Water space, Front 4" Sides 3½" Back 3½"
Water space frame Single Riveted
Water space stays ⅜" diam. with 3/16" holes 1½" deep from O.S.
Radial stays 1" diam. Sling stays front Two rows B. L. W. Expansion stays.
Button heads below crown on Eight central rows
Crown bars None. Placed --- above crown
Crown bolts ---

Flues None.
Tubes No. 12 B.W.G. Charcoal iron or steel, (B.L.W. Option).
Tube ends Swaged for copper ferrules, fire box ends.
Number 246 Diam. 2" Length 11' 0"

Heating Surface Flues --- Combus. Chamb. --- Total 1529
Tubes 1406 Fire Box 123 Fire Brick Tubes ---
Grate area 25 Ratio to Heating Surface 1: 61.2
Superheater ---

Fire Brick Arch, on studs.

Grates Rocking bars and drop plate.
Ash Pan, Dampers Front and back
Ash pan to conform to New York State Requirements.

Throttle Balance. Pos. Dome.
Dry pipe Steel.

Superheater None.

Smokebox extension With. Cleaning hole and cap L. S. Only.
Spark ~~ejector or~~ hopper With.
Netting and deflect plates With.
Smoke box netting to conform to New York State Requirements.
Exhaust nozzles Double high.

Stack Straight. Dia. 16".

Safety Valves Two Coale 2½" Open. (Not Spec'd)
Safety valves Both with relief lever, Set to 185 pounds.
Whistle One B. L. W. Plain.

Steam Gauge One Iron 7" Maker: Ashcroft.
Steam gauge stand Iron. **Clock** None.

Water Gauge One "Delco" **Cab Lamps** Electric.
Gauge Cocks Three back. Surface valve None.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve without separate dry pipe to dome
Blower Valve One B. L. W.

Blow off Cock One B.L.W. Pos: Left side.
Cleaning Plugs One plug above fire door.
Firebox, Corners diagonal, right side and front.
Crown, Two each side and two back.
Waist, One under front.
Front tube sheet. One. Fusible plug One.

Pump None.
Locomotive for operation the State of New York. Automatic fire door and vestibule between cab and tender not required.
Boiler to conform to the laws of the State of New York, i.e., A.S.M.E. Code, and to be inspected by Hartford Steam Boiler Inspection and Insurance Company.
Injectors Two Sellers, Class "M" (Spec) No. 8½
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check B.L.W., with stop valve. Pos. Right and left.

Steam Heat None.
One 1½" globe valve on engineer's side for supplying steam to ladle line. Piping not required.
Cab Steel.

Cab boards to be covered with wood planking, 1¼" thick.
Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 25¼"

Pilot None.
Front Bumper Oak. Bumper plate With.
Steps across front, with hand rails.
Steps, hand holds, etc., to conform to I. C. C. requirements.
Front Drawhead, Center above rail 33½"
Coupler M. C. B. Automatic.

Signal fixtures None.
Headlight equipment to be Pyle National Electric, type K-2, with incandescent headlights. Headlight to have dimmer attachment.
Headlight Two round case 16" Reflector,
Headlight, Nos. on sides With. H'd'l't step With.
Lamp shelf None. Nosing ---

Bell 92 pounds. Gollmar air bell ringer.
Sand Box Two Diam. 28" Body Iron painted. Pipes Iron.
Sander (Not Spec'd) Leach air, trap A-1, in each box, to sand front and back.

Dome casing Iron painted.

Boiler Jacket #18 Soft steel ptd. Bands Iron. Style 9
Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

E.H. Roberts. Feb-1921

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1149.

FOR Rogers-Brown Iron Co.

HNW.

Frames Cast steel.

Cylinders, Diam. 19" Stroke 26"
St'm ports, Length 16" Width 1½" Bridges 1"
Exh. ports, Length 16" Width 2½" Valve lead 1/16"
Valve travel 5½" Steam lap ¾" Exhaust clearance ---
Eccentric ~~crank~~ throw 5" By-pass valve None.
S. F. Lubr. (Not Spec) Nathan triple No. 9 Bull's Eye.
Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings Iron painted. Covers Steel painted.
St'm chest valves Balanced, with vacuum valves.
Met. pkg. (Not Spec) (Piston rods, valve stems) United States, King type.
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron, rings of cast iron sprung in.
Guides Laird type, steel. Oil cups Needle.
Crossheads Cast steel, with bearings of cast iron tinned.
Wrist Pins Steel. Rod cups Plunger.
Parallel rods to have solid ends.

Valve Motion Stephenson.
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub linings Bronze.
Drivers, O. S. Diam. 50" Cen. diam. 44", centers cast iron.

Tires Steel. Held by Shrinkage and shoulder.
Tires, Flanged, Pos. All. Size 3" x 5½"
Tires, Plain, Pos. --- Size ---
Lateral play between driving boxes and wheel hubs = 3/16" total.
Driving Boxes Cast steel.
Journals, Diam. 8½" Length 8½"

Springs. Make B. L. W.

Front Engine Truck None Wheeled ---
To swing --- each side of cen. Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck None. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels.
Operating Parts: Engine, sch. No. 6 ET. Westg. Combined auto. and straight air.
Foundation Parts: Eng. Tr'k, sch. ---
Foundation Parts: Drivers, sch. No. 2- American outside equalized.
Eng. Tr'k, sch. ---
Air pump One 9½". Pos. Left side.
Train connections Front and back. Air reservoirs to have hydrostatic test of 210 pounds.
Train signal, sch. None.
Brakes, including foundation brakes and enamelled reservoirs from New York Air Brake Co.
Governor to be furnished with plain top instead of the S. F. type.

Tender Eight Wheeled, Drawing No. 1649.
Weight, with fuel and water, about 74,000 pounds.
Tender to be weighed: Yes. ~~5588~~ 5580 for hereafter.
Tank 3,500 Gallons, Bill 5588. for 1149 only.
Tank "U" shape, sloping back. Fuel capacity, 6 tons.

Tool Boxes of hard wood, top.

Frame Steel, 6" and 8" channels, with bumpers of wood reinforced with steel plate.
Front Drawbar height 28"
Pilot None.
Back drawhead, center above rail 33½"
Coupler M. C. B. Automatic.

Steps, hand holds, etc., to conform to I. C. C. requirements.
Steps across rear, with hand rails.
Steps and hand holds on sloping back of tank.
Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, B. L. W.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.
Tires None. Cen. diam. --- Size ---
Tires held by ---
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6 ET. Westinghouse automatic and straigh air, with 10" x 12" tender brake cylinder.

List of tools, sch. 29.
Photo sch. None. Inspection B.L.W., except for boiler.
To be weighed: Yes. Material spec'ns B.L.W., except for boiler.
Certificate of boiler test Three copies B. L. W. form 1036.
Junior laws to 11-30-20 . Shipment On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

B. L. W.
Patents None.

Property plates None.

Painting, style --- Black, no striping.

Lettering, etc., in aluminum leaf.
Mark on tank sides in plain block letters: Rogers-Brown Iron Company

Road Nos. Pos. Road Nos. Name None.
F. No. Plate. 1
F. Sand box.
Cab sides.
Back of tank.

Actual Dimensions of Loco. Extreme height over all 14' 1½"
Extreme Width: Cab boards 9' 9" ; Cylinders ~~or valve motion~~ 9' 1½"
Length outside face front bumper of engine to face of tender wedge = 28' 1½"
Length face of tender wedge to outside face back bumper of tender = 22' 6½"
Total length outside face front bumper of engine to outside face back bumper of tender = 50' 2½"

THE BALDWIN LOCOMOTIVE WORKS As Spec'n C-6465

Memorandum Spec'n 20095

SPECIFICATION FOR LOCOMOTIVES 10 32 E 173

FOR John L. Roper Lumber Company.

TAB

Gen. as Photo. 5965

Engine Drawing No. 22

4-17-20

Gauge of Road 4' 8½" Play ⅞"
Wheelbase, Rigid 14' 6" Driving 14' 6" Total 22' 4"
Total wheelbase, eng. and tend. {Actual 51' 7" {Limited to ----
Locomotive for service in North Carolina.
Curves 16 degrees.

Limits, Height ---- Width ----
Weight (approximate) in working order, Total 126,500 pounds.
On F. trk 16,100 lbs., Drivers 110,400 lbs., B. trk ---- lbs.

Tractive power 27,600 lbs., Ratio of adhesion 4
Work'g St'm Pres. 180 lbs., Service Logging
Fuel Soft coal

Boiler Steel Thick 9/16" Bil 9101
Front Tube Sheet ½" Thick
Boiler, Diam. 56" Plan Straight Top
Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.
With Factor of Safety of 5.1 240 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips
Main dome - One-piece type. Auxiliary dome - None
Dome, diam. 29" Pos. Central

Firebox Steel Combustion chamb. None
Firebox, length 91-15/16" Width 41⅛" Depth F. 91 15/16" B. 41⅛"
Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"
Firedoor opening 16" diam.
Water space, Front 4" Sides 3½" Back 3½"
Water space frame Single Riveted
Water space stays ⅞" diam. with 3/16" holes 1½" deep from O.S.

Radial stays 1" diam. Sling stays front {Two rows B.L.W. expansion stays.
Button heads below crown on Six {central rows
Crown bars None Placed ---- above crown
Crown bolts ----

Flues None
Tubes No. 12 B.W.G. Charcoal Iron or Steel (B.L.W. Option)
Tube ends Swaged for Copper ferrules, fire box ends.
Number 204 Diam. 2" Length 14' 0"

Heating Surface Flues None Combus. Chamb. ---- Total 1601.6
Tubes 1487.0 Fire Box 114.6 Fire Brick Tubes ----
Grate area 26.2 Ratio to Heating Surface 1: 61
Superheater ----

Fire Brick Arch, on studs

Grates Rocking bars and drop plate
Ash Pan, Dampers Front and back.

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

Smokebox extension With Cleaning hole and cap L. S. only
Spark ~~arrester~~ hopper With
Netting and deflect. plates With

Exhaust nozzles Double, High

Stack Straight Dia. 16"

Safety Valves (Spec) Two Star 2½" Open
Safety valves None with relief lever, Set to 180 pounds
Whistle One Chime

Steam Gauge One Iron 7" Maker: Star
Steam gauge stand Iron **Clock** None

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric
Gauge Cocks Three Back Surface valve None
Lowest gauge cock 3¼" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B.L.W.

Blow off Cock One B. L. W. POS: Front
Cleaning Plugs
Firebox, Corners diagonal, sides and back
Crown, Three each side and two back
Waist, One under front
Front tube sheet, One Fusible plug One

*Hancock No. 9 Syphon under cab board on left side with pipe connection to tank and with 25 feet of 4" suction hose. Syphon to be arranged also as an ejector to discharge water from tank, always leaving a supply of 8" in tank; with 25 feet of delivery hose, for the purpose of supplying water from the tender to a skidder tank.

Injectors Sellers' Class "N" (Spec) No. 8½"
Injectors, Pos. Right and left Steam pipes Copper
Pipes, Check Iron Feed Iron Overflow Iron
Check Sellers combined main check and stop Pos. Right and left

Steam Heat None

Cab Wood

Cab boards Wood Nosing None
Running boards Wood Nosing None
Hand rail Iron Located on Boiler

Back Bumper Bar steel Back drawbar height 30¾"

Pilot Wood Pushing shoes ----
Front Bumper Oak Bumper plate With
Steps Hand holds, etc., to conform to I.C.C. requirements.

Front Drawhead, Center above rail
Coupler Two-pocket cast steel draw castings fitted with M.C.B. auto.coupler, with slotted knuckle 33½" centre above rail when in upper pocket and 25" centre above rail when in lower pocket.
Signal fixtures Iron on bumper.
Headlight equipment to include Pyle Electric Co's type 'E' Turbo generator, voltage 32 incandescent light, Road type casing.
Headlight One Round Cast 18" Reflector,
Headlight, Nos. on sides With H'd'l't step With
Lamp shelf None Nosing ----

Bell 92 pounds.
Sand Box, (Not Spec) One Diam. 28" Body Iron painted Pipes Iron
Sander Leach Air Double, Trap A-10 to sand front and rear.

Dome casing Iron painted.

Boiler Jacket 22 Soft Steel ptd. Bands Iron Style 9
Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

M. Ash Aug 1920

SPECIFICATION FOR LOCOMOTIVES 10 32 E 173

FOR John L. Roper Lumber Company.

TAB

Frames Cast steel

Cylinders, Diam. 19" Stroke 24"
St'm ports, Length 16" Width 1½" Bridges 1"
Exh. ports, Length 16" Width 2½" Valve lead ⅛"
Valve travel 5" Steam lap ¾" Exhaust clearance ----
Eccentric crank throw 20" By-pass valve None
S. F. Lubr. (Not Spec) Detroit Triple No. 22 Bull's eye with oil control valve. Syphon connection to left side of tank. (See *)
Cyl'r heads Cast iron. Lubricator pipes of iron under jacket.
Cyl'r casings Iron ptd. Head covers Steel painted.
St'm chest casings Iron ptd. Covers Steel painted
St'm chest valves Richardson balanced with vacuum valves.
Met. pkg. (Not Spec) piston rods valve stems United States - King type.
Piston rods to be keyed for crossheads.
Pistons Heads Cast Iron with rings of cast iron sprung in.
Guides Steel Oil cups Needle
Crossheads Cast steel with bearings of cast iron tanned.
Wrist Pins Steel Rod cups Plunger
Parallel rods to have solid ends.

Valve Motion Southern, Royalty payable by B.L.W.
{Links, sliding blocks, pins, lifting links and eccentric rod saws to be
{well case hardened or to have hardened bushings.
{Southern locomotive valve gear license plates (herewith) to be
{applied to rear end of link support on each side of locomotive.
All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners None
Drivers, O. S. Diam. 48" Cen. diam. 42" Centres Cast Iron

Tires Steel Held by Shrinkage and Shoulder.
Tires, Flanged, Pos. Front and Back Size 3" x 5½"
Tires, Plain, Pos. Intermediate Size 3" x 6½"
Lateral play between driving boxes and wheel hubs = 3/16" total
Driving Boxes Steeled Cast Iron
Journals, Diam. {Main 8" {Others 7½" Length 8½"

Springs. Make B.L.W. make

Front Engine Truck Two Wheeled Swing bolster, center bearing.
To swing 2½" each side of cen. Cen. pin liners None
Journals, Diam. 5" Length 8" Boxes Cast Iron
Wheel hub liners ----
Wheels, Diam. 30" Tread 1¼" Kind Chilled cast iron plate
Tires None Cen. diam. ---- Size ----
Tires held by ----

Back Engine Truck None Wheeled ----
To swing ---- each side of cen. Cen. pin liners ----
Journals, Diam. ---- Length ---- Boxes ----
Wheel hub liners ----
Wheels, Diam. ---- Tread ---- Kind ----
Tires ---- Cen. diam. ---- Size ----
Tires held by ----

Brake, position On all driving and tender wheels
Operating {Engine No. 6-ET West's Combined Auto. and
Parts {Eng. Trk. sch. ---- Straight air.
Foundation {Drivers, sch. WN-1 American O.S. Equalized
Parts {Eng. Trk. sch. ----
Air pump One - 9½" Pos. Left side
Train connections Front and back
Train signal, sch. None
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1577
Weight, with fuel and water, about 90,000 pounds.
Tender to be weighed - Yes.
Tank 4,500 Gallons. Bil 4229
Tank "U" Shaped, Straight Top. Fuel Capacity - 7 tons.

Tool Boxes of hard wood, Top.
Frame Steel 8" and 10" channels. Bumpers of wood and steel plate.
Front Drawbar height 30½"
Pilot None Pushing shoes ----
Back drawhead, center above rail ----
Coupler Two-pocket cast steel draw casting fitted with M.C.B. Auto.coupler, with slotted knuckle 33½" centre above rail when in upper pocket and 25" centre above rail when in lower pocket.
Steps Hand holds, etc., to conform to I.C.C. requirements.

Trucks Arch bar type, with bolsters of steel.

Springs Elliptic B. L. W. make
Journals, Diam. 5" Length 9"
Wheels, Diam. 28" Tread 4½" Kind Chilled cast iron double plate
Tires None Cen. diam. ---- Size ----
Tires held by ----

Brake Position On all wheels
Brake sch. No. 6-ET West's. Auto. and straight air, with 10" x 12" tender cylinder.

List of tools, sch. 29 One pair wrecking frogs.
Photo sch. None Inspection B. L. W.
To be weighed Yes Material specs B. L. W.
Certificate of boiler ins't Three copies of B.L.W. form 1036
Junior Laws to 7-23-20 Shipment On own wheels

Brass soon finish, No. 1
Machine shop finish D-165

Springs. Make B.L.W. make

Front Engine Truck Two Wheeled Swing bolster, center bearing.
To swing 2½" each side of cen. Cen. pin liners None
Journals, Diam. 5" Length 8" Boxes Cast Iron
Wheel hub liners ----
Wheels, Diam. 30" Tread 1¼" Kind Chilled cast iron plate
Tires None Cen. diam. ---- Size ----
Tires held by ----

Back Engine Truck None Wheeled ----
To swing ---- each side of cen. Cen. pin liners ----
Journals, Diam. ---- Length ---- Boxes ----
Wheel hub liners ----
Wheels, Diam. ---- Tread ---- Kind ----
Tires ---- Cen. diam. ---- Size ----
Tires held by ----

Brake, position On all driving and tender wheels
Operating {Engine No. 6-ET West's Combined Auto. and
Parts {Eng. Trk. sch. ---- Straight air.
Foundation {Drivers, sch. WN-1 American O.S. Equalized
Parts {Eng. Trk. sch. ----
Air pump One - 9½" Pos. Left side
Train connections Front and back
Train signal, sch. None
Air reservoirs to have hydrostatic test of 210 pounds.

B. L. W.
Patents Feed pipe strainer patented Sept. 1, 1903 (Cast on)

Property plates B.L.W., for engine and tender.

Painting, style 291 Olive Green and Aluminum

Marking to be same as for 10 20 & D 20 etc.
Mark on Cab Sides J. L. R. L. Co.
Mark on Tank Sides John L. Roper Lumber Co.

Road Nos. Pos. Road No. Name None
F. No. Plate 105
Sand box
Back of tank

Actual Dimensions of Loco. Extreme height over all 13' 10½"
Extreme Width: Cab boards 10' 0" Cylinders ~~valve chests~~ 10' 0"
Length outside face front bumper of engine to face of tender wedge 32' 11⅝"
Length face of tender wedge to outside face back bumper of tender 24' 2½"
Total length outside face front bumper of engine to outside face back bumper of tender 57' 1⅝"

THE BALDWIN LOCOMOTIVE WORKS DUP. OF 10 3+ E 2057 WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED. As Specification F-1956

* Memorandum Spec'n ~~F-20178~~ 2100½

SPECIFICATION FOR LOCOMOTIVES 10 3+ E ~~2099 to 2101~~ 2100 Gen. as PHOTO. 7203

FOR ~~STOCK~~ SAN ANTONIO SOUTHERN RAILWAY **Engine Drawing No.** 177

EF ~~(DUAL)~~

HW. ~~F-20178~~ 1-26-21

Gauge of Road 4'8½" Play ⅜"
Wheelbase, Rigid 14'6" Driving 14'6" Total 22'0"
Total wheelbase, eng. and tend. (Actual 51'9" (Limited to ---

* THIS LOCO. WAS ORIGINALLY ORDERED FOR STOCK ON FOREIGN SALES DEPARTMENT MEMO. SPECN. F-20178.
Curves 8 DEGREES GRADES 2.5 FOR LENGTH OF 300 METERS.

Limits, Height --- Width ---
Weight (approximate) in working order, Total 132,000 POUNDS.
On F. tr'k ~~14,000~~ 13,200 lbs., Drivers ~~118,000~~ 118,800 lbs., B. tr'k --- lbs.
WEIGHT OF ENGINE EMPTY, ABOUT ~~117,500~~ 117,800 POUNDS.
Tractive power 27,800 lbs., Ratio of adhesion ~~4.25~~ 4.29
Work'g St'm Pres. 170 lbs., Service ~~PLANTATION~~ FREIGHT
Fuel OIL

Boiler STEEL Thick ~~9/16~~ ⅝" Bill ~~8831~~ 8837
Front Tube Sheet ½" Thick ~~BOILER PLATE EXPORT~~
Boiler, Diam. 56" Plan EXTENDED WAGON TOP.
Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.
With Factor of Safety of 4.55 267 lbs. water pres.
Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.
AUXILIARY DOME - NONE
Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL Combustion chamb. NONE
Firebox, length 102-11/16" Width 42½" Depth F. 63¾" B. 60½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.
Water space, Front 4" Sides 3" Back 3"
Water space frame DOUBLE Riveted
Water space stays ⅜" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O.S.
WATER SPACE STAYS TO PROJECT THROUGH SHEET 5/16" FOR RIVETING.
Radial stays 1" DIAM. Sling stays from THREE ROWS B.L.W. EXPANSION STAYS
Button heads below crown on EIGHT central rows
Crown bars NONE Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 241 Diam. 2" Length 13'0"
TUBES TO BE ELECTRICALLY WELDED IN FIRE BOX TUBE SHEET, AND TO PROJECT THROUGH SMOKE BOX TUBE SHEET A UNIFORM DISTANCE ½".
Heating Surface Flues --- Combus. Chamb. --- Total 1774 sq. ft.
Tubes 1630 sq. ft. Fire Box 144 sq. ft. Fire Brick Tubes ---
Grate area 30.3 sq. ft. Ratio to Heating Surface 1: 58.5
Superheater ---

Fire Brick ARCH NONE
FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.
FIRE BRICK PAVEMENT IN PAN.
Grates NONE
Ash Pan, Dampers FRONT ONLY.
OIL BURNING ARRANGEMENT B.L.W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.
Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L.S. ONLY
Spark ~~arrester~~ hopper WITH
Netting and deflect. plates NONE

Exhaust nozzles DOUBLE LOW
CLEANING PIPE - WITH.
Stack STRAIGHT Dia. 16"

Safety Valves TWO ASHTON 2½" OPEN ½ (NOT SPEC)
Safety valves NONE with relief lever, Set to 170 POUNDS
Whistle ONE B. L. W. PLAIN

Steam Gauge ONE BRASS 7" MAKER: ASHCROFT (NOT SPEC)
Steam gauge stand BRASS **Clock** NONE

Water Gauge ONE B.L.W., IRONCLAD **Cab Lamps** ELECTRIC
Gauge Cocks THREE BACK Surface valve NONE
Lowest gauge cock 3" above highest part of crown
Lubricator steam valve WITHOUT separate dry pipe to dome
Blower Valve B.L.W.

Blow off Cock ONE EVERLASTING Pos: R.S.
Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER.
Firebox, CORNERS, BACK ONES DIAGONAL, SIDES, FRONT AND BACK.
Crown, TWO EACH SIDE AND TWO BACK.
Waist, ONE UNDER FRONT
Front tube sheet, TWO Fusible plug ONE
~~ENAMELLED~~ PRESSED STEEL COLLARS RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE
DETAILS TO BE ARRANGED SO THAT LOCOMOTIVE CAN BE READILY CHANGED TO BURN COAL FUEL. LOCO. TO OPERATE IN STATE OF TEXAS, IN I.C.C. SERVICE AND TO MEET ALL REQUIREMENTS OF THE I.C.C. RULES AND THE U. S. SAFETY APPLIANCE LAWS.
Injectors (NOT SPEC) TWO NATHAN SIMPLEX, TYPE "R" No. 8
Injectors, Pos. R. AND L. Steam pipes COPPER
Pipes, Check COPPER Feed COPPER Overflow IRON
Check B. L. W. Pos. R. AND L.

Steam Heat NONE

Cab STEEL CRYSTAL PLATE GLASS GAB WINDOWS.

Cab boards STEEL Nosing T-IRON
Running boards STEEL Nosing T-IRON
Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 33½"

Pilot WOOD Pushing shoes NONE
Front Bumper YELLOW PINE Bumper plate WITH
Steps ETC. HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"
Coupler (NOT SPEC) SHARON M. C. B. AUTO. WITH SLOTTED KNUCKLE.

Signal fixtures IRON ON BUMPER
HEADLIGHT EQUIPMENT TO BE SCHROEDER ELECTRIC WITH INCANDESCENT HEADLIGHTS.
Headlight TWO ROUND CASE 18" Reflector,
Headlight, Nos. on sides WITH H'dl't step WITH
Lamp shelf NONE Nosing ---

Bell 92 POUNDS
Sand Box ONE Diam. 31" Body HIGH, IRON PTD. Pipes IRON
Sander (NOT SPEC) LEACH AIR TRAP A-10 DOUBLE, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED PRESSED STEEL TOP AND BOTTOM RINGS.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON Style 9 AND 14
Boiler Lagging MAGNESIA SECTIONAL
BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

6/W Bell

SPECIFICATION FOR LOCOMOTIVES 10 3+ E ~~2099 to 2101~~ 2100 Feb 1921.

FOR ~~STOCK~~ SAN ANTONIO SOUTHERN RAILWAY

HW.

Frames CAST STEEL

Cylinders, Diam. 20" Stroke 24"
St'm ports, Length 16" Width 1½" Bridges 1"
Exh. ports, Length 16" Width 2½" Valve lead 3/16"
Valve travel 5¾" Steam lap 1 5/16" Exhaust clearance ---
Eccentric crank throw 12¾" By-pass valve NONE
(NOT SPEC) S. F. Lubr. NATHAN TRIPLE BULLS EYE.
Cyl'r heads CAST IRON LUBR. PIPES OF COPPER O.S. OF JACKET
Cyl'r casings IRON PTD. Head covers STEEL PAINTED
St'm chest casings IRON PTD. Covers STEEL PAINTED
St'm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES. (NOT SPEC)
Met. pkg. PISTON RODS / VALVE STEMS UNITED STATES, KING TYPE.
PISTON RODS TO BE KEYED, TO CROSSHEADS.
Pistons CAST IRON RINGS SPRUNG INTO SOLID HEAD.
Guides ALLIGATOR, TYPE, STEEL Oil cups NEEDLE
Crossheads CAST STEEL WITH BEARINGS OF CAST IRON, TINNED.
Wrist Pins STEEL Rod cups PLUNGER, FORGED ON.
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.
Driving wheel hub liners ~~BRASS~~ BRONZE FOR MAIN WHEELS ONLY.
Drivers, O. S. Diam. 50" Cen. diam. 44"
CENTERS, MAIN CAST STEEL, OTHERS CAST IRON.
Tires STEEL Held by SHRINKAGE AND SHOULDER
Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"
Tires, Plain, Pos. INTERMEDIATE Size 3" x 6"
Lateral play between driving boxes and wheel hubs 3/16" TOTAL
Driving Boxes STEELED CAST IRON.
Journals, Diam. MAIN 8" Length 8½"
OTHERS 7½"

Springs. Make B. L. W.

Front Engine Truck TWO WHEELED SWING BOLSTER, CENTRE BEARING.
To swing 3" each side of cen., Cen. fin liners NONE
Journals, Diam. 5" Length 10" Boxes CAST IRON
Wheel hub liners NONE
Wheels, Diam. 30" Tread --- Kind CAST IRON SPOKE CENTER
Tires STEEL Cen. diam. 25" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE
~~BELL, WHISTLE, OIL CUPS, TOOLS, CAB LAMPS AND ELECTRIC LIGHT CABLE TO BE PACKED IN A BOX AND PLACED IN SMOKE BOX FOR SAFE KEEPING DURING TRANSIT.~~

~~EXTRAS COVERED ON EXTRA ORDER No. 1116 DATED 9-22-20 TO BE SHIPPED WITH LOCOS.~~ (OMIT)

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating Engine, sch. No. 6 ET WESTG. COMBINED AUTO. AND
Parts Eng. T. P. sch. --- STRAIGHT AIR.
Foundation Drivers, sch. AN-1 AMERICAN O.S. EQUALIZED
Parts Eng. Tr. sch. ---
Air pump ONE 9½" Pos. L.S.
Train connections FRONT AND BACK
Train signal, sch. NONE
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1589
Weight, with fuel and water, about ~~130,000~~ 112,500 POUNDS (WEIGHT EMPTY ~~52,000~~ 52,000 ABOUT ~~34,000~~ 34,000 LBS.)
TENDER TO BE WEIGHED:- Yes No.
Tank OIL 2500 WATER 5000 Gallons, Bill 5134 5289
TANK "U" SHAPE, STRAIGHT TOP. TANK COCK AND HOSE - WITH.
TWO SIDE TANK FUNNELS.
Tool Boxes of STEEL, TOP.
TENDER FLOOR OF STEEL.
Frame STEEL, 10" CHANNELS, WITH BUMPERS OF WOOD.

Front Drawbar height 30⅝"
Pilot NONE Pushing shoes NONE
Back drawhead, center above rail 33½"
Coupler (NOT SPEC) SHARON M. C. B. AUTO. WITH SLOTTED KNUCKLE.

Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTERS.
JOURNAL BRASSES TO BE M. C. B. STANDARD, LEAD LINED.
Springs ELLIPTIC, B.L.W. JOURNAL BOX WEDGES, M.C.B. TYPE.
Journals, Diam. 5" Length 9" AXLES M.C.B. STANDARD
Wheels, Diam. 33" Tread 1¼" Kind CAST IRON SPOKE CENTER.
Tires STEEL Cen. diam. 28" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER
Safety chains SINGLE

Brake Position ON ALL WHEELS.
Brake sch. No. 6 ET WESTINGHOUSE AUTOMATIC AND STRAIGHT AIR WITH 12" x 12" TENDER CYLINDERS.

* ALL I. C. C. SPECIFICATION CARDS AND FORMS TO BE PROVIDED
List of tools, sch. 37 TWO TRAVERSING JACKS
Photo sch. NONE Inspection B.L.W.
To be weighed No. Material specns B.L.W.
Certificate of boiler test ~~DUPLICATE~~ (SEE * ABOVE)
Junior laws to 7-28-20 Shipment ERECTED, ON WHEELS ~~(SEE)~~

Brass shop finish, No 3, EXCEPT INJECTOR CHECKS TO BE PAINTED.
Machine shop finish D-158, EXCEPT CYLINDER HEAD COVERS AND STEAM CHEST COVERS TO BE PAINTED.

Patents NONE

Property plates ~~NONE~~, B. L. W. FOR ENGINE AND TENDER.

Painting, style 291, OLIVE GREEN AND ALUMINUM

Mark on TANK SIDES:- SAN ANTONIO SOUTHERN

Road Nos. Pos. Road Nos. Name NONE
F. No. PLATE 4
~~DOME~~ SAND BOX
BACK OF TANK
CAB SIDES

Actual Dimensions of Loco. Extreme height over all 13'11½"
Extreme Width: Cab boards 9'9" Cylinders or valve motion 9'11"
Length outside face front bumper of engine to face of tender wedge 32'11½"
Length face of tender wedge to outside face back bumper of tender 24'6½"
Total length outside face front bumper of engine to outside face back bumper of tender 57'6"

THE BALDWIN LOCOMOTIVE WORKS | As Spec'n. C-6713 Duplicate of 12 30½ E 55 Except where otherwise specified.
Memorandum Spec'n 20133
SPECIFICATION FOR LOCOMOTIVES 12 34 ½ E 58
FOR Sewell Valley Railroad Co.
P.

Gen. as Photo. 7326
Engine Drawing No. 15

Gauge of Road 4' 8½" Play 2"
Wheelbase, Rigid 13' 1" Driving 13' 1" Total 27' 0"
Total wheelbase, eng. and tend. {Actual 53' 6½" / Limited to ---

Curves 30 degrees
Grades 3%, 1%, 5.3% **Rails** 70 pounds
Limits, Height --- Width ---
Weight (approximate) in working order, Total 183,700 pounds
On F. tr'k 15,600 lbs., Drivers 146,500 lbs., B. tr'k 21,600 lbs.

Tractive power 33,300 lbs., Ratio of adhesion 4.2
Work'g St'm Pres. 150 lbs., Service Passenger and Freight
Fuel Soft Coal

Boiler Steel Thick ¾" Bill 8714
Front Tube Sheet ½" Thick
Boiler, Diam. 74" Plan Straight Top
{Allowable st'm pres. 200 lbs. / With Factor of Safety of 4.6} **Tested to** {220 / 287} lbs. steam pres. / lbs. water pres.
Longitud. seams Butt jointed, double covering strips
Auxiliary dome, None Main Dome, One-piece type
Dome, diam. 33" Pos. Central

Firebox Steel Combustion chamb. None
Firebox, length 90-3/16" Width 66" Depth F. 68½" B. 62½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening One Oval 16" x 20"
Water space, Front 4" Sides 3½" Back 3½"
Water space frame Double Riveted
Water space stays ⅞" diam. with 3½" holes 1½" deep from O. S. Three rows B. L. W.
Radial stays 1" diam. Sling stays front Expansion Stays
Button heads below crown on Eight central rows
Crown bars None Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 B. W. G. Charcoal Iron or Steel (B.L.W.Option)
Tube ends Swaged for copper ferrules, fire box ends
Number 350 Diam. 2" Length 16' 6"

Heating Surface (Flues ---, Combus. Chamb. ---, Total 3191 sq. ft.; Tubes 3009 sq. ft., Fire Box 158 sq. ft., Fire Brick Tubes 24 sq. ft.)
Grate area 41.3 sq. ft. Ratio to Heating Surface 1: 77.4
Superheater ---

Fire Brick Arch, American Arch Co's. Security Arch on Four Tubes, 3" O. S. diam.

Grates Rocking Bars and drop plate
Ash Pan, Dampers None

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

Smokebox extension With Cleaning hole and cap L.S.Only
Spark ~~arrester~~ nozzle With
Netting and deflector plates With

Exhaust nozzles Single, High

Stack Straight Dia. 18"

B-26-20 (Not Spec.)
Safety Valves Two Coale 3½" Open
Safety valves None with relief lever. Set to 160 pounds
Whistle One (See Sup. 6)

Steam Gauge One Iron 7" Maker: Ashcroft
Steam gauge stand Iron **Clock** None

Water Gauge One (See Sup. 7) **Cab Lamps** Electric
Gauge Cocks Three Back Surface valve None
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome.
Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front
Cleaning Plugs
Firebox, Corners diagonal; sides and back
Crown, Two each side, and four back
Waist, One under front
Front tube sheet. Two Fusible plug One

Pump None

(Not Spec.) **Injectors** Two Sellers Non-Lifting Type K No. 10½
Injectors, Pos. Right and Left Steam pipes Copper
Pipes, Check Iron Feed Iron Overflow Iron
Check Sellers Combined Stop and Check Valve Pos: R. and L.

Steam Heat (See Sup. 9)

Cab Wood

Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 31"

Pilot Steel
Front Bumper Cast Steel Bumper plate With
Steps Hand holds, etc., to conform to I.C.C. requirements.

Front Drawhead. Center above rail 33½"
Coupler M. C. B. Auto., with spring draft gear.

Signal fixtures Iron on bumper
Headlight equipment to be Pyle National Electric with type "E" 1½ K. W. Turbo Generator, and with incandescent headlights.
Headlight Two Round Case 18" Reflector
Headlight, Nos. on sides With H'd'l't step With
Lamp shelf None Nosing ---

Bell 92 pounds
Sand Box Two Diam. 31" Body Iron painted Pipes Iron
Sander (Not Spec.) Leach Air, Trap A-1, in each box, to sand front and back.

Dome casing Iron painted.

Boiler Jacket #22 Soft Steel pto. Bands Iron Style 9 and 14
Boiler Lagging Magnesia Sectional
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS
C. Wagner Dec 1920
SPECIFICATION FOR LOCOMOTIVES 12 34 ½ E 58
FOR Sewell Valley Railroad Co.
P

348
347

Frames Cast Steel

Cylinders, Diam. 20½" Stroke 28"
St'm ports, Length 18" Width 1⅞" Bridges 1⅞"
Exh. ports, Length 18" Width 3" Valve lead ⅛"
Valve travel 5¾" Steam lap 1" Exhaust clearance ---
Eccentric crank throw 11-7/16" By-pass valve None
(Not Spec.) S. F. Lubr. Michigan Three Feed Bull's Eye
Cyl'r heads Cast Iron Lubr. pipes of iron under jacket
Cyl'r casings Iron painted Head covers Steel painted
St'm chest casings Iron painted Covers Steel painted
St'm chest valves Richardson Balanced with vacuum valves
(Not Spec.) Met. pkg. Piston rods / valve stems United States, King Type
Piston rods to be keyed to crossheads
Pistons Heads of cast iron with rings of cast iron sprung in
Guides Steel Oil cups Needle
Crossheads Cast Steel, with bearings of brass
Wrist Pins Steel Rod cups (See Sup. 15)
Parallel rods to have solid ends.

Valve Motion Walschaerts
(Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners None
Drivers, O. S. Diam. 48" Cen. diam. 42" Centers cast iron

Tires Steel Held by Shrinkage and shoulder
Tires, Flanged, Pos. Front and Back Size 3" x 5½"
Tires, Plain, Pos. Intermediate Size 3" x 6½"
Lateral play between driving boxes and wheel hubs = 3/16" total
Driving Boxes Steeled cast iron.
Journals, Diam. {Main 9" Length 10" / Others 8½"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing
To swing 1⅜" each side of cen., Cen. pin liners None
Journals, Diam. 6" Length 10" Boxes Cast Iron
Wheel hub liners None
Wheels, Diam. 28" Tread --- Kind Cast iron spoke center
Tires Steel Cen. diam. 23" Size 2½" x 5½"
Tires held by Shrinkage and shoulder

Back Engine Truck Two Wheeled Rushton, inside bearing
To swing ¼" each side of cen., Cen. pin liners None
Journals, Diam. 6" Length 10" Boxes Cast Iron
Wheel hub liners None
Wheels, Diam. 36" Tread --- Kind Cast iron spoke centers
Tires Steel Cen. diam. 31" Size 2½" x 5½"
Tires held by Shrinkage and shoulder

Brake, position On all driving and tender wheels
Operating {Engine, sch. No.6-ET Westg. Combined Auto. and / Eng. Tr'k, sch. ---} Straight Air
Foundation {Drivers, sch. WN-2 American O. S. Equalized / Eng Tr'k, sch ---}
Air pump Two 11" Pos. L. S.
Train connections Front and Back
Train signal, sch. "L"
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1631
Weight, with fuel and water, about 118,000 pounds
Tender to be weighed: Yes
Tank 5300 Gallons, Bill 5351
Tank "U" shape, straight top. Fuel capacity 10 tons.

Tool Boxes Hard Wood, Top

Frame Steel, 10" channels with bumpers of wood re-inforced with steel plate
Front Drawbar height 30½"
Pilot Steel, at rear
Back drawhead, center above rail 33½"
Coupler M. C. B. Auto. with spring draft rigging.

Preps hand molds, etc. to conform to I.C. C. requirements.

Trucks Arch bar type, with cast steel bolsters.

Springs Elliptic, B. L. W.
Journals, Diam. 5" Length 9"
Wheels, Diam. 30" Tread 1¼" Kind Chilled cast iron plate
Tires None Cen. diam. --- Size ---
Tires held by ---
Safety chains Single

Brake Position On all wheels
Brake sch. No.6-ET Westg. Auto. and Straight Air, with 12" x 12" tender cylinder.

List of tools, sch. 29 One pair wrecking frogs
Photo sch. None Inspection B. L. W.
To be weighed No Material spec'ns B. L. W.
Certificate of boiler test Three copies B. L. W. form 1036
Junior laws to 12-15-20 Shipment On own wheels (See Sup. 10)

Brass shop finish, No. 1
Machine shop finish D-165

B. L. W. {None
Patents {None

Property plates B. L. W., for engine and tender.

Painting, style 291, Olive Green and Aluminum

Lettering etc. to be same as for 12 34 ½ E 55.
Mark on tank sides: Sewell Valley Railroad

Road Nos. Pos. Road Nos. Name None
F. No. Plate 8
F. Sand Box,
Cab Panel,
Back of Tank

Actual Dimensions of Loco. Extreme height over all 15' 5"
Extreme Width: Cab boards 9' 11" Cylinders or valve motion 9' 5"
Length outside face front bumper of engine to face of tender wedge = 36' 10½"
Length face of tender wedge to outside face back bumper of tender = 22' 6½"
Total length outside face front bumper of engine to outside face back bumper of tender = 59' 5"

SPECIFICATION FOR LOCOMOTIVES 12 34 ¼ E 58

FOR SEWELL VALLEY RAILROAD COMPANY

P

1 LOGO. TO OPERATE UNDER I. C. C. JURISDICTION.

2 THE GRATE BARS ARE TO BE MADE UP WITH RIBS ALL AROUND THE EDGES. THE BARS ARE TO FIT CLOSELY TOGETHER WITH CONSIDERABLY LESS AIR SPACE THAN FOR 12 34 ¼ E 55. THE FINGER TYPE GRATE TO BE SUBSTITUTED BY THE ABOVE DESCRIBED TYPE.

3 GRATE ROD CONNECTED TO DROP PLATE TO BE RAISED SO AS TO BE KEPT FREE OF THE HOT ASHES, IN CASE THIS CONDITION IS NOT IMPROVED BY THE LARGER ASH PAN.

4 ASH PAN TO BE MADE LARGER AND TO EXTEND FARTHER TO THE REAR OF THE ENGINE THAN FOR 12 34 ¼ E 55. TWO HOLES TO BE PROVIDED IN THE SIDES OF THE ASH PAN CLOSE UP UNDER THE ENGINE FRAME, THROUGH WHICH AN IRON BAR MAY BE INSERTED FOR LEVELING THE ASHES IN THE PAN.

5 SMOKE BOX TO BE SELF CLEANING TYPE.

6 WHISTLE MUST HAVE LOUD COARSE TONE, PREFERABLY CHIME.

7 WATER GAUGE TO BE NATHAN, KLINGER TYPE.

8 THE INJECTOR OVERFLOW ON ONE SIDE TO EMPTY INTO THE ASH PAN.

9 STEAM HEAT TO BE PROVIDED, WITH CONNECTIONS TO FRONT OF ENGINE AND TO REAR OF TENDER.

10 STEAM HEAT LEVER COUPLER COMPLETE WITH HOSE (ONE PIECE) TO BE SHIPPED DIRECT TO RY. CO. AT MEADOW CREEK, W. VA., AND TO BE APPLIED TO LOCOMOTIVE AFTER DELIVERY, FOR 12 34 ¼ E 58 ONLY. (ACCOUNT OF TIME).

11 CAB TO BE SOMEWHAT NARROWER AND SHORTER THAN FOR 12 34 ¼ E 55.

12 PILOT TO BE SO DESIGNED AS TO PERMIT ENGINE AND TENDER BEING COUPLED UP WITH EACH OTHER, EITHER IN TANDEM OR FRONT TO FRONT.

13 STEPS NOT MORE THAN 10" ABOVE TOP OF RAIL, SAME AS FOR 12 34 ¼ E 55.

14 BACK HEAD JACKET SOFT STEEL PAINTED.

15 MAIN ROD TO HAVE WEDGE BLOCK TERMINATING IN A BOLT TOP AND BOTTOM, ADJUSTED AND HELD IN PLACE BY LOCK NUTS TOP AND BOTTOM.

16 COMPRESSION GREASE CUPS FOR MAIN AND SIDE RODS.

17 TWO SETS OF COLLIN'S FLANGE LUBRICATORS TO BE APPLIED, ONE SET FOR FRONT DRIVERS AND ONE SET FOR BACK DRIVERS.
GRAPHITE STICKS TO BE FURNISHED WITH THE LUBRICATORS.

18 DRIVING BOX CELLARS FOR USE OF GREASE LUBRICATION.

19 AIR PUMPS TO BE ARRANGED SO THAT EITHER PUMP MAY BE OPERATED INDEPENDENTLY.
AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.

TENDER

23 TANK TO BE LENGTHENED 22" AND MADE 62" HIGH TO PROVIDE THE INCREASED CAPACITY FROM 4000 TO 5500 GALLONS.

24 PILOT TO BE SO DESIGNED AS TO PERMIT ENGINE AND TENDER BEING COUPLED UP WITH EACH OTHER, EITHER IN TANDEM OR FRONT TO FRONT.

25 STEPS TO BE NOT MORE THAN 10" ABOVE TOP OF RAIL, SAME AS FOR 12 34 ¼ E 55

26 BOTH TRUCKS TO HAVE SIDE BEARINGS.

THE BALDWIN LOCOMOTIVE WORKS DUPL. PREVIOUS LOCOS., (SUP. 1)

Memorandum Spec'n 22063.

SPECIFICATION FOR LOCOMOTIVES 12 34 & E 59 AND 60. Gen. as PHOTO. 7326.

FOR SEWELL VALLEY RAILROAD COMPANY. Engine Drawing No. 15.

HNW. 7-7-22.

Gauge of Road 4' 8½" Play ⅜"
Wheelbase, Rigid 13' 1" Driving 13' 1" Total 27' 0"
Total wheelbase, eng. and tend. {Actual 52' 2" / Limited to ----

Curves 30 DEGREES.
GRATES, ⅜, ½, 5.⅜. RAILS, 70 POUNDS.
Limits, Height ---- Width ----
Weight (approximate) in working order, Total 183,700 POUNDS.
On F. tr'k 15,600 lbs., Drivers 146,500 lbs., B. tr'k 21,600 lbs.

Tractive power ~~39700~~ 33,300 lbs., Ratio of adhesion ~~3.69~~ 4.2
Work'g St'm Pres. ~~160~~ 190 lbs., Service PASSENGER AND FREIGHT.
Fuel SOFT COAL.

2. **Boiler** STEEL. Thick ¾" Bill 8741
Front Tube Sheet ½" Thick
Boiler, Diam. 74" Plan STRAIGHT TOP.
{Allowable st'm pres. 200 lbs. / With Factor of Safety of 4.6} **Tested to** {220 lbs. steam pres. / 267 lbs. water pres.}
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.
4. MAIN DOME, ONE-PIECE TYPE. AUXILIARY DOME, NONE.
Dome, diam. 33" Pos. CENTRAL.

Firebox STEEL. Combustion chamb. NONE.
Firebox, length 90-3/16" Width 66" Depth F. 68¼" B. 62½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening ONE OVAL 16" x 20". (SEE SUP. 5)
Water space, Front 4" Sides 3½" Back 3½"
Water space frame DOUBLE Riveted
6. Water space stays ⅞" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O.S.
Radial stays 1" DIAM. Sling stays front {THREE ROWS B. L. W. EXPANSION STAYS.} central rows
Button heads below crown on EIGHT
Crown bars NONE. Placed ---- above crown
Crown bolts ----

Flues ----
Tubes No. 12 B.W.G. CHARCOAL IRON OR STEEL, (B.L.W.OPTION).
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 350 Diam. 2" Length 16' 6"

Heating Surface	Flues ---	Combus. Chamb. ---	Total	3191 sq. ft.
	Tubes 3009 sq. ft.	Fire Box 158 sq. ft.	Fire Brick Tubes	24 sq. ft.
Grate area 41.3 sq. ft.		Ratio to Heating Surface 1 : 77.4		
Superheater ----				

Fire Brick ARCH, AMERICAN ARCH CO'S. SECURITY ARCH ON FOUR TUBES, 3" O. S. DIAM.

Grates ROCKING BARS AND DROP PLATES. (SEE SUP. 7)
Ash Pan, Dampers NONE. (SEE SUP. 8)

Throttle BALANCE. Pos. DOME.
Dry pipe STEEL.

Superheater NONE.

9. **Smokebox** extension WITH. Cleaning hole and cap L.S. ONLY.
Spark ejector in hopper WITH.
Netting and deflect. plates WITH.

10. Exhaust nozzles SINGLE HIGH.

Stack STRAIGHT. Dia. 18"

Safety Valves (NOT SPEC) TWO COALE 3½" OPEN.
Safety valves NONE with relief lever, Set to ~~160~~ 190 POUNDS.
Whistle ONE. (SEE SUP. 11)

12. **Steam Gauge** ONE IRON, 7". MAKER:- ASHCROFT. (NOT SPEC)
Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE. (SUP. 13) **Cab Lamps** ELECTRIC.
Gauge Cocks THREE BACK. Surface valve NONE.
Lowest gauge cock 3½" above highest part of crown.
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B. L. W. (SEE SUP. 14)

Blow off Cock ONE B. L. W. POS: FRONT.
Cleaning Plugs
Firebox, CORNERS DIAGONAL, SIDES AND BACK.
Crown, TWO EACH SIDE AND FOUR BACK.
Waist, ONE UNDER FRONT.
Front tube sheet. TWO Fusible plug ONE.

Pump NONE.

15. **Injectors** (NOT SPEC) TWO HANCOCK NON-LIFTING TYPE HNL, 5000 GALS. CAPACITY.
Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.
16. Pipes, Check IRON. Feed IRON. Overflow IRON.
Check (SEE SUP. 17) Pos. RIGHT AND LEFT.

Steam Heat NONE.

19. **Cab** STEEL.
Cab boards STEEL. Nosing T-IRON.
Running boards STEEL. Nosing T-IRON.
Hand rail IRON. Located on BOILER.

20. **Back Bumper** BAR STEEL. Back drawbar height 31".

21. **Pilot** STEEL.
Front Bumper CAST STEEL. 56. Bumper plate WITH.
25. **Steps** HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"
Coupler (SEE SUP. 26 ETC)

28. Signal fixtures IRON ON BUMPER.

27. **Headlight** TWO ROUND CASE 18". Reflector,
Headlight, Nos. on sides WITH. H'dl't stop WITH. (SUP. 30)
Lamp shelf NONE. Nosing ----

Bell 92 POUNDS. GOLLMAR AIR BELL RINGER.
Sand Box TWO Diam. 31" Body IRON PAINTED. Pipes IRON.
Sander (NOT SPEC) (SEE SUP. 31)

Dome casing IRON PAINTED.

32. **Boiler Jacket** #22 SOFT STEEL. Bands IRON. Style 9 AND 14.
Boiler Lagging MAGNESIA SECTIONAL.
BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS
C. WAGNER Aug 1922

SPECIFICATION FOR LOCOMOTIVES 12 34 & E 59 AND 60.

FOR SEWELL VALLEY RAILROAD COMPANY.
HNW.

251
250

Frames CAST STEEL.

34. **Cylinders,** Diam. 20½" Stroke 28"
St'm ports, Length 18" Width 1⅞" Bridges 1⅜"
Exh. ports, Length 18" Width 3" Valve lead ⅛"
Valve travel 5¾" Steam lap 1" Exhaust clearance ----
Eccentric crank throw 11-7/16" By-pass valve NONE.
S. F. Lubr. (NOT SPEC) NATHAN THREE FEED BULL'S EYE.
Cyl'r heads CAST IRON. LUBR. PIPES OF IRON UNDER JACKET.
Cyl'r casings STEEL. Head covers STEEL PAINTED.
St'm chest casings STEEL. Covers STEEL PAINTED.
St'm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES.
Met. pkg (NOT SPEC) PISTON RODS / VALVE STEMS UNITED STATES, KING TYPE.
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.
35. **Guides** STEEL. Oil cups NEEDLE.
36. **Crossheads** CAST STEEL, WITH BEARINGS OF BRASS.
Wrist Pins STEEL. Rod cups (SEE SUP. 39)
PARALLEL RODS TO HAVE SOLID ENDS.

40. **Valve Motion** WALSCHAERTS.
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners BRASS.
41. **Drivers,** O. S. Diam. 48" Cen. diam. 42", CENTERS CAST IRON.

41. **Tires** STEEL. Held by SHRINKAGE AND SHOULDER.
Tires, Flanged, Pos. FRONT, SECOND AND BACK. Size 3" x 5½"
Tires, Plain, Pos. THIRD PAIR, (MAIN) Size 3" x 6½"
Lateral play between driving boxes and wheel hubs (SEE SUP. 45)
44. **Driving Boxes** CAST STEEL.
Journals, Diam. {MAIN, 9" Length 10" / OTHERS, 8½"}
47. **Springs.** Make B. L. W.

49. **Front Engine Truck** TWO Wheeled SWING BOLSTER, CENTER BEARING.
To swing 4" each side of cen., Cen. pin liners NONE.
Journals, Diam. 6" Length 10" Boxes CAST IRON.
Wheel hub liners NONE.
50. Wheels, Diam. 28" Tread --- Kind CAST IRON SPOKE CENTER.
Tires STEEL. Cen. diam. 23" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

51. **Back Engine Truck** TWO Wheeled RUSHTON, INSIDE BEARING.
To swing 4" each side of cen., Cen. pin liners NONE.
Journals, Diam. 6" Length 10" Boxes CAST IRON.
Wheel hub liners NONE.
52. Wheels, Diam. 36" Tread --- Kind CAST IRON SPOKE CENTERS.
Tires STEEL. Cen. diam. 31" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

53. **Brake,** position ON ALL DRIVING AND TENDER WHEELS.
Operating Engine, sch. No. 6 ET. WESTG. COMBINED AUTO. AND STRAIGHT AIR.
Parts Eng. Tr'k, sch. ----
Foundation Drivers, sch. WN-2, AMERICAN OUTSIDE EQUALIZED.
Parts Eng. Tr'k, sch. ----
53. 12. Air pump TWO 11" Pos. LEFT SIDE.
Train connections FRONT AND BACK.
Train signal, sch. NONE.
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

71. **Tender** EIGHT Wheeled, Drawing No. 1737.
Weight, with fuel and water, about 80,000 POUNDS.
TENDER TO BE WEIGHED: YES.
Tank 4,000 Gallons, Bill 5872.
71. TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 6½ TONS.

75. Tool Boxes HARD WOOD, TOP.

82. **Frame** STEEL, 8" AND 10" CHANNELS WITH BUMPERS OF CAST STEEL.

78. Front Drawbar height 30¾"
Pilot NONE.
Back drawhead, center above rail 33½"
79. **Coupler** (SEE SUP. 79)

81. Steps HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B. L. W.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 30" Tread 4½" Kind CHILLED CAST IRON PLATE.
Tires NONE. Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE.

Brake Position ON ALL WHEELS.
Brake sch. No. 6 ET. WESTG. AUTO. AND STRAIGHT AIR, WITH 10" x 12" TENDER CYLINDER.

List of tools, sch. 158. ONE PAIR WRECKING FROGS.
Photo sch. NONE. Inspection B. L. W.
To be weighed No. Material specs B. L. W.
Certificate of boiler test (SEE SUP. 3)
Junior laws to 8-1-22. Shipment ON OWN WHEELS.

Brass shop finish, No 1.
Machine shop finish D-165.

B. L. W.
Patents NONE.

Property plates, B. L. W. FOR ENGINE AND TENDER.

33. **Painting,** style 291, OLIVE GREEN AND ALUMINUM.

LETTERING, ETC., TO BE SAME AS FOR 12 34 & E 55 AND 58.
Mark on TANK SIDES: SEWELL VALLEY RAILROAD

Road Nos. Pos.	Road Nos.	Name NONE.
F. No. PLATE.	10	
F. SAND BOX.	11	
CAB PANEL.		
BACK OF TANK.		

Actual Dimensions of Loco. Extreme height over all 15' 9"
Extreme Width: Cab boards 9' 11"; Cylinders ~~or valve motion~~ 9' 5"
Length outside face front bumper of engine to face of tender wedge 36' 10½"
Length face of tender wedge to outside face back bumper of tender 20' 10"
Total length outside face front bumper of engine to outside face back bumper of tender 57' 8½"

SPECIFICATION FOR LOCOMOTIVES: 12 34 ¼ E 59 AND 60.

FOR: SEWELL VALLEY RAILROAD COMPANY.

HNW.

1 ENGINE TO BE GENERALLY DUPLICATE OF RY. Co's LOCOMOTIVE No. 8 B. L. W. CLASS 12 34 ¼ E 58, WITH SAME EXTRAS, EXCEPT WHERE OTHERWISE SPECIFIED.

2 LOCOMOTIVE TO OPERATE UNDER I. C. C. JURISDICTION.

3 BOILER TEST CERTIFICATES: THREE COPIES B. L. W. FORM 1036, AND TWO COPIES B. L. W. FORM 491.

4 DOME TO BE SO ARRANGED THAT MAN CAN ENTER BOILER WITHOUT REMOVING THROTTLE.

5 FIRE DOOR TO BE FRANKLIN, BUTTERFLY TYPE, OPERATED BY AIR.

6 TATE FLEXIBLE STAYBOLTS IN BREAKING ZONE OF FIRE BOX.

7 GRATE BARS ARE TO BE MADE UP WITH RIBS ALL AROUND THE EDGES. BARS ARE TO FIT CLOSELY TOGETHER WITH CONSIDERABLY LESS AIR SPACE THAN FOR 12 34 ¼ E 55.
GRATES TO BE ARRANGED TO OBTAIN FULL MOVEMENT OF GRATE ROCKING BARS. (RY. Co. HAD TO CUT OUT BACK FURNACE PLATE TO OBTAIN MORE MOVEMENT OF LEVERS ON ENGINE No. 8, B.L.W. CLASS 12 34 ¼ E 58. SUGGEST KEEPING SHAKER LEVERS BELOW DECK, IF POSSIBLE, WITH DOOR ON DECK PLATE OVER LEVERS.)
DUMP GRATE ROD ON ENGINE No. 8, B. L. W. CLASS 12 34 ¼ E 58 IS SO LOCATED THAT HOT CINDERS LODGING UNDER SAME TEND TO BURN OUT ROD. RY. Co. REQUEST THAT FOR NEW LOCOMOTIVES WE IMPROVE THIS CONDITION.

8 ASH PAN TO HAVE TWO HOLES IN SIDES OF PAN CLOSE UP UNDER THE ENGINE FRAME, THROUGH WHICH AN IRON BAR MAY BE INSERTED FOR LEVELING THE ASHES IN THE PAN.

9 SMOKE BOX TO BE SELF CLEANING TYPE.

10 EXHAUST NOZZLE TO HAVE TUPS WITH ANNULAR PASSAGE FOR BLOWER CONNECTION WITH JETS AT TOP OUTLET.

11 WHISTLE MUST HAVE LOUD, COURSE TONE, PREFERABLY CHIME.

12 STEAM AND AIR GAUGE STAND LOCATION TO BE IMPROVED. LOCATE ON BACK HEAD ABOVE TALLOW CAN HOLDER, IF POSSIBLE.

13 WATER GAUGE TO BE EDNA, TYPE "M", WITH GLASS OF SAME LENGTH AS NATHAN KLINGER B-5.

14 BLOWER PIPE TO HAVE TWO VALVES: ONE IN TURRET AND ONE IN PIPE LINE. (SEE SUP. 10)
BLOWER SMOKE BOX CONNECTIONS TO BE BARCO.

15 INJECTORS TO HAVE SCREW TYPE PIPE CONNECTIONS.
Injectors with flange connections as Hancock Inspirator bolted later (sug. 1st)

16 INJECTOR OVERFLOW ON LEFT SIDE ONLY TO BE PIPED INTO ASH PAN.

17 BOILER CHECK TO BE HANCOCK COMBINED CHECK AND STOP VALVE, WITH FLANGED CONNECTION TO BOILER AND WITH THREADED NIPPLE PIPE CONNECTION.

18 FEED PIPE STRAINER TO BE ARRANGED SO THAT STRAINER CAN BE REMOVED WITHOUT DISCONNECTING HOSE.

19 ALL VALVES TO HAVE RENEWABLE VALVE SEATS AND DISCS. STEMS TO HAVE SQUARE THREADS WHERE POSSIBLE.
ALL VALVES IN TURRET, EXCEPT INJECTOR STEAM AND BLOWER VALVES TO HAVE EXTENSION HANDLES SO THEY CAN BE READILY OPERATED BY ENGINE MEN.

20 CHAFING CASTINGS BETWEEN ENGINE AND TENDER TO BE SPRING BUFFER TYPE. CHAFING CASTINGS TO BE OF CAST STEEL.

21 PILOT TO BE SO DESIGNED AS TO PERMIT ENGINE AND TENDER BEING COUPLED UP WITH EACH OTHER, EITHER IN TANDEM OR FRONT TO FRONT.

25 STEPS NOT MORE THAN 10" ABOVE TOP OF RAIL, SAME AS FOR 12 34 ¼ E 55 AND 58.

26 COUPLER AT FRONT OF ENGINE TO BE A. R. A. TYPE "D", WITH 11" KNUCKLE AND WITH 6" x 8" SHANK. COUPLER POCKET TO HAVE WIDE MOUTH, WITH EXTENDED FLOOR SUPPORT.
NO PROVISION TO BE MADE FOR SPRING DRAFT GEAR.

27 COUPLING PIN LIFTER TO BE ARRANGED TO OPERATE SEPARATELY FROM EITHER SIDE OF ENGINE.
GRAB IRONS TO BE APPLIED IN ADDITION TO COUPLING PIN LIFTER RODS.

28 SIGNAL LAMP AND FLAG BRACKETS TO BE APPLIED ON RIGHT AND LEFT SIDES OF LOCOMOTIVE AT SMOKE BOX.

29 HEADLIGHT CASES TO BE PYLE NATIONAL ELECTRIC, WITH INCANDESCENT LIGHTS.
HEADLIGHT GENERATOR TO BE WESTINGHOUSE.
ELECTRICAL CONNECTIONS BETWEEN ENGINE AND TENDER, (SUP. 77)

39 UPPER HEADLIGHT STEP TO BE MADE WIDER AND LOCATED HIGHER UP WITHOUT OBTAINING EXCESSIVE DISTANCE BETWEEN STEPS.

31 SANDER TO BE OF THE LEACH TYPE, WITH LEAD LINED PASSAGES, I.E., VILOCO TRAP AL-101 IN EACH BOX, TO SAND FRONT AND BACK. SAND PIPES TO BE APPLIED WITH AS FEW BENDS AS POSSIBLE, PARTICULARLY AT REAR DRIVERS. PIPE TO BE APPLIED BACK OF BRAKE HANGER TO PROVIDE FOR READY RENEWAL OF BRAKE HEAD AND SHOES.

32 BOILER JACKET ON BOILER SHEET TO HAVE HOOK JOINT AT RUNNING BOARD TO MAKE JACKET READILY REMOVEABLE IN SECTIONS. JACKET ALSO TO BE PARTED AT TOP AND BOTTOM CENTERS IN USUAL MANNER. JACKET OVER FIRE BOX BOTH INSIDE OF CAB AND OUTSIDE OF CAB, ALSO ON BACK HEAD, TO BE ARRANGED WITH JOINTS FOR READY REMOVAL IN SECTIONS.

33 JACKET NOT TO BE PAINTED, BUT TO BE GREASED INSTEAD.

34 CYLINDER COCKS TO HAVE BODY OF MALLEABLE IRON WITH PIPE NIPPLE CONNECTION TO CYLINDER.

35 CROSSHEAD SHOES TO HAVE THICKER BABBITT AT SIDES.
CROSSHEAD PIN TO HAVE CASTLE NUT WITH EIGHT THREADS PER INCH.

36 CRANK PINS TO BE EQUIPPED WITH CASTLE NUT OUTSIDE OF COLLAR AND HAVING EIGHT THREADS PER INCH.
WHERE UNABLE TO APPLY CASTLE NUTS AT OUTSIDE, COLLAR IS TO BE HELD BY BOLT THROUGH THE PIN.

37 MAIN ROD TO HAVE WEDGE BLOCK TERMINATING IN A BOLT TOP AND BOTTOM, ADJUSTED AND HELD IN PLACE BY LOCK NUTS TOP AND BOTTOM.

38 SIDE ROD KNUCKLE PINS TO BE EQUIPPED WITH CASTLE NUTS, USING WASHER AND ONE NUT. THREADED ENDS OF PINS TO HAVE EIGHT THREADS PER INCH.

39 COMPRESSION GREASE CUPS FOR MAIN AND SIDE RODS.

40 REVERSE GEAR TO BE RAGONNET TYPE "B" OPERATED BY AIR, COVERED ON EXTRA ORDER No. 8627, DATED 7-29-22.

41 TWO SETS OF COLLINS FLANGE LUBRICATORS TO BE APPLIED, ONE SET FOR FRONT DRIVERS AND ONE SET FOR BACK DRIVERS.
GRAPHITE STICKS TO BE FURNISHED WITH THE LUBRICATOR.

42 RAIL WASHER HAVING ¾" DIAM. PIPE TO BE APPLIED TO BOTH FRONT AND BACK DRIVERS, RIGHT AND LEFT SIDES. END OF PIPE AT RAIL TO BE FLATTENED. MAIN SHUT OFF VALVE TO BE APPLIED IN BOILER SIDE WATER LEG UNDER CAB ON RIGHT SIDE. PLUG COCKS TO BE APPLIED IN EACH LINE AND ARRANGED TO BE OPERATED FROM CAB.

SPECIFICATION FOR LOCOMOTIVES:- 12 34 ¼ E 59 AND 60.

FOR: SEWELL VALLEY RAILROAD COMPANY.

HNW.

45 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

46 DRIVING BOX CELLARS FOR USE WITH OIL LUBRICATION.

47 EQUALIZING BEAM AND LINKS TO HAVE CAST HARDENED PINS AND BUSHINGS THROUGHOUT.
EQUALIZING BEAM PINS IN FULCRUM AT FRAME TO BE APPLIED WITH HEAD AT INSIDE AND PIN HELD IN PLACE BY PLATE INSTEAD OF COTTER PIN.

48 EQUALIZING BEAM FULCRUM FOR FORWARD EQUAL BEAM TO BE MADE OF CAST STEEL WITH HARDENED STEEL BUSHINGS ½" THICK, IN PIN HOLE.

49 FRONT ENGINE TRUCK SWING LINKS TO HAVE STEEL BUSHINGS IN PIN HOLES AT BOTTOM END.

50 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

51 BACK ENGINE TRUCK TO BE SAME TYPE AS FOR ENGINE No. 8, B.L.W. CLASS 12 34 ¼ E 58, I.E., INSIDE BEARING.
SWING LINK SUPPORTS TO BE MADE HEAVIER AND TO HAVE LARGER SIZE PINS AT CONNECTION TO EQUAL BEAMS.

52 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS, ¼" TOTAL. THERE IS NO LATERAL PLAY IN PEDESTAL FITS.

53 AIR PUMPS TO BE ARRANGED SO THAT EITHER PUMP MAY BE OPERATED INDEPENDENTLY.
AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.
AIR PUMP TO HAVE AUTOMATIC OIL CUPS ON AIR CYLINDERS.

54 BRAKE FEED VALVES TO BE LOCATED AND PIPING TO BE ARRANGED SO THEY CAN BE READILY REPAIRED.

55 BRAKE HEADS AND SHOES TO BE SEPARATE.
SHOES TO BE OF THE CENTER FASTENING TYPE.

56- The side portions of the front bumper plate to be made detachable, and to be bolted to the supports, not hinged.

TENDER

71 TENDER TO BE SAME AS FOR LOCOMOTIVE No. 7, B. L. W. CLASS 12 34 ¼ E 55, (4,000 GALLONS CAPACITY).

72 TANK TO HAVE OVAL FUNNEL EXTENDING CROSSWISE OF TANK.

73 TANK VALVE TO HAVE DOUBLE HANDLE TYPE ROD WITH NOTCHES FOR REGULATION OF LIFT. HANDLES TO BE PINNED TO ROD INSTEAD OF APPLIED ON THREADED END. STOP TO BE APPLIED ON INSIDE OF TANK.

74 STEEL PLATES TO BE APPLIED AROUND FUEL SPACE TO PREVENT COAL PILING UP AROUND TOOL BOXES ON TOP OF WATER LEG.

75 TOOL BOXES TO BE APPLIED AT TOP OF WATER LEGS, SET CROSSWISE OF WATER LEG AND TO OPEN TOWARD CAB. ADDITIONAL TOOL BOX TO BE LOCATED ON TOP OF THE TANK BACK OF FUEL BOARD.

76 SIGNAL LAMP AND FLAG BRACKETS TO BE APPLIED TO RIGHT AND LEFT SIDES AT BACK END OF TANK.

77 ELECTRICAL CONNECTIONS BETWEEN ENGINE AND TENDER FOR TENDER HEADLIGHTS TO BE A FLEXIBLE SOCKET CONNECTOR LOCATED BELOW TENDER FLOOR.
CONDUIT ON TENDER TO BE APPLIED UNDERNEATH TENDER FRAME.
CONDUIT WHERE IT EXTENDS UP AT REAR END TO BE ARRANGED SO THAT IT CANNOT BE KNOCKED LOOSE.

78 CHAFING CASTINGS BETWEEN ENGINE AND TENDER TO BE SPRING BUFFER TYPE. CHAFING CASTINGS TO BE OF CAST STEEL.

79 COUPLER TO BE A. R. A. TYPE, "D" HEAD WITH 11" KNUCKLE AND WITH 6" x 8" SHANK. COUPLER POCKET TO BE SOLID WIDE MOUTH POCKET, HAVING EXTENDED FLOOR COUPLER SUPPORT.
NO PROVISION TO BE MADE FOR SPRING DRAFT GEAR.

80 COUPLING PIN LIFTER TO BE ARRANGED TO OPERATE SEPARATELY FROM EITHER SIDE.
GRAB IRONS TO BE APPLIED IN ADDITION TO COUPLING PIN LIFTER RODS.

81 TENDER STEP AT REAR TO BE APPLIED AT BOTH ENDS OF BUMPER BEAM.

82 HOOKS FOR RE-RAILERS TO BE APPLIED ON EACH SIDE OF FRAME.

83 HOOKS FOR WRECKING CABLE TO BE APPLIED ON EACH SIDE OF FRAME.

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7441

Memorandum Spec'n 22033

SPECIFICATION FOR LOCOMOTIVES 10 2½ D 151

FOR Sierra Railway Company of California

FXD

Gen. as Photo 8263 {Except to have only one air pump

Engine Drawing No. 40

4.10.22

Gauge of Road 4' 8½" Play ⅜"

Wheelbase, Rigid 9' 2" Driving 9' 2" Total 23' 9"

Total wheelbase, eng. and tend. {Actual 46' 2½" / Limited to ---

Curves 45 degrees Grades 4%

Rails 40 pounds per yard.

Limits, Height --- Width ---

Weight (approximate) in working order, Total 98000 pounds

On F. tr'k 10000 lbs., Drivers 78000 lbs., B. tr'k 10000 lbs.

Tractive power 19100 lbs., Ratio of adhesion 4.06

Work'g St'm Pres. 175 lbs., Service Passenger and Freight

Fuel Oil

Boiler Steel Thick 9/16" Bill 9035

Front Tube Sheet ½" Thick

Boiler, Diam. 52" Plan Extended wagon top

{Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

{With Factor of Safety of 4.5 267 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips.

Main dome - One piece type. Auxiliary Dome None

Dome, diam. 29" Pos. Forward of fire box.

Firebox Steel Combustion chamb. None

Firebox, length 59 3/16" Width 34½" Depth F. 60½" B. 58"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O.S.

Radial stays 1" diam. Sling stays front {Two rows B.L.W. / Expansion Stays

Button Heads below crown on Eight central rows to suit oil fuel

Crown bars None Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G. Steel

Tubes No. 12 B.W.G. Charcoal Iron or steel (B.L.W. Option)

Tube ends Swaged for copper ferrules, fire box ends.

Number 14 Diam. 5⅜" Length 11' 4"

89 2"

Heating Surface	Flues	223	Combus. Chamb. ---	Total	832
	Tubes	524	Fire Box 86	Fire Brick Tubes	---
Grate area 14.1			Ratio to Heating Surface 1: 59		
Superheater 178					

Fire Brick Arch: None

Fire box lined with fire brick, for oil burning.

Fire brick pavement in pan.

Grates None

Ash Pan, Dampers Front only

Ash pan to be same as for 10 32 E 177

Throttle to have auxiliary drifting valve.

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater Schmidt type (See sup. 8 etc.)

Safety Valves Two Crosby 2" Open, Style HJ-110 (Not spec.)

Safety valves None with relief lever, Set to 175 pounds

Whistle One B.L.W. Plain

Steam Gauge One Iron 7" Maker: Ashcroft (Not spec.)

Steam gauge stand Iron **Clock** None

Water gauge to be plainly visible from both sides of cab

Water Gauge One Reflex type. **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 5" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front

Cleaning Plugs One filling plug in top of boiler

Firebox, Corners diagonal

Crown, Two each side and two back.

Waist, One under front

Front tube sheet, One Fusible plug One

Pump None

Injectors Two Monitor (Not spec.) No. 6

Injectors, Pos. R. and L. Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B. L. W. Pos. R. and L.

Steam Heat With

Cab Steel

Cab boards to be covered with wood.

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 33½"

B.L.W. Radial spring buffer between engine and tender, similar to 10 32 E 177

Pilot Wood

Front Bumper Cast Steel Bumper plate With

Steps, hand holds etc. to conform to I.C.C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M.C.B. Automatic

Signal fixtures Iron on bumper.

Headlight equipment to be electric with Pyle National type K-2 generator for incandescent headlights.

Headlight Two Round Case 14" Reflector, To burn

Headlight, Nos. on sides With H'dl't step ~~With~~ None

Lamp shelf None Nosing ---

Bell 85 pounds

Sand Box Two Diam. 23" Body Iron painted Pipes Iron

Sander (Not spec.) Leach Air Trap A-1, in each box, to sand front and back.

Dome casing Steel painted, with pressed steel top and bottom ring.

Boiler Jacket #22 Soft Steel ptd. Bands Steel Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

Jos. Wolf

SPECIFICATION FOR LOCOMOTIVES 10 2½ D 151

FOR Sierra Railway of California

FXD

{One complete set of Blue Prints to be furnished

255 254

Frames Cast Steel

Cylinders, Diam. 15" Stroke 24"

St'm ports, Length 19½" Width 1 5/16" Bridges ---

Exh. ports, Length --- Width --- Valve lead ⅛"

Valve travel 5" Steam lap 1 3/16" Exhaust clearance ---

Eccentric crank throw 12⅜" By-pass valve None

S. F. Lubr. (Not spec.) Detroit Five Feed No. 42 Bull's Eye

Cyl'r heads Cast Iron Lubr. pipes of iron under jacket

Cyl'r casings Iron painted Head covers Steel painted

St'm chest casings --- Covers ---

St'm chest valves 8" diam. Piston type.

Met. pkg. (Spec.) {Piston rods / Valve stems} United States, King type.

Piston rods to be keyed to crosshead.

Pistons Heads of cast iron, rings of cast iron sprung in.

Guides Steel Oil cups Needle

Crossheads Cast Steel, with bearings of cast iron, tinned.

Wrist Pins Steel Rod cups Plunger

Parallel rods to have solid ends.

Valve Motion Walschaerts.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Bronze

Drivers, O. S. Diam. 42" Cen. diam. 36" Centers Cast Steel

Tires Steel Held by Shrinkage and Shoulder

Tires, Flanged, Pos. Front and Back Size 3" x 5½"

Tires, Plain, Pos. Middle Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = (Sup. 12.)

Driving Boxes Cast Iron

Journals, Diam. 6" Length 8"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled swing bolster center bearing

To swing 5⅛" each side of cen., Cen. pin liners None

Journals, Diam. 5" Length 8" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 26" Tread -- Kind Cast Iron spoke center

Tires Steel Cen. diam. 21" Size 2½" x 5½"

Tires held by. Shrinkage and Shoulder

Back Engine Truck Two Wheeled swing bolster, side bearing

To swing 6¼" each side of cen., Cen. pin liners None

Journals, Diam. 5" Length 8" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 26" Tread --- Kind Cast Iron spoke center

Tires Steel Cen. diam. 21" Size 2½" x 5½"

Tires held by Shrinkage and Shoulder

Brake, position On all driving and tender wheels

Operating Parts { Engine, sch. No. 6-ET Westg. Combined Auto. and Straight Air / Eng. Tr'k, sch. ---

Foundation Parts { Drivers, sch. WM-1-BC American O.S. Equalized / Eng. Tr'k, sch ---

Air pump One 11" Pos. L.S.

Train connections Front and Back

Train signal, sch. (With) "L"

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1719

Weight, with fuel and water, about 63100 pounds

Oil 1000 5244

Tank Water 3000 Gallons, Bill 5828

Tank "U" shape, straight top. Tender to be weighed:- Yes

Tool Boxes Wood, Top

Frame Steel, 8" and 10" channels, with bumpers of wood and steel plate.

Front Drawbar height 29⅜"

Pilot None

Back drawhead, center above rail 33½"

Coupler M.C.B. Automatic

Steps, hand holds etc., to conform to I.C.C. requirements.

Trucks Arch Bar type, with bolsters of cast steel

Springs Elliptic, B.L.W.

Journals, Diam. 4½" Length 8"

Wheels, Diam. 28" Tread --- Kind Rolled Steel

Tires None Cen. diam. --- Size ---

Tires held by --- Wheel rims 2½" thick x 5½" wide.

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET Westg. Auto. and Straight Air with 10" x 12" tender cylinder.

List of tools, sch. #157

Photo sch. No. 2 Inspection B.L.W.

To be weighed Yes Material specns B.L.W.

Certificate of boiler test (See sup. 3)

Junior laws to 4-25-22 Shipment On own wheels

Brass shop finish, No. 1

Machine shop finish D-165

Property plates B. L. W. for engine and tender

Painting, style 291, Olive Green and Aluminum

Lettering, etc., to be same as for 10 32 E 177

Mark on Tank collar at sides: Sierra Railway Company

Mark on tank collar to be in letters 6" high.

Road numbers on tank to be in 18" figures.

Road Nos. Pos. Road Nos. Name None

F. No. Plate 30

F. Sand Box

Tank Sides

Back of tank

Actual Dimensions of Loco. Extreme height over all 12' 4½"

Extreme Width: Cab boards 9' 0" ; Cylinders ~~over cylinders~~ 8' 10½"

Length outside face front bumper of engine to face of tender wedge 29' 2½"

Length face of tender wedge to outside face back bumper of tender 22' 8½"

Total length outside face front bumper of engine to outside face back bumper of tender 51' 10½"

SPECIFICATION FOR LOCOMOTIVE 10 2¼ D 151

FOR SIERRA RAILWAY COMPANY OF CALIFORNIA

Specification for Type A Double Loop Superheater AS SPECN. O-18089 DATED APRIL 25, 1922

BOILER TUBES	89 in number 2" o.d. 11 ft. 4 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	14 in number 5¾" o.d. #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18	Card 11025-B
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections	Card 1136
TUBE SHEET LAYOUT		Card 50603
UNITS	14 units 14" o.d. #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 1064-L
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 350 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls	A.H.S. 3 x 5 - 1 Card 1124-J
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron	SEE ARRGT.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	Card 4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card 1067
PYROMETER	Model No. Pyrometer.	Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 4L-40626
TEST FINAL	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 11402-H	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1065-A	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1944
DAMPER CYCL. PIPE CONNECTION	Card 1L-11437	S. H. PIPE BAND	Card 1938
DAMPER CYL. PIPING DIAGRAM	Card 2L-11442	SPACING OF BANDS & SUPPORTS	Card 10727
DAMPER CYL. SUPPORT	Card 11073-C	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card 11003-E	RETURN BENDS	Card
DAMPER SHAFT ARM	Card 1071-C	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O.S.)	Card 11403-E	DEFLECTING PLATE HANDLE	Card 1407
DAMPER SHAFT BEARING (I.S.)	Card 10396-A	DEFLECTING PLATE STUDS	Card 10009
DAMPER SHAFT LINK	Card 1L-11629	DEFLECTING PLATE CLAMP	Card 10809-A
PATENT PLATE	Card 34-3307		
DAMPER SEEING CARD	11405-A		

SPECIFICATION FOR LOCOMOTIVE 10 2¼ D 151

FOR SIERRA RAILWAY COMPANY OF CALIFORNIA.

257
258

— TENDER —

1. LOCOMOTIVE TO DEVELOP APPROXIMATELY 19150 POUNDS TRACTIVE POWER WITH A RATIO OF ADHESION OF 4.07.

2. LOCOMOTIVE TO BE USED IN I. C. C. SERVICE.

3. CERTIFICATE OF BOILER TEST: THREE COPIES B.L.W. FORM 1036 AND TWO COPIES B.L.W. FORM 491

4. FUEL OIL, SAME AS FOR 10 32 E 177, I.E. GRAVITY 14, FLASH 150 DEGREES, FIRE 170 DEGREES.

5. OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX, EXCEPT TO HAVE CLOSED HEATER AND METALLIC JOINTS FOR OIL AND HEATER CONNECTIONS BETWEEN ENGINE AND TENDER, SAME AS FOR 10 32 E 177. ROYALTY PAYABLE BY THE B.L.W.

6. FLEXIBLE STAYBOLTS TO BE APPLIED IN BREAKING ZONE.

7. STAYBOLTS BEHIND FIRE BRICK AND OTHER OBSTRUCTIONS TO BE HOLLOW, SAME AS FOR 10 30 E 138 AND 155.

8. SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPECN. NO.O-18089 DATED APRIL 25, 1922 (COPY ATTACHED). SUPERHEATER TO CONNECT WITH THROUGH BOLT HEADER (MODIFIED TYPE) IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS. ROYALTY PAYABLE BY THE B.L.W.

9. HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

10. PATENT PLATE (FROM STOCK) FROM THE SUPERHEATER CO., COVERING THE SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

11. COUPLERS TO HAVE SUFFICIENT SWING FOR CURVES OF 45 DEGREES.

12. LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN PEDESTAL FITS 7/32" TOTAL.

13. LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN PEDESTAL FITS 5/16" TOTAL.

14. LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN PEDESTAL FITS 5/16" TOTAL.

15. AIR PUMP EXHAUST TO BE PIPED TO EXHAUST CAVITY OF CYLINDER.

21. TANK MANHOLE TO BE NOT MORE THAN 11'0" ABOVE TOP OF RAIL.

22. B. L. W. RADIAL SPRING BUFFER BETWEEN ENGINE AND TENDER SIMILAR TO 10 32 E 177.

24. OIL TANK CONSTRUCTION TO BE SAME AS FOR 10 32 E 177, FLANGING THE SHEETS AT JOINTS AND OMITTING ANGLE IRONS.

THE BALDWIN LOCOMOTIVE WORKS As Specn. 0-8309 Sup. 10 30 E 138 with same extras except where otherwise specified.

Memorandum Sheet 2044

SPECIFICATION FOR LOCOMOTIVES 10 30 E 155

FOR Sierra Railway Company of California.

HW.

Gen. as Photo. 5941

Engine Drawing No. 23

2.23.20

Gauge of Road 4'8½" Play ¾" **Wheelbase,** Rigid 12' 2" Driving 12' 2" Total 19' 8"

Total wheelbase, eng. and tend. {Actual 46' 3" / Limited to ---

Rails 50 pounds per yard.

Curves 30 degrees

Limits, Height --- Width ---

Weight (approximate) in working order, Total 121,000 pounds.

On F. tr'k 14,000 lbs., Drivers 107,000 lbs., B. tr'k --- lbs.

Tractive power 26,000 lbs., Ratio of adhesion 4.12

Work'g St'm Pres. 180 lbs., Service Freight

Fuel Oil (See sup. 4a 9c)

Boiler Steel Thick 9/16" & ⅝" Bill 8932

Front Tube Sheet ½" Thick

Boiler, Diam. 54" Plan Wagon top.

{Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.3} **Tested to** {200 lbs. steam pres. / 240 lbs. water pres.

Longitud. seams butt jointed, double covering strips.

Domes-One piece type.

Dome, diam. 29" Pos. On wagon top.

Firebox Steel Combustion chamb. None

Firebox, length 96-3/16" Width 33½" Depth F. 66-½" B. 60"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays 1" diam. (See sup. 6)

Radial stays 1⅛" diam. Sling stays front {Two rows B. L. W. Expansion Stays.

Button heads below crown on eight central rows

Crown bars None Placed --- above crown

Crown bolts ---

Tubes {Flues #9 W. G. Seamless Steel. / Tubes #11 W. G. Iron

Tube ends Swaged for copper ferrules, fire box ends.

Number {18 / 109} Diam. {5⅜" / 2"} Length 11' 6"

Heating Surface {Flues 2835 sq. Combus. Chamb. --- Total 1075 sq. / Tubes 651 sq. Fire Box 135 sq. Fire Brick Tubes ---}

Grate area 22.5 sq. Ratio to Heating Surface 1: 48.5

Superheater 231 sq.

Fire Brick Arch None

Fire box lined with fire brick, for oil burning.

Fire brick pavement in pan

Grates None

Ash Pan, Dampers Front only

Throttle Balanced Pos. Dome

Dry pipe Steel

Superheater Schmidt Type (See sup. 9)

Smokebox extention None Cleaning hole and cap None

Spark ejector or hopper None

Arch, Deflect. plates with

Exhaust nozzles Single Lor

Cleaning Pipe - With

Stack Straight Dia. 16"

Safety Valves Two Ashton 3" Open (Not Spec.)

Safety valves None with relief lever, Set to 180 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Maker: Ashcroft (Spec.)

Steam gauge stand Iron **Clock** None

Water Gauge Two (See sup. 11) **Cab Lamps** Electric

Gauge Cocks Three Right Side Surface valve None

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos:- Front

Cleaning Plugs

Firebox, Corners, back one diagonal, and back

Crown, Two each side and two back.

Waist, One under front

Front tube sheet. One Fusible plug One

Pump None

Injectors Two Monitor (Not Spec.) No. 8

Injectors, Pos. Right and Left Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B. L. W. Pos. Right and Left

Steam Heat None

Cab Steel

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on boiler

Back Bumper Bar Steel Back drawbar height 27½"

B. L. W. radial spring buffer between engine and tender.

Pilot None Pushing shoes Cast in bumper

Front Bumper Cast Steel. Bumper plate With

Steps Hand holds, etc. to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. auto.

Signal fixtures Iron on bumper.

Headlight One round base 18" Reflector,

Headlight, Nos. on sides With Hd'l't step With

Lamp shelf None Nosing ---

Bell 92 pounds

Sand Box One Diam. 28" Body Iron Painted Pipes Iron (Not Spec.)

Sander Leach air trap A-10 to sand front of front and back of main drivers.

Dome casing Iron painted

Boiler Jacket #22 Plan. Steel Bands Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

W. E. Moore April 1920

SPECIFICATION FOR LOCOMOTIVES 10 30 E 155

FOR Sierra Railway Company of California.

HW.

Furnish to Railway Company, one set of detail blue prints.

Frames Cast Steel

Cylinders, Diam. 18" Stroke 22"

St'm ports, Length 20.8" Width 1½" Bridges ---

Exh. ports, Length --- Width --- Valve lead 3/16"

Valve travel 5½" Steam lap ¾" Exhaust clearance ---

Eccentric crank throw 12½" By-pass valve None

S. F. Lubr. Detroit five feed No. 42 Bull's Eye.

Cyl'r heads Cast Iron Lubr. pipes of copper under jacket

Cyl'r casings Iron painted Head covers Steel painted

St'm chest casings --- Covers ---

St'm chest valves 9" diam., Piston Type, inside admission.

Met. pkg. (Not Spec.) Piston rods Valve stems United States King Type

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron, with rings of cast iron sprung in.

Guides Laird type, Steel Oil cups Needle

Crossheads Cast Steel with bearings of cast iron, tinned.

Wrist Pins Steel Rod cups for grease

Parallel rods to have solid ends.

Valve Motion Walschaert's

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard

All finished movable nuts of steel or of iron case hardened

Wearing Bearings B. L. W.

Driving wheel hub liners None

Drivers, O. S. Diam. 42" Cen. diam. 36" centers cast iron

Tires Steel Held by Shrinkage and Shoulder

Tires, Flanged, Pos. Front and Back Size 3" x 5½"

Tires, Plain, Pos. Intermediate Size 3" x 7"

Lateral play between driving boxes and wheel hubs = 3/16" total

Driving Boxes Steeled Cast Iron

Journals, Diam. {Main 7½" Length 8½" / Others 7"}

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing

To swing 1'-8" each side of cen., Cen. pin liners None

Journals, Diam. 5" Length 8" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 26" Tread --- Kind Cast Iron Spoke Center

Tires Steel Cen. diam. 21" Size 2½" x 5½"

Tires held by Shrinkage and Shoulder

Back Engine Truck None Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels

Operating Parts: Engine, sch. No. 6 ET Westg. combined auto. and straight air.

Foundation Parts: Eng. Tr'k, sch. ---; Drivers, sch. W-1 American O. S. equalized; Eng. Tr'k, sch. ---

Air pump One 11" Pos. Left Side

Train connections Front and Back

Train signal, sch. None

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1510 {Tender to be weighed: Yes}

Weight, with fuel and water, about 84,500 pounds

Tank {Oil 1000 / Water 4000} Gallons, Bill {5244 / 4481}

Tank "U" shape straight top.

Tool Boxes Hard wood, top.

Frame Steel, 8" and 10" channels with bumpers of wood and steel plate.

Front Drawbar height 27"

Pilot None Pushing shoes At rear

Back drawhead, center above rail 33½"

Coupler M. C. B. auto.

Steps Hand holds, etc. to conform to I. C. C. requirements.

Trucks Arch bar type, with cast steel bolsters

Cross beams of channel iron

Springs Elliptic, B. L. W.

Journals, Diam. 4½" Length 8" M. C. B. axles, etc.

Wheels, Diam. 28" Tread 4½" Kind Chilled cast iron plate

Tires None Cen. diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6 ET Westg. auto and straight air, with 10"x12" tender brake.

List of tools, sch. 31

Photo sch. None Inspection B. L. W. (See sup. 2)

To be weighed No Material spec'ns B. L. W.

Certificate of boiler test: (See sup. 3)

Junior laws to 3-20-20 Shipment On own wheels.

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents: Feed Water Strainer, Patd. Sept. 1, 1903 (cast on)

Property plates B. L. W., for engine and tender.

Painting, style 291, olive green and aluminum

Lettering etc. to be same as for 10 30 E 138

Mark on tank sides, Sierra Railway

Road Nos. Pos. Road Nos. Name None

F. No. Plate 22

Sand Box and Back of Tank

Actual Dimensions of Loco. Extreme height over all 13' 5"

Extreme Width: Cab boards 9'3" ; Cylinders or valve motion = 9' 11"

Length outside face front bumper of engine to face of tender wedge = 29' 2"

Length face of tender wedge to outside face back bumper of tender = 25' 2"

Total length outside face front bumper of engine to outside face back bumper of tender = 54' 5"

SPECIFICATION FOR LOCOMOTIVES 10 30 E 155

FOR: SIERRA RY. CO. OF CALIFORNIA.

Specification for Type A Double Loop Superheater Speen. O-1322, dated April 8th, 1920.

BOILER TUBES	109 in number 2 o. d. 11 ft. 6 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	18 in number 5 o. d. 9 BWG of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18.	Card 1409-E
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections.	Card 1136
TUBE SHEET LAYOUT		Card 50572
UNITS	18 units 1½ o. d. No. 9 BWG. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 1043
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 1084-L
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls.	Card 11031-D
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place.	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card See Annex.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing.	Card 11313
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card 1062
PYROMETER	Model No. Pyrometer	Card
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 1059-A
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 11331-V	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1078	S. H. UNIT CLAMP	Card 1070
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 1084-K
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1382
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. PIPE BAND	Card 1081
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 1079
DAMPER SHAFT	Card 1068-B	TYPE OF RETURN BENDS	Forged
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 11072
DAMPER SHAFT BEARING (O. S.)	Card 11277-L	SUPERHEATER CONNECTION	Card 1078
DAMPER SHAFT BEARING (I.S.)	Card 1275-G	DEFLECTING PLATE HANDLE	Card 1067
DAMPER SHAFT LINK	Card 1070-K	DEFLECTING PLATE STUDS	Card 1080
PATENT PLATE	Card 372	DEFLECTING PLATE CLAMP	Card 1080-A
DAMPER RIGGING	Card 11301	PYROMETER	None

SPECIFICATION FOR LOCOMOTIVES 10 30 E 155

FOR SIERRA RAILWAY COMPANY OF CALIFORNIA.

261

1 ENGINE AND TENDER TO MEET ALL LAWS AND RULES OF THE I.C.C. AND OF THE SAFETY APPLIANCE STANDARDS.

2 FURNISH TO RAILWAY COMPANY TWO COPIES OF TESTS COVERING BOILER MATERIAL.

3 FURNISH TO RAILWAY COMPANY TWO COPIES OF BOILER SPECIFICATION USED I.C.C. FORM No. 4, B.L.W. FORM 1030.

4 FUEL OIL, GRAVITY 18°, FLASH 150 DEGREES, FIRE 170 DEGREES.

5 OIL BURNING ARRANGEMENT B.L.W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

6 STAYBOLTS TO HAVE 3/8" HOLES 1¾" DEEP FROM O.S. EXCEPT THE TWO BACK ROWS OF STAYBOLTS IN EACH SIDE SHEET OF FIRE BOX, AND AND THE BACK ROW OF STAYBOLTS IN EACH SIDE SHEET OF THE FIRE BOX, TO BE THE SAME HEIGHT AS THE FIRE DOOR, THE ENTIRE THROAT SHEET STAYING, AND THE STAYS IN THE BACK HEAD FROM FIRE DOOR TO MUD RING ARE TO BE HOLLOW ALL THE WAY THROUGH.

7 LARGE SUPERHEATER FLUES TO HAVE FERRULES #11 B.S.GAUGE THICK.

8 LOCOMOTIVE TO HAVE A DRIFTING THROTTLE, THAT IS, AN AUXILIARY OPERATING VALVE TO ALLOW A SMALL QUANTITY OF STEAM TO PASS THROUGH SUPERHEATER PIPES EVEN WHEN THE MAIN THROTTLE IS CLOSED, THUS PREVENTING REAR END SUPERHEATER PIPES FROM BEING BURNED OUT.

9 SUPERHEATER AS PER L.C.C. SUPERHEATER CO'S SPECN. No. O-1322, DATED APRIL 8, 1920. (COPY ATTACHED)
SUPERHEATER TO CONNECT WITH THE HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
SUPERHEATER UNITS OF LATEST DESIGN.
SUPERHEATER ENDS FOR SMALL TUBES TO BE OF MOST IMPROVED TYPE SAME AS FURNISHED BY THE LOCOMOTIVE SUPERHEATER CO. FOR RAILWAY CO'S ENGINE No. 18, B.L.W. CLASS 10 30 E 102.
ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. W.

10 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF THE SUPERHEATER.

11 WATER GAUGE TO BE A 5/8" ROUND GLASS 12" LONG, WITH CARMERAY WATER GLASS PROTECTOR, FROM THE HANDLAN-BUCK MANUFACTURING CO.

12 INJECTORS TO HAVE FLANGE CONNECTIONS WITH FOUR BOLTS INSTEAD OF SPANNER NUT.

13 AMPLE CLEARANCE TO BE PROVIDED BETWEEN ENGINE AND TENDER SO BUMPERS WILL CLEAR ON MAXIMUM CURVATURE.

14 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC TYPE K-2 WITH SUPERHEATER EQUIPMENT.

15 FOR HEREAFTER - PLEASE NOTE. Railway Company complains that cab pan was not in accordance with I.C.C. requirements, i.e. it was held to Boiler Sheets by Studs.
H.R. 7-27-20

MORE CLEARANCE TO BE PROVIDED BETWEEN END OF THE COUPLER JOINT PIN AND ENDS OF THE SECOND PAIR OF DRIVERS AND INSIDE MAIN ROD TO INSURE SUFFICIENT CLEARANCE WHEN LOCOMOTIVE HAS EXCESSIVE LATERAL.

PARTICULAR CARE TO BE TAKEN TO HAVE WHEEL CENTRES A GOOD FIT ON THE AXLES AS THE WHEELS CAME LOOSE ON Co's ENGINE No. 18, B.L.W. CLASS 10 30 E 102.

TENDER

OIL TANK TO BE CONSTRUCTED AS SHOWN BY RAILWAY Co's PENCIL SKETCH (SCRAWL) IN ORDER TO AVOID LEAKY SEAMS BY OMITTING THE ANGLE IRONS AND FLANGING THE SHEETS.

AMPLE CLEARANCE TO BE PROVIDED BETWEEN ENGINE AND TENDER SO BUMPERS WILL CLEAR ON MAXIMUM CURVATURE.

B.L.W. RADIAL SPRING BUFFER BETWEEN ENGINE AND TENDER.

THE BALDWIN LOCOMOTIVE WORKS As Specn. 6-7018. (See sup. 1 etc.)

Memorandum Spec'n 21042.

SPECIFICATION FOR LOCOMOTIVES 10 32 E 177.

EB/ **FOR** Sierra Railway Company of California.

HNW.

Gen. as Photo. 7306.

Engine Drawing No. 24

12-5-21

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 14' 6" Driving 14' 6" Total 22' 2"

Total wheelbase, eng. and tend, {Actual 50' 2" / Limited to ---

Curves 30 degrees.

Grades, average, 3%, with one grade of 5% about 3200 ft. long.

Limits, Height --- Width ---

Weight (approximate) in working order, Total 142,000 pounds.

On F. tr'k 14,400 lbs., Drivers 127,600 lbs., S. tr'k --- lbs.

Tractive power 30,000 lbs., Ratio of adhesion 4.25

Work'g St'm Pres. 180 lbs. Service Freight.

Fuel Oil. (See sup. 5 etc.)

1. **Boiler** Steel. Thick ⅞" & 1 1/16" Bill 9524

Front Tube Sheet ½" Thick

Boiler, Diam. 60" Plan Extended wagon top.

Allowable st'm pres. 200 lbs. With Factor of Safety of 4.43 — Tested to 220 lbs. steam pres. / 267 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips.

Main dome, one-piece type. Auxiliary dome, None.

Dome, diam. 29" Pos. Forward of fire box.

Firebox Steel. Combustion chamb. None.

Firebox, length 96-3/16" Width 42¼" Depth F. 65-3/16" B. 63-3/16"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Double Riveted

Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O.S. Two rows B. L. W.

Radial stays 1" diam. Sling stays front Expansion stays.

Button heads below crown on Eight central rows, to suit oil fuel.

Crown bars None. Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G. Steel.

Tubes No. 12 B.W.G. Charcoal iron or steel, (B.L.W. Option).

Tube ends Swaged for copper ferrules, fire box ends.

Number {21 / 148} Diam. {5⅜" / 2"} Length 13' 6"

Heating Surface Flues 396 sq. ft. Combus. Chamb. --- Total 1569 sq. ft. / Tubes 1040 sq. ft. Fire Box 133 sq. ft. Fire Brick Tubes ---

Grate area 28.2 sq. ft. Ratio to Heating Surface 1: 55.6

Superheater 332 sq. ft.

Fire Brick Arch, None.

5-c Fire box lined with fire brick, for oil burning.

Fire brick pavement in pan.

Grates None.

Ash Pan, Dampers Front only.

Fire pan to conform to I. C. C. requirements, i.e., fire pan to be secured to mud ring.

Throttle Balance, Pos. Dome.

Dry pipe Steel.

Superheater Schmidt type, (See sup. 7 etc.)

Smokebox extenstion None. 9. Cleaning hole and cap None.

Spark ejector or hopper None.

~~Superheater~~ deflect. plates With.

Exhaust nozzles Double, Low.

Cleaning pipe, with.

Stack Straight. Dia. 16".

(Not Spec.) **Safety Valves** Two Crosby 2½" Open, Style HA-110.

Safety valves None with relief lever, Set to 180 pounds.

Whistle One B. L. W. Plain.

Steam Gauge One Iron 6½" Maker: U.S. Gauge Co.

Steam gauge stand Iron. **Clock** None.

One **Water Gauge** (See sup. 10) **Cab Lamps** Electric.

Gauge Cocks Three back. Surface valve None.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.

Cleaning Plugs One plug bove fire door.

Firebox, Corners, back ones diagonal, sides and back.

Crown, Two each side and four back.

Waist, One under front.

Front tube sheet, Two Fusible plug One.

Pump None.

Injectors to have flange connections with four bolts, instead of spanner nut.

Injectors Two Monitor. (Not Spec.) No. 8

Injectors, Pos. Right and left. Steam pipes Copper.

Pipes, Check Iron. Feed Iron. Overflow Iron.

Check B. L. W. Pos. R. and L.

Steam Heat None.

Cab Steel.

Cab boards to be covered with wood.

Cab boards Steel. Nosing T-Iron.

Running boards Steel. Nosing T-Iron.

Hand rail Iron. Located on Boiler.

11. **Back Bumper** Bar steel. Back drawbar height 30"

Pilot Wood.

Front Bumper Cast steel. Bumper plate With.

1. **Steps** Hand holds, etc., to conform to I.C.C. requirements.

Front Drawhead, Center above rail 33½"

1. **Coupler** M. C. B. Automatic.

Signal fixtures Iron on bumper.

12. **Headlight** One round case 18" Reflector,

Headlight, Nos. on sides With. H'dl't step With.

Lamp shelf None. Nosing ---

Bell 92 pounds.

Sand Box One Diam. 31" Body Iron painted. Pipes Iron.

Sander (Not Spec.) Leach air, trap A-10 double, to sand front of front and back of back drivers.

Dome casing Iron painted.

Boiler Jacket #18 Soft steel ptd. Bands Iron. Style 9.

Boiler Lagging Magnesia sectional.

THE WIN LOCOMOTIVE WORKS

L. G. Tandy Jan 1921

SPECIFICATION FOR LOCOMOTIVES 10 32 E 177.

FOR Sierra Railway Company of California.

HNW.

Furnish Prints (See sup. 3)

Frames Cast steel.

Cylinders, Diam. 19" Stroke 26"

St'm ports, Length 20.84" Width 1⅜" Bridges ---

Exh. ports, Length --- Width --- Valve lead ¼"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ---

Eccentric crank throw 14-13/16" By-pass valve None.

(Not Spec.) S. F. Lubr. Detroit five feed No. 42 Bull's Eye.

Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

St'm chest castings ---- Covers ----

St'm chest valves 9½" diam. Piston type.

(Not Spec.) Met. pkg. {Piston rods / Valve stems} United States, King type.

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron with rings of cast iron sprung in.

Guides Steel. Oil cups Needle.

Crossheads Cast steel, with bearings of cast iron tinned.

Wrist Pins Steel. Rod cups For grease, forged on.

Parallel rods to have solid ends.

Valve Motion Walschaerts.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel nub lin... Brass.

Drivers, O. S. Diam. 48" Cen. diam. 42" centers cast steel.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. Front and back. Size 3" x 5½"

Tires, Plain, Pos. Intermediate. Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = (See sup. 13).

Driving Boxes Cast steel.

Journals, Diam. {Main, 8" / Others, 7½"} Length 8½"

Springs. ...ake B. L. W.

Front Engine Truck Two. Wheeled Swing bolster center bearing.

14. To swing 5" each side of cen., Cen. pin liners None.

Journals, Diam. 5½" Length 10" Boxes Cast iron.

Wheel hub liners None.

Wheels, Diam. 30" Tread --- Kind Cast iron spoke center.

Tires Steel. Cen. diam. 25" Size 2½" x 5½"

Tires held by Shrinkage and shoulder.

Back Engine Truck None. Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels.

Operating Parts: Engine, sch. No. 6 ET. Westg. combined auto. and straight air. / Eng. Tr'k, sch. ---

Foundation Parts: Drivers, sch. WN-2-BC American O.S. equalized. / Eng. Tr'k, sch. ---

Air pump One 11" Pos. Left side.

Train connections Front and back.

Train signal, sch. ----

Air reservoirs to have hydrostatic test of 210 pounds.

Brakes to be bushed and case hardened.

Tender Eight Wheeled, Drawing No. 1698. Tender to be weighed: Yes.

Weight, with fuel and water, about 90,500 lbs.

Tank Oil, 2000 5741 / Water, 4000 Gallons, Bill 5740.

Tank "U" shape, straight top.

Tool Boxes of wood, top.

Frame Steel, 12" channels, with bumpers of wood reinforced with steel channels.

28 Front Drawbar height 28"

Pilot None.

Back drawhead, center above rail 33½"

1. **Coupler** M. C. B. Automatic.

1. Steps hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, B. L. W.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread --- Kind Rolled steel.

Tires --- Cen. diam. --- Size ---

Tires held by --- Wheel rims, 2½" thick x 5½" wide.

Safety chains Single.

Brake Position On all wheels.

Brake sch. No. 6 ET. Westinghouse automatic and straight air, with 10" x 12" tender brake cylinders.

List of tools, sch. 160.

Photo sch. No. 2. Inspection B. L. W.

To be weighed No. Material spec'ns B. L. W.

Certificate of boiler test (See sup. 4.)

Junior laws to 12-13-21. Shipment On own wheels. (See sup. 15.)

Brass shop finish, No. 1.

Machine shop finish D-165.

Patents B. L. W. None.

Property plates B. L. W. for engine and tender.

Painting, style 291, Olive green and aluminum.

Mark on tank collar at sides: Sierra Railway Company

Mark on tank collars to be in letters 6" high, and road numbers on tank to be in 18" figures, otherwise, painting to be the same as for 10 30 E 155.

Road Nos. Pos. Road Nos. Name None.

F. No. plate. 28

Sand box.

Tank sides.

Back of tank.

Actual Dimensions of Loco. Extreme height over all 14' 3½"

Extreme Width: Cab boards 10' 3" ; Cylinders ~~engine center~~ 9' 5"

Length outside face front bumper of engine to face of tender wedge = 33' 0"

Length face of tender wedge to outside face back bumper of tender = 22' 10½"

Total length outside face front bumper of engine to outside face back bumper of tender = 55' 11½"

SPECIFICATION FOR LOCOMOTIVES: 10 32 E 177.

FOR: SIERRA RAILWAY COMPANY OF CALIFORNIA.

HNW.

1 LOCOMOTIVE TO CONFORM TO ALL I. C. C. AND M. C. B. REQUIREMENTS.

2 AS MANY DETAILS AS POSSIBLE TO BE INTERCHANGEABLE WITH COMPANY'S PRESENT LOCOMOTIVES.

3 FURNISH RY. CO. SET OF BLUE PRINTS, TO INCLUDE PRINCIPAL DETAILS OF ENGINE AND TENDER ONLY.

4 CERTIFICATE OF BOILER TEST, THREE COPIES B. L. W. FORM 1036, AND TWO COPIES B. L. W. FORM 491.

5 FUEL OIL SAME AS FOR 10 30 E 155, O.E., GRAVITY, 14; FLASH, 150 DEGREES; FIRE, 170 DEGREES.

6 OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX, EXCEPT TO HAVE CLOSED HEATER AND METALLIC JOINTS FOR OIL AND HEATER CONNECTIONS, BETWEEN ENGINE AND TENDER, SAME AS FOR 10 30 E 155. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

7 SUPERHEATER AS THE SUPERHEATER CO'S SPECN. NO. O-17316, DATED 12-10-21, (COPY ATTACHED). SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS. ROYALTY PAYABLE BY THE B. L. W.

8 PATENT PLATES (HEREWITH) FROM THE SUPERHEATER COMPANY, COVERING THE SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

9 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF THE SUPERHEATER.

10 WATER GAUGE WITH 5/8" ROUND GLASS, 12" LONG, AND WITH CARBERRY WATER GLASS PROTECTOR, FROM THE HANDLAN-BUCK MANUFACTURING CO., SAME AS FOR 10 30 E 155.

11 B. L. W. SPRING BUFFER WITH RADIAL FACE BETWEEN ENGINE AND TENDER.

12 HEADLIGHT GENERATOR TO BE SUNBEAM ELECTRIC TYPE RE-3 WITH SUNBEAM INCANDESCENT HEADLIGHT AT FRONT OF ENGINE, AND PYLE NATIONAL ELECTRIC, NO. 1095, BACK-UP LIGHT AT REAR OF TENDER.

13 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

14 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

15 SPARE PARTS COVERED ON EXTRA ORDER NO. 12770, DATED 12-14-21, TO BE SHIPPED WITH LOCOMOTIVE.

TENDER

26 OIL TANK TO BE CONSTRUCTED AS SHOWN ON RY. CO'S PENCIL SKETCH IN ORDER TO AVOID LEAKY SEAMS BY OMITTING THE ANGLE IRONS AND FLANGING THE SHEETS.

27 HEADLIGHT AT REAR. (SEE SUP. 12.)

28 B. L. W. SPRING BUFFER WITH RADIAL FACE BETWEEN ENGINE AND TENDER.

265

264

SPECIFICATION FOR LOCOMOTIVES 10 32 E 177

FOR SIERRA RAILWAY COMPANY OF CALIFORNIA

Specification for Type A Double Loop Superheater O-17316. DATED DECEMBER 10TH, 1921

BOILER TUBES	148 in number 2" o.d. 13 ft. 6 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	21 in number 5-3/8" o.d #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card	1409-M
BOILER FLUE SETTING	1/4 in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card	1136
TUBE SHEET LAYOUT	Card	5871
UNITS	21 units 14" o.d #9 B. W. Ga. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card	10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card	1043
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A. Card	10695
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card	A.T. 3 x 7 10893
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured as supports. This to be done before superheater units are put in place. Card	1323
STEAM PIPE JOINT RINGS	Of cast iron. Card	SEE ABOVE
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units Card	
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card	1067-A
PYROMETER	Model No. Pyrometer. Card	NONE
PYROMETER ARRANGEMENT	Generally in accordance with Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration Card	4901
S. H. ARRANGEMENT	In accordance with	
TEST (FINAL)	The superheater, after assembling to boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card	10916	
DAMPER CYL. ARM	Card	1074	
DAMPER CYL. PIPE FITTING	Card	11115	
DAMPER CYL. PIPE UNION	Card	11114	
DAMPER CYCL. PIPE CONNECTION	Card	1L-11437	
DAMPER CYL. PIPING DIAGRAM	Card	2L-11442	
DAMPER CYL. SUPPORT	Card		
DAMPER SHAFT	Card	1068	
DAMPER SHAFT ARM	Card	1065	
DAMPER SHAFT BEARING (O. S.)	Card	1148	
DAMPER SHAFT BEARING (S.S.)	Card	1275-H	
DAMPER SHAFT LINK	Card	1079	
PATENT PLATE	Card	3L-3367	

S. H. UNIT BOLT WASHER	Card	1071
S. H. UNIT CLAMP	Card	1073
S. H. UNIT CLAMP WASHER	Card	10305
S. H. PIPE END	Card	1344
S. H. PIPE BAND	Card	1988
SPACING OF BANDS & SUPPORTS	Card	10759
TYPE OF RETURN BENDS		FORGED
RETURN BENDS	Card	11022
LUBRICATOR CONNECTION	Card	3023
DEFLECTING PLATE HANDLE	Card	1487
DEFLECTING PLATE STUDS	Card	10809
DEFLECTING PLATE CLAMP	Card	10809-A

THE BALDWIN LOCOMOTIVE WORKS {As Specn. C-7368, Dup. 6 32 D 1145, with same extras, except where otherwise specified.

Memorandum Spec'n 22021.

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1151. Gen. as Photo. 5129.

J.C.W.
FOR Standard Oil Company, (Constable Hook, N.J.) **Engine Drawing No.** 97.

HNW.

3-22-22.

Gauge of Road 4' 8½" Play 2" **Safety Valves** Two Coale, 3" Plain.
Wheelbase, Rigid 10' 6" Driving 10' 6" Total 10' 6" Safety valves None with relief lever, Set to 160 pounds.
Total wheelbase, eng. and tend. {Actual 43' 3½" / Limited to ---

Whistle One B. L. W. Plain.

Curves 46 degrees. Grades, 7%.
Loco. to push cars up a 7% grade while running backwards.
Limits, Height 13' 0" Width ---
Weight (approximate) in working order, Total 110,000 pounds.
On F. tr'k --- lbs., Drivers 110,000 lbs., B. tr'k --- lbs.

Steam Gauge One Iron 7" Maker: Ashcroft. (Not Spec.)
Steam gauge stand Iron. **Clock** None.

Water Gauge One B. L. W. Ironclad **Cab Lamps** Electric.
Gauge Cocks Three back. Surface valve None.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Tractive power 26,800 lbs., Ratio of adhesion 4.11
Work'g St'm Pres, 160 lbs., Service Switching.
Fuel Mexican Oil, (See sup. 30)

Blow off Cock One B. L. W. Pos: Front.
Cleaning Plugs One plug above fire door.
Firebox, Corners, diagonal, sides and back.
Crown, Two R. S., Three L. S., and three back.
Waist, One under front. One fusible plug extra.
Front tube sheet, One. Fusible plug One.

Boiler Steel (Sup. 6) Thick 9/16" Bill 9204.
Front Tube Sheet ½" Thick
Boiler, Diam. 58" Plan Straight top.
Allowable st'm pres. 160 lbs. **Tested to** 180 lbs. steam pres.
With Factor of Safety of 5.48 214 lbs. water pres.
Longitud. seams Butt jointed, double covering strips.

Pump None.

Dome, diam. 29" Pos. Forward of fire box.
Auxiliary dome, None.
Firebox Steel (Sup. 6) Combustion chamb. None.
Firebox, length 83⅜" Width 60" Depth F. 5½" B. 4½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening Oval, 13" x 18". Crown and sides in one sheet.
Water space, Front 4" Sides 3½" Back 3½"
Water space frame Double Riveted
Water space stays 15/16" diam. (See sup. 4. 8. 13-16-21-36)
Radial stays 1" diam. Sling stays front {Two rows B. L. W. / Expansion stays.
Button heads below crown on six central rows to suit fuel oil.
Crown bars None. Placed --- above crown
Crown bolts ---

Injectors Two Monitor. (Not Spec.) No. 8.
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check B. L. W., with stop valve. Pos. Right and left.

Steam Heat None.

Flues ---
Tubes No. 12 B.W.G. Charcoal iron or steel, (B.L.W. Option).
Tube ends Swaged for copper ferrules, fire box ends. (Sup. 38)
Number 208 Diam. 2" Length 11' 6"

Cab Wood.
Cab boards Wood. Nosing None.
Running boards Wood. Nosing None.
Hand rail Iron. Located on Boiler.

Heating Surface Flues --- Combus. Chamb. --- Total 1350
Tubes 1243 Fire Box 107 Fire Brick Tubes ---
Grate area 35 Ratio to Heating Surface 1: 38.5
Superheater ---

Back Bumper Bar steel. Back drawbar height 28⅞"

Pilot None. Pushing shoes at front.
Front Bumper Oak. Bumper plate None.
Steps Across front, with hand rails. (See sup. 52)
Steps, hand holds, etc., to conform to I. C. C. requirements.
Front Drawhead, Center above rail 34½"
Coupler M. C. B. Auto.

Fire Brick Arch, None.
Fire box lined with fire brick, for oil burning.
Fire brick pavement in pan.
Grates None.
Ash Pan, Dampers Front only.

Signal fixtures None.

Throttle Balance. Pos. Dome.
Dry pipe Steel.

Headlight Two round case 18" Reflector,
Headlight, Nos. on sides With. H'd'l't step With.
Lamp shelf Iron. Nosing None.

Superheater None.

Bell 92 pounds. Gollmar air bell ringer.
Sand Box Two Diam. 28" Body Iron painted. Pipes Iron.
Sander (Not Spec.) Leach air, trap A-1, in each box, to sand front and back.

Smoke box to have short extension.
Smokebox extension Short Cleaning hole and cap L. S. Only.
Spark arrester or hopper With.
Netting and deflect. plates None.

Dome casing Iron painted.

Boiler Jacket #22 Soft steel ptd. Bands Iron. Style 9.
Boiler Lagging Magnesia sectional.

Exhaust nozzles Double, low.
Cleaning pipe: With.
Stack Straight. Dia. 16"

THE BALDWIN LOCOMOTIVE WORKS

W. E. Moore April 1922

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1151.

FOR Standard Oil Company.

HNW.

Frames Cast steel.

Cylinders, Diam. 19" Stroke 24"
St'm ports, Length 16" Width 1½" Bridges 1"
Exh. ports, Length 16" Width 2½" Valve lead ⅛"
Valve travel 5½" Steam lap ¾" Exhaust clearance ---
Eccentric throw 5" By-pass valve None.
S. F. Lubr. (Not Spec.) Michigan, triple bull's eye.
Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings Iron painted. Covers Steel painted.
St'm chest valves Balanced, with vacuum valves.
Met. pkg. (Not Spec.) Piston rods / Valve stems United States, King type.
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron, with rings of cast iron sprung in.
Guides Laird type, steel. Oil cups Needle.
Crossheads Cast steel, with bearings of cast iron tinned.
Wrist Pins Steel. Rod cups Plunger.
Parallel rods to have solid ends.

Valve Motion Stephenson.
(Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners Brass.
Drivers, O. S. Diam. 44" Cen. diam. 38" centers cast iron.

Tires Steel. Held by Shrinkage and shoulder.
Tires, Flanged, Pos. Front and back. Size 3" x 5½"
Tires, Plain, Pos. Middle. Size 3" x 6½"
Lateral play between driving boxes and wheel hubs = (See sup. 54)
Driving Boxes Cast steel.
Journals, Diam. 8" Length 8½"

Springs. Make B. L. W.

Front Engine Truck None. Wheels ---
To swing --- each side of cen. Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck None Wheels ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels.
Operating Parts / Engine, sch. No. 6 ET. Westg. combined auto. and straight air. / Eng. Trk. sch. ---
Foundation Parts / Drivers, sch. WM-2-8C American outside equalized. / Eng. Trk. sch. ---
Air pump One 9½" Pos. Left side.
Train connections Front and back.
Train signal, sch. None.
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1612. Tender to be weighed: Yes.
Weight, with fuel and water, about 97,000 lbs.
Fuel, Oil, 1600 5044
Tank Water, 4500 Gallons. Bill 5037
Tank "U" shape, sloping back. Coal space for 6 tons.

Tool Boxes of hard wood, top.

Frame Steel, 10" channels with bumpers of wood and steel plate.
Front Drawbar height 29⅜"
Pilot None. Pushing shoes at rear.
Back drawhead, center above rail 34½"
Coupler M. C. B. Auto.

Steps, hand holds, etc., to conform to I. C. C. requirements.
Steps across rear with hand rails. (See sup.
Steps on sloping back of tank with hand rails.
Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, B. L. W.
Journals Diam. 4½" Length 8"
Wheels Diam. 30" Tread 1¼" Kind Chilled cast iron plate.
Tires None. Cen. diam. --- Size ---
Tires held by ---
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6 ET. Westinghouse automatic and straight air, with 10" x 12" cylinders.

List of tools, sch. 160.
Photo sch. None. Inspection B.L.W., except for boiler. (Sup. 22, 39)
To be weighed Now Material specns B.L.W., except for boiler. See sup. 44
Certificate of boiler test (See sup. 55)
Junior laws to 4-1-22. Shipment On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

B. L. W. Patents None.

Property plates None.

Painting, style 291, Olive green and aluminum.

Lettering to be same as for 6 32 D 1145.
Mark on sides of cab and tank: Standard Oil Company of N. J., Inc. / Bayonne Works
Road number to be under center of mark on cab and tank.
Road Nos. Pos. Road Nos. Name None.
F. No. Plate. 8
F. Sand box.
Cab sides.
Sides and back of tank.

Actual Dimensions of Loco. Extreme height over all 12' 10½"
Extreme Width: Cab boards 9' 10"; Cylinders or valve motion 9' 3½"
Length outside face front bumper of engine to face of tender wedge 28' 0"
Length face of tender wedge to outside face back bumper of tender 26' 2"
Total length outside face front bumper of engine to outside face back bumper of tender 54' 2"

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1151

FOR STANDARD OIL CO

J.C.W. 1.31.32

1 BOILERS TO BE BUILT TO CONFORM TO THE LOCOMOTIVE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1921) OR TO THE REQUIREMENTS OF THE STATE OF NEW JERSEY MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1¼ TIMES BOILER PRESSURE. (FOLLOWS L.W. PRACTICE OF 1⅕ TIMES BOILER PRESSURE

4 THE MATERIAL ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL & MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A. S. M. E. SPEC. PAGE 15
BOILER RIVET IRON	A. S. M. E. SPEC. PAGE 31
BOILER BRACE IRON	A. S. M. E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A. S. M. E. SPEC. PAGE 34
BOILER TUBES	A. S. M. E. SPEC. PAGE 40, EXCEPT AS MODIFIED BY PARAGRAPH L-18 LOCO. BOILER CODE OF 1921.

5 TUBES 2" AND 2¼" DIAM. TO BE NO.12 B.W.G. UP TO 200 POUNDS PRESSURE, AND NO.11 B.W.G. FOR PRESSURE OVER 200 POUNDS.

6 ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE-PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL, AND FOR MATERIAL FOR ONE-PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B. L. W. SPECIFICATION.

7 THE MINIMUM FACTOR OF SAFETY SHALL BE 4½ (1921)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

8 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATES, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYS DIAM.	PRESSURE	5/16" PLATE PITCH
7/8"	160 LBS.	4.41"
7/8"	180 LBS.	4.16"
7/8"	190 LBS.	4.05"
7/8"	200 LBS.	3.95"
1"	225 LBS.	3.72"

9 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,600 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

10 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

11 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54"	1/2"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I.E. FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

12 DOME:- ONE-PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B. L. W. THREE-PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

13 THE OUTSIDE END OF SOLID STAYBOLTS 14" AND LESS IN LENGTH (EXCLUDING STAYS IN LARGE RADIUS OF CROWN) SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIAM. TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 THE THICKNESS OF THE WRAPPER SHEET SHOULD BE CHECKED TO SEE THAT IT CONFORMS TO PARAGRAPH L 43 A AND L 43 B BEFORE ORDERING MATERIAL FOR BOILER.

16 IN BRACING TUBE SHEETS AND BACK HEAD, FOLLOW PARAGRAPH L 45 AND ORDER ONLY THE STAY CARDS THAT HAVE BEEN MADE TO MEET THESE REQUIREMENTS.

17 ALL HOLES FOR INJECTOR CHECKS, WHISTLE AND SAFETY VALVES WHEN SCREWED INTO BOILER, AND ALL HOLES IN BOILER BARREL, FIRE BOX, ROOF SHEET, AND ALL UNSTAYED SURFACES WHEN THE DIAMETER IS OVER 3¼" AND EXCEEDS 4½ TIMES THE THICKNESS OF THE PLATE MUST BE REINFORCED WITH A LINER OR FLANGE RIVETED TO THE BOILER. THE THICKNESS OF THE LINER OR FLANGE MUST BE AT LEAST 75% OF THE THICKNESS OF THE PLATE AND THE RIVETS MUST HAVE A SHEARING STRENGTH OF AT LEAST 52% OF THE TENSILE STRENGTH OF THE METAL REMOVED.

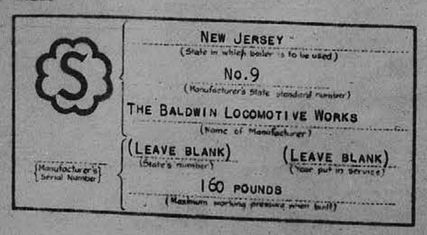
18 EACH BOILER MUST BE PROVIDED WITH A CONNECTION 1/4" PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

19 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B. L. W. MARKING CARD #6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET.
SAFETY VALVE ELBOWS OR FITTINGS CONNECTING SEVERAL VALVES MUST HAVE AN OPENING EQUAL TO BE COMBINED AREA OF ALL THE VALVES.

20 THERE SHALL BE NOT LESS THAN EIGHT BRASS WASHOUT PLUGS LOCATED AS FOLLOWS:-
ONE OR MORE IN BARREL OF BOILER.
ONE OR MORE EACH SIDE OF ROOF SHEET ABOVE LEVEL OF CROWN.
ONE OR MORE IN BACK HEAD AT OR ABOUT LINE OF CROWN SHEET.
ONE ABOVE FIRE DOOR.
FOUR IN LOWER PART OF WATER LEG, AT CORNERS.
SCREW PLUGS MUST HAVE AT LEAST FOUR FULL THREADS IN SHEET.

21 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN PLACE: OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE ~~FOR PLATES~~ FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION. THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE, AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

22 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼" THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.



SPECIFICATION FOR LOCOMOTIVES: 6 32 D 1151.

FOR: STANDARD OIL COMPANY.

HNW.

269 268

20 LOCOMOTIVE TO OPERATE IN STATE OF NEW JERSEY.

27 BOILER TO CONFORM TO REQUIREMENTS OF STATE OF NEW JERSEY.

28 BOILER TO CONFORM TO THE A. S. M. E. CODE. (SEE SUP. 1-22).

29 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY (SEE SUP. 22)

30 FUEL OIL TO BE MEXICAN OIL. (SEE SUP. 34)
OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH BURNER PLACED IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

31 HEATING SYSTEM FOR OIL SUPPLY TANK HOSE TO BE OPEN STEAM JET TYPE OF SUFFICIENT CAPACITY TO MAINTAIN MEXICAN FUEL OIL OF ABOUT 12 DEGREES GRAVITY AT 150 DEGREES TO 160 DEGREES FAHRENHEIT.

32 OIL SUPPLY LINE FROM TENDER TO ENGINE TO HAVE FOUR-BALL UNIVERSAL JOINTS.
DO NOT FAIL TO PROVIDE FOUR-BALL [redacted] JOINTS FOR OIL.

33 DETAILS TO BE ARRANGED SO THAT LOCOMOTIVE CAN BE READILY CHANGED TO COAL BURNER.

34 DETAILS, SUCH AS FUEL OIL, FIRE EXTINGUISHER, ETC., TO BE SAME AS FOR 6 32 D 1133 AND 1145.

36 FULL INSTALLATION, ABOUT 538, AMERICAN FLEXIBLE WATER SPACE STAYS.

37 ALL STAYBOLTS 8" OR LESS IN LENGTH TO HAVE 3/16" HOLES DRILLED TO A DEPTH EXTENDING TO AT LEAST ½" BEYOND THE INSIDE OF THE PLATE. (SEE SUP. 13)

38 TUBES TO BE ELECTRICALLY WELDED TO BACK TUBE SHEET.

39 PROVIDE A 2" CONNECTION ON DOME, CONSISTING OF A TEE WITH A 2" VALVE ON EACH OUTLET OF THE TEE FOR SUPPLYING STEAM TO FIRE PUMPS LOCATED ON TANK CARS WHICH ARE FILLED WITH CHEMICALS FOR EXTINGUISHING OIL FIRES.

40 FIRE EXTINGUISHER, LEHIGH VALLEY TYPE, AS LEHIGH VALLEY R. R. CO'S PRINT 4890-C, TO BE APPLIED TO ONE INJECTOR BEANCH PIPE. (SEE SUP. 34 & 41)

41 ONE 50 FT. LENGTH 2" CANVAS HOSE TO BE ENCLOSED IN SUITABLE WOODEN BOX AND PLACED ON TENDER, FOR USE WITH FIRE EXTINGUISHER (SEE SUP. 40)

42 BOILER TO BE REINFORCED AT INJECTOR CHECKS.

43 CANVAS ROLLED STORM CURTAIN AT REAR OF CAB SAME AS FOR 6 32 D 1133.
DROP WINDOWS TO BE INSTALLED IN BACK END OF ENGINE CAB.
CAB TO HAVE DROP SEAT ON ENGINEER'S SIDE.

44 HOSE CONNECTIONS BETWEEN ENGINE AND TENDER TO BE ARRANGED SO THERE WILL BE NO TROUBLE IN ROUNDING CURVES.

45 SPRING BUFFER BETWEEN ENGINE AND TENDER.

46 CLEARANCE DISTANCE BETWEEN ERGINE AND TENDER SHALL NOT BE LESS THAN 18".

47 CHAFING PLATE ON BUMPER TO BE AS SHOWN ON CO'S SKETCH.

51 DRAWBAR TO BE AS SHOWN ON CO'S SKETCH

52 HANDRAIL ACROSS FRONT OF ENGINE TO BE SOLID INSTEAD OF PIPE.

53 HEADLIGHT EQUIPMENT TO BE SCHROEDER SUNBEAM ELECTRIC TYPE R5-3, WITH INCANDESCENT HEADLIGHTS.

54 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN PEDESTAL FITS, 7/32" TOTAL.

56 CERTIFICATE OF BOILER TEST: THREE COPIES B. L. W. FORM 1036, AND FIVE COPIES B. L. W. FORM 1915.

TENDER

65 TANK TO BE FASTENED SECURELY TO PREVENT POSSIBILITY OF SHIFTING.

66 OIL SUPPLY TANK ON TENDER TO BE SET ON 8" x 10" CREOSOTED TIMBERS, BRACED WITH EXTRA HEAVY BRACES, AND FIRMLY RIVETED TO WATER TANK.

67 TENDER FLOORING TO BE SPACED SO AS TO ALLOW 1" BETWEEN PLANKS.

68 HANDRAIL ACROSS REAR OF TENDER TO BE SOLID INSTEAD OF PIPE.

69 TENDER BRAKE BEAMS TO BE BUFFALO, NO. 3.

70 ONE 50 FT. LENGTH 2" CANVAS HOSE TO BE ENCLOSED IN SUITABLE WOODEN BOX AND PLACED ON TENDER, FOR USE WITH FIRE EXTINGUISHER (SEE SUP. 41)

THE BALDWIN LOCOMOTIVE WORKS As Specn. 0-6549.

Memorandum Spec'n 20082

SPECIFICATION FOR LOCOMOTIVES 6 36 D 321

FOR Standard Oil Company of New Jersey

HW Bayway Refinery

Gen. as Photo. 5385

Engine Drawing No. 25

3.29.20

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"

Total wheelbase, eng. and tend. Actual 42' 4⅛" Limited to ---

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 146,000 pounds.

On F. tr'k --- lbs. Drivers 146,000 lbs., B. tr'k --- lbs.

Tractive power 35,400 lbs. Ratio of adhesion 4.1

Work'g St'm Pres. 185 lbs., Service Switching

Fuel Hard Coal, Egg Size.

Boiler Steel Thick 21/32" Bill 9017

Front Tube Sheet ½" Thick

Boiler, Diam. 66" Plan Straight Top.

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 5.07 300 lbs. water pres.

Longitud. seams Butt jointed, double covering strips, octuple riveted seams.

Dome, diam. 29" Pos. Central

Firebox Steel Combustion chamb. None

Firebox, length 107⅞" Width 100" Depth F. 61" B. 53"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening Two 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3½" Back 3½"

Water space frame Double Riveted

Water space stays ⅞" diam. with 3⅛" holes 1¼" deep from O. S.

Radial stays 1" diam. Sling stays front Two rows B. L. W. Expansion Stays

Button heads below crown on Eight central rows---

Crown bars None Placed --- above crown

Crown-bolts ---

Flues None

Tubes #12 W.G. Charcoal Iron or Steel (B. L. W. Option)

Tube ends Swaged for copper ferrules, fire box ends.

Number 306 Diam. 2" Length 11'0"

Heating	Flues ---	Combus. Chamb. ---	Total	1920 sq. ft.
Surface	Tubes 1749 sq. ft.	Fire Box 171 sq. ft.	Fire Brick Tubes ---	
Grate area	75 sq. ft.	Ratio to Heating Surface 1:		25.6
Superheater	---			

Fire Brick Arch, None

Grates Rocking bars and drop plate

Ash Pan, Dampers Back only

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater None

Smokebox extension With Cleaning hole and cap L. S. Only

Spark ~~nicholson~~ hopper With

Netting and deflect. plates With

Exhaust nozzles Double High

Stack Straight Dia. 18¾"

Safety Valves Two Coale 3" Open (Not Spec)

Safety valves Both with relief lever, Set to 185 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Maker: Ashcroft (Not Spec)

Steam gauge stand Iron **Clock** None

Water Gauge One B. L. W. Ironclad **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front

Cleaning Plugs

Firebox, Corners diagonal and sides.

Crown, Two R. S. Three L. S. and four back.

Waist, One under front

Front tube sheet One 1" fusible plug One

Pump None

Locomotive for operation in New Jersey.

Boiler to conform to A. S. M. E. Code. (See Sup. 1 etc)

Boiler to be inspected by The Hartford Steam Boiler Inspection and Insurance Company. (See Sup. 1 etc)

Injectors Monitor, Two (Not Spec) No. 9

Injectors, Pos. Right and Left Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B. L. W. with stop valve Pos. Right and Left

Steam Heat None

Cab Steel

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 31"

B.W. Radial Spring buffer between engine and tender.

Pilot None Pushing shoes Cast in bumper

Front Bumper Cast Steel Bumper plate With

Steps Across front with handrail.

Steps, hand holds, etc. to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Automatic

Signal fixtures None

Headlight Equipment to be Pyle-National Electric, Type "K-2" with incandescent headlights.

Headlight Two Round case 18" Reflector,

Headlight, Nos. on sides With H'd'l't step With

Lamp shelf None Nosing ---

Bell 92 pounds

Sand Box Two Diam. 28" Body Iron Painted Pipes Iron

Sander Leach air, trap A-1 in each box to sand front and back (Not Spec)

Dome casing Iron Painted

Boiler Jacket #22 Soft Steel Pto. Bands Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

E. Steele June-1920

SPECIFICATION FOR LOCOMOTIVES 6 36 D 321

271

270

FOR Standard Oil Company of New Jersey

HW Bayway Refinery

Frames Cast Steel

Cylinders, Diam. 21" Stroke 26"

St'm ports, Length 19" Width 1⅞" Bridges 1⅞"

Exh. ports, Length 19" Width 3" Valve lead ¼"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ---

Eccentric crank throw, 11-3/16" By-pass valve None

(Not Spec) S. F. Lubr. Nathan Triple Bull's Eye

Cyl'r heads Cast Iron Lubr. Pipes of iron under jacket.

Cyl'r casings Iron Pto. Head covers Steel Pto.

St'm chest casings Iron Pto. Covers Steel Pto.

St'm chest valves Richardson balanced, with vacuum valves

(Not Spec) Main pkg (Piston Rod Valve Stem) United States King Type

Piston rods to be keyed to crossheads

Pistons heads of cast iron with rings of cast iron sprung in.

Guides Steel Oil cups Needle

Crossheads Cast Steel, with bearings of cast iron, tinned.

Wrist Pins Steel Bot cups Plunger

Parallel rods to have solid ends.

Valve Motion Walschaerts

Links, sliding blocks, combining links and eccentric rod jaws to be steel case hardened or to have hardened bushings.

All through bolts except stay-bolts, to be United States Standard.

All finished removable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel, Pedestal liners Bronze, for main wheels only

Drivers, O. S. Diam. 51" Cent. diam. 44"

Wheel centres; main cast steel, others cast iron.

Tires Steel Held by Shrinkage and Shoulder.

Tires, Flange, Pos. Front and back Size 3½" x 5½"

Tires, Plain, Pos. * Middle Size 3½" x 6½"

Lateral play between driving boxes and wheel hubs 3/16" total

Driving Boxes Steeled Cast Iron

Journals, Diam. 9" Length 11"

Springs. Make B. L. W.

Front Engine Truck None Wheels ---

To swing --- each side of cent. Cent. per liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cent. diam. --- Size ---

Tires held by ---

Back Engine Truck None Wheels ---

To swing --- each side of cent. Cent. per liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cent. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels

Operating Engine, sch. No. 6 ET Westg. combined auto. and

Parts Eng. Tr'k, sch. --- straight air

* Foundation Drivers, sch. M-2 American O. S. Equalized

Parts Eng. Tr'k, sch. ---

Air pump One 9½" Pos. Left Side

Train connections Front and back

Train signal line None

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1551

Weight, with fuel and water, about 105,000 pounds.

Tender to be weighed: Yes

Tank 5,000 Gallons, Bill 3887

Tank "U" shape, sloping back. Fuel capacity, 8 tons.

Tool Boxes Hard wood, top.

Spring buffer between engine and tender.

Frame Steel, 8" and 10" channel, with bumpers of wood and steel plate.

Front Drawbar height 28½"

Pilot None Pushing shoes at rear

Back drawhead, center above rail 33½"

Coupler M. C. B. Automatic

Steps hand holds, etc. to conform to I. C. C. requirements.

Steps across rear with hand rail. Steps on sloping back of tank.

Trucks Arch bar type with cast steel bolsters.

Both trucks to have side bearings.

Springs Elliptic, B. L. W.

Journals Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.

Tires None Cent. diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6 ET Westg. automatic and straight air, with 12"x12" tender cylinder.

List of tools, sch. 29

Photo sch. None Inspection B. L. W. except (see page 1 & Sup 1 etc.)

To be weighed No Material specs. B. L. W. except (See Sup 4)

Certificate of boiler test Three copies of B. L. W. form 1036

Junior laws to 5.22.20 Shipment On own wheels.

Brass shop finish, No. 1

Machine shop finish D-165

* 6 36 D 321 - Present owner - Semet Solvay Co. reports that all drivers have flanged tires. Brake shoes for plain tires furn. on Ex. Ord. 5817-36 were replaced on Ex. Ord 6160. 1936. (HF 4/6/44)

B. L. W. Patents Feed Water Strainer, patented, Sept. 1, 1903 (Cast On)

Property plates None

Lettering etc. to be in Gold Leaf Bronze, as Ry. Co's sketch herewith, Striping to be ½" wide.

Painting, style 291, Black and Gold.

Road Number to be in 8" figures on sides of cab and in 16" figures on sides and back of tank.

Mark on tank sides: BAYWAY REFINERY in 8" letters

Road number on sides of tank to be under centre of mark.

Front number plate to have 8" figure.

Road Nos. Pos. Road Nos. Name None

F. No. Plate 8

Cab Sides

Sides of tank

Back of tank

Actual Dimensions of Loco. Extreme height over all 15'0"

Extreme Width Cab boards 10'3½" Cylinders ~~valve motion~~ 10'1"

Length outside face front bumper of engine to face of tender wedge 29'8⅛"

Length face of tender wedge to outside face back bumper of tender 25'1⅝"

Total length outside face front bumper of engine to outside face back bumper of tender 54' 9⅛"

SPECIFICATION FOR LOCOMOTIVES 6 36 D 321

FOR STANDARD OIL COMPANY OF NEW JERSEY
P BAYWAY REFINERY

271 272

1 BOILER TO BE OPERATED IN THE STATE OF NEW JERSEY
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND -ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL / MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
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BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLE:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	⅜"	7/16"	⅞"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I. E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6858.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG: ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ⅛" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN 2". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(S)	NEW JERSEY (State in which boiler is to be used)
	No. 3 (Manufacturer's State Standard number)
	THE BALDWIN LOCOMOTIVE WORKS (Name of manufacturer)
(Manufacturer's Serial Number)	(LEAVE BLANK) (State number) / (LEAVE BLANK) (Year put in service)
	200 LBS. (Maximum working pressure when built)

C-6631

THE BALDWIN LOCOMOTIVE WORKS As Spec'n ~~20075~~, Dup. 10 30 D 645 same extras except where otherwise specified

Memorandum Spec'n 20075

SPECIFICATION FOR LOCOMOTIVES 10 30 D 673

FOR Sugarland Railway Company ~~South Georgia Railway~~

HW

Gen. as Photo. 3252

3.23.20 **Engine Drawing No. 96**

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 11' 4" Driving 11' 4" Total 22' 2"

Total wheelbase, eng. and tend. {Actual 49' 0½" / Limited to ---

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 126,000 pounds

On F. tr'k 28,000 lbs., Drivers 98,000 lbs. B. tr'k --- lbs.

Tractive power 23,200 lbs. Ratio of adhesion 4.2

Work'g St'm Pres. 185 lbs., Service Freight

11 **Fuel** ~~Soft Coal~~ Oil, with specific gravity of 12.

Boiler Steel Thick ⅜ & 11/16" Bill 8881

Front Tube Sheet ½" Thick

Boiler, Diam. 58" Plan Extended Wagon Top

{Allowable st'm pres. 200 lbs. / With Factor of Safety of 5.} **Tested to** {220 lbs. steam pres. / 267 lbs. water pres.}

Longitud. seams butt jointed, double covering strips.

Auxiliary dome for interior inspection.

Dome, diam. 29" Pos. Forward of Fire Box.

Firebox Steel Combustion chamb. None

Firebox, length 95 15/16" Width 42" Depth F. 62⅞" B. 61¼"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

2 Firedoor opening 16" diam.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

3 Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O.S.

Radial stays 1" diam. Sling stays front {Two Rows B. L. W. Expansion Stays.}

Button heads below crown on eight central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues ---

Tubes #11 W. G. Seamless Steel

Tube ends Swaged for copper ferrules, fire box ends.

Number 230 Diam. 2" Length 13'1"

Heating Surface {Flues --- Combus. Chamb. --- Total 1709⁰ / Tubes 1566⁰ Fire Box 143⁰ Fire Brick Tubes ---} Grate area 28⁰ Ratio to Heating Surface 1: 61 Superheater ---

Fire Brick Arch ~~None~~ ~~American Arch Co's section fire brick on studs.~~ Fire box lined with fire brick for oil burning.

12 Fire brick pavement in pan.

13 **Grates** ~~(See Sup. 14)~~ None

Ash Pan, Dampers Front ~~and Back~~ only

~~Ash Pan of steel plate, self dumping type.~~

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater None

Smokebox extension With Cleaning hole and cap L. S. Only

Spark ejector or hopper ~~With~~ None

Netting and deflect. plates ~~With~~ None

~~Front and arrangement to be Atlantic Coast Line Stds.~~

Exhaust nozzles Single ~~Iron~~ Low

Cleaning pipe, with.

Stack Straight Dia. 18"

(Not Spec) **Safety Valves** Two Star 3" One Muffled

Safety valves None with relief lever, Set to {182 lbs. Muffled / 188 lbs. Open}

Whistle One B. L. W. Chime

Steam Gauge One Iron 6½" Maker: Star

Steam gauge stand Iron **Clock** None

~~Water Gauge to be A. C. L. standard as print 503-A~~

Water Gauge (not spec) One ~~Nathan~~ B.L.W. Ironclad **Cab Lamp** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve to have separate dry pipe to ~~me~~

Blower Valve B. L. W.

Blow off Cock Everlasting One ~~B. L. W. Standard~~ Pos:- ~~Front~~

Cleaning Plugs

Firebox, Corners, back ones diagonal and bar

Crown, Two each side and two back

Waist, One under front

Front tube sheet, Two Fusible plug None

Pump None

(Not Spec) **Injectors** Two Sellers, Class "M" {One No. 9½ / One No. 8½}

Injectors, Pos. (See Sup. 5) Steam pipes Copper

7 Pipes, Check Iron Feed Iron Overflow Iron

Check Sellers Duplex Type Pos. Top (See Sup. 6)

Steam Heat None

Cab Steel Cab to have ventilator in roof.

Cab saddle to be securely braced to boiler

Cab boards Wood Nosing None

Running boards Wood Nosing None

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 26⅝"

Pilot Steel ~~Wood for hereafter~~ Pushing shoes None

Front Bumper Oak Bumper plate With

1 **Steps** hand holds, etc. to conform to I. C. C. requirements.

Front Drawhead, Center above rail 34½"

Coupler Sharon M. C. B. Auto.

Uncoupling arrangement, Atlantic Coast Line Standard

Signal fixtures Iron on bumper

8 **Headlight** One Round Case 18" Reflector,

Headlight, Nos. on sides With H'd'l't step With

Lamp shelf None Nosing ---

Bell 92 pounds

Sand Box (not spec) One Diam. 28" Body Iron Painted Pipes Iron

Sander Leach, Air Double, Trap A-10

Dome casing Iron Painted

Boiler Jacket #22 Soft Steel Ptd. Bands Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

W. Bolton. June 1920

SPECIFICATION FOR LOCOMOTIVES 10 30 D 673

FOR Sugarland Railway Co. ~~South Georgia Railway~~

HW

274

273

Frames Cast Steel

Cylinders, Diam. 18" Stroke 26"

Stm ports, Length 15" Width 1½" Bridges 1"

Exh. ports, Length 16" Width 2½" Valve head 1¾"

Valve travel 5" Steam lap ¾" Exhaust clearance ---

Eccentric crank throw 11½" By-pass valve None

(not spec) S. F. Lubr. Detroit Triple No. 22 Bull's Eye

Cyl'r heads Cast Iron Lubr. pipes of iron, under jacket.

Cyl'r casings Iron Painted Head covers Steel Painted

St'm chest casings Iron Painted Covers Steel Painted

St'm chest valves Richardson balanced, with vacuum valves

(not spec) Metallic pkg. Piston rods, valve stems United States, King Type.

Piston rods bolted to crossheads with nut and cotter

Pistons heads of cast iron with rings of cast iron sprung in

Guides Steel Oil cups B. L. W. Needle

Crossheads Alligator type, Cast Steel (See sup. 9)

Wrist Pins Steel Rod cups (See sup 10)

Parallel rods to have solid ends.

Main rods, I Section, side rods rectangular section.

Valve Motion Walschaerts.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be {well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings Damascus Bronze

Driving wheel hub liners, Bronze

Drivers, O. S. Diam. 57" Cen. diam. 49½" centres cast iron.

Tires Steel Held by Shrinkage and Shoulder

Tires, Flanged, Pos. All Size 3¾" x 5½"

Tires, Plain, Pos. None Size ---

Lateral play between driving boxes and wheel hubs = 3/8" total

Driving Boxes Cast Steel

Journals, Diam. 8¼" Length 8½"

Springs. Make B. L. W.

Front Engine Truck Four Wheeled Swing bolster, centre bearing

To swing 3" each side of cen., Cen. pin liners None

Journals, Diam. 5" Length 10" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 28" Tread 4½" Kind Chilled Cast Iron Spoke

Tires None Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck None Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels

Operating Parts {Engine, sch. No. 6 ET Westg. combined auto. and / Eng. Tr'k, sch. --- straight air.}

Foundation Parts {Drivers, sch. WM-1 American O. S. Equalized / Eng. Tr'k, sch. ---}

Air pump Two 9½" Pos. L. S.

Train connections Front and Back

Train signal, sch. "L"

Air pump exhaust to be piped into cylinder saddle.

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1545

Weight, with fuel and water, about ~~100,000 lbs.~~ 109,500 pounds

Tender to be weighed: Yes

Tank ~~5,000~~ Oil 2400 Gallons, Bill 5368

Water 5000 5291

Tank "U" shape straight top, not over 5'10" high.

~~Fuel capacity 10 tons~~

Tool Boxes Hard wood, top.

~~Syphon connection to left side of tank.~~

Frame Steel 12" channels with front bumper of wood reinforced with channel and rear bumper of steel plate.

Front Drawbar height 30½"

Pilot None Pushing shoes None

Back drawbar, center above rail 34½"

Coupler Sharon M. C. B. Auto.

Uncoupling arrangement, Atlantic Coast Line Standard.

Steps hand holds, etc. to conform to I. C. C. requirements.

Ladder applied to back of tank.

Trucks Arch bar type, with cast steel bolsters.

Springs Elliptic, B. L. W.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind Chilled Cast Iron Plate

Tires None Cen. diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6 ET Westg. automatic and straight air, with 12" x 12" tender cylinder.

List of tools, sch. ~~29~~ 31

Photo sch. No. 2 Inspection B. L. W.

To be weighed No Material spec'ns B. L. W

Certificate of boiler test Three copies of B. L. W. form 1036

Junior laws to 4-1-20 Shipment On own wheels

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W.

Patents Feed Water Strainer, Patented Sept. 1, 1903 (cast on)

Property plates ~~B. L. W., for engine and tender~~ None

Painting, style 291, Olive Green and Aluminum

~~Mark in aluminum letters 7" high, 7" wide.~~

~~Mark on tank sides: South Georgia~~

13 Mark on tank sides, Sugarland Railway

Mark on back of tank just above center: S. L. Ry.

13 Road Nos. Pos. Road Nos. Name None

F. No. Plate ~~1015~~

Sand Box 9

Cab Panel

~~Back of tank~~

Actual Dimensions of Loco. Extreme height over all 14' 3½"

Extreme Width: Cab boards 9' 11" Cylinders ~~or valve motion~~ 9' 11"

Length outside face front bumper of engine to face of tender wedge 31' 9½"

Length face of tender wedge to outside face back bumper of tender 22' 1"

Total length outside face front bumper of engine to outside face back bumper of tender 53' 10½"

SPECIFICATION FOR LOCOMOTIVES- 10 30 D 673
FOR SUGARLAND RAILWAY CO.
~~SOUTH GEORGIA RAILWAY~~
NW

275
274

1 LOCO. TO CONFORM TO ALL I.C.C. REQUIREMENTS.

2 ~~FIRE DOOR TO BE FRANKLIN AUTOMATIC.~~

3 FLEXIBLE STAYS, TATE IN BREAKING ZONE, 347 IN NUMBER.

4 ~~GRATES TO BE ATLANTIC COAST LINE STANDARD TO SUIT WIDTH OF FIRE BOX.~~

5 INJECTORS No. 9½ ON R. S. AND No. 8½ ON L. S.

6 INJECTOR CHECK TO BE LOCATED FRONT OF SAND BOX.

7 ~~ONE SELLERS EJECTOR No. 9, STYLE "R" UNDER CAB BOARD ON LEFT SIDE, WITH PIPE CONNECTION TO TANK AND WITH 20 FEET OF 1¼" FOUR-PLY PLAIN SUCTION HOSE.~~

8 HEADLIGHT EQUIPMENT TO BE PYLE-NATIONAL ELECTRIC, TYPE ~~"K-1"~~ "K-2" WITH TURBINE GENERATOR AND INCANDESCENT EQUIPMENT. HEADLIGHT GENERATOR TO BE LOCATED NEXT TO CAB, IF POSSIBLE, TO DO SO WITHOUT INTERFERING WITH AUXILIARY DOME AS SHOWN BY PHOTO. 5872, 10 32 D 1159.

9 CROSSHEAD WITH REMOVABLE SHOES, BABBITT LINED. CROSSHEAD GIBS TO HAVE FOUR BOLTS SAME AS FOR Co's LOCO. No. 103, B. L. W. CLASS 10 30 D 557.

10 RODS TO HAVE PLUNGER FEED OIL CUPS, FORGED ON RODS.

11 OIL BURNING ARRANGEMENT, B. L. W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

12 FIRING VALVE TO BE BETTER FITTED THAN FOR 10 28 D 142, 143.

13 THE NUMBER ON SIDES OF CAB TO BE AS LARGE AS CAN BE USED TO LOOK WELL.
MARK ON TANK SIDES TO BE IN 8" OR 10" LETTERS, WHICHEVER IS THE BETTER FOR SIZE OF TANK.

THE BALDWIN LOCOMOTIVE WORKS As Specn. 6-7046.

Memorandum Specn 21007

SPECIFICATION FOR LOCOMOTIVES 6 36 D 347.

FOR (MEX.) TEXAS MEXICAN RAILWAY COMPANY, THE.

HNB.

Gen. as Photo. 7391. (Except to have 9½" air pump, Walschaerts valve motion, alligator crosshead, and sloping back tender.

Engine Drawing No. 44.

2-24-21.

Gauge of Road 4' 8½" Play ¾", EXCEPT (SEE SUP. 8)
Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"
Total wheelbase, eng. and tend. {Actual 41' 7" / Limited to ---

Curves 6 DEGREES.

Limits, Height --- Width ---
Weight (approximate) in working order, Total 142,000 POUNDS.
On F. tr'k --- lbs., Drivers 142,000 lbs., B. tr'k --- lbs.

Tractive power 34,400 lbs., Ratio of adhesion 4.13
Work'g St'm Pres. 180 lbs., Service SWITCHING.
Fuel MEXICAN OIL, WITH 11 TO 12 GRAVITY.

Boiler STEEL. Thick 1 1/16" Bill 9367
Front Tube Sheet ½" Thick
Boiler, Diam. 68" Plan STRAIGHT TOP.
{Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.25} **Tested to** {200 / 240} lbs. steam pres. / lbs. water pres.
Longitud. seams BOTT JOINTED, DOUBLE COVERING STRIPS.

Dome, diam. 29" Pos. CENTRAL.

Firebox STEEL. Combustion chamb. NONE.
Firebox, length 97¾" Width 40" Depth F. B.
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.
Water space, Front 4½" Sides 3½" Back 3½"
Water space frame DOUBLE Riveted
Water space stays ⅜" DIAM. WITH 3/16" HOLES 1¼" DEEOM FROM O.S.
Radial stays 1" DIAM. Sling stays front {TWO ROWS B. L. W. EXPANSION STAYBU}
Button heads below crown on EIGHT central rows
Crown bars NONE. Placed --- above crown
Crown bolts ---

Flues #2 B. W. G. STEEL. (To use stock)
Tubes #11 B.W.G. CHARCOAL IRON ~~OR STEEL, (B.L.W. OPTION)~~.
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number {22 / 144} Diam. {5½" / 2"} Length 10' 5"

Heating {Flues 327 / Tubes 779 / Grate area 27.1 / Superheater 255} Combus. Chamb. --- Total 1255
Fire Box 149 Fire Brick Tubes ---
Ratio to Heating Surface 1: 46.3

Fire Brick ARCH, NONE.
FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.
FIRE BRICK PAVEMENT IN PAN.
Grates NONE.
Ash Pan, Dampers FRONT ONLY.

THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.
Throttle BALANCE. Pos. DOME.
Dry pipe STEEL.

Superheater SCHMIDT TYPE. (SEE SUP. 2 ETC)

Smokebox extonstion WITH. Cleaning hole and cap NONE.
Spark ejector or hopper NONE.
~~SUPERHEATER~~ Arching and deflect. plates WITH.

Exhaust nozzles DOUBLE, LOW.
CLEANING PIPES: WITH.
Stack STRAIGHT. Dia. 18"

Safety Valves (Not Spec.) TWO ASHTON 2½" OPEN.
Safety valves NONE with relief lever, Set to 180 POUNDS.
Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: ASHTON.
Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC.
Gauge Cocks THREE BACK. Surface valve NONE
Lowest gauge cock 1½" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock ONE B. L. W. POS: FRONT.
Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.
Firebox, CORNERS DIAGONAL, SIDES AND BACK.
Crown, THREE EACH SIDE AND THREE BACK.
Waist, ONE UNDER FRONT.
Front tube sheet, ONE. Fusible plug ONE.

Pump NONE.

Injectors TWO MONITOR, SCREW TYPE. (Spec) No. 9
Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.
Pipes, Check IRON. Feed IRON. Overflow IRON.
Check B. L. W. Pos. R. AND L.

Steam Heat NONE.

Cab WOOD.

Cab boards WOOD. Nosing NONE.
Running boards WOOD. Nosing NONE.
Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 31½"
SPRING BUFFER BETWEEN ENGINE AND TENDER.

Pilot NONE.
Front Bumper OAK. Bumper plate WITH.
Steps ACROSS FRONT OF ENGINE, WITH HAND RAILS.
STEPS, HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.
Front Drawhead, Center above rail 33½"
Coupler M. C. B. AUTOMATIC.

Signal fixtures IRON ON BUMPER.
HEADLIGHTS AND EQUIPMENT TO BE SUNBEAM ELECTRIC INCANDESCENT WITH TYPE RE-3 GENERATOR.
Headlight TWO ROUND CASE 18" Reflector,
Headlight, Nos. on sides WITH. H'd'l't step NONE.
Lamp shelf NONE. Nosing ---

Bell 92 POUNDS.
Sand Box TWO Diam. 28" Body IRON PAINTED. Pipes IRON.
Sander (Not Spec.) LEACH AIR, TRAP A-1 SINGLE, IN EACH BOX, TO SAND FRONT OF FRONT AND BACK OF BACK DRIVERS.
Dome casing IRON PAINTED, WITH PRESSED STEEL TOP AND BOTTOM RINGS

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON. Style 9
Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

C. Powell June 1921

SPECIFICATION FOR LOCOMOTIVES 6 36 D 347.

FOR HNB. TEXAS MEXICAN RAILWAY CO., THE.

Frames CAST STEEL.

Cylinders, Diam. 21" Stroke 26"
St'm ports, Length 23-3/16" Width 1¾" Bridges ---
Exh. ports, Length --- Width --- Valve lead 3/16"
Valve travel 5" Steam lap 1" Exhaust clearance ---
Eccentric crank throw 13⅜" By-pass valve NONE.
S. F. Lubr. DETROIT No. 42 FIVE FEED BULL'S EYE.
Cyl'r heads CAST IRON. LUBR. PIPES OF IRON UNDER JACKET.
Cyl'r casings IRON PAINTED. Head covers STEEL PAINTED.
St'm chest castings --- Covers ---
St'm chest valves 10" DIAM. PISTON TYPE.
Met. pkg. (Not Spec.) PISTON RODS & VALVE STEMS UNITED STATES, KING TYPE.
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN.
Guides ALLIGATOR, TYPE, STEEL. Oil cups NEEDLE.
Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.
Wrist Pins STEEL. Rod cups PLUNGER, FORGED ON.
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS.
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners BRONZE.
Drivers, O. S. Diam. 51" Cen. dia. 45". CENTERS CAST STEEL.
DRIVING TIRES TO BE STANDARD STEEL WORKS MAKE.
Tires STEEL. Held by SHRINKAGE AND SHOULDER.
Tires, Flanged, Pos. FRONT AND BACK. Size 3" x 5½"
Tires, Plain, Pos. MIDDLE. Size 3" x 6½"
Lateral play between driving boxes and wheel hubs = (SEE SUP. 9)
Driving Boxes CAST STEEL, WITH GREASE CELLERS.
Journals, Diam. 9" Length 11"

Springs. Make B. L. W.

Front Engine Truck NONE. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck NONE. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating Parts: Engine, sch. No. 6 ET. WESTG. COMBINED AUTO. AND STRAIGHT AIR.
Foundation Parts: Drivers, sch. BH-2, AMERICAN O. S. EQUALIZED. / Eng. Tr'k, sch. ---
Air pump ONE 9½" Pos. LEFT SIDE.
Train connections FRONT AND BACK.
Train signal, sch. NONE. AIR BRAKE TO HAVE ASHTON GAUGES.
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1660 (TENDER TO BE WEIGHED) YES.
Weight, with fuel and water, about 86,550 POUNDS.
Tank {OIL, 1,500 5637 / WATER, 4,000 Gallons, Bill 5631}
TANK "U" SHAPE, SLOPING BACK.

Tool Boxes STEEL, TOP.

Frame 8" AND 10" STEEL CHANNELS WITH BUMPERS OF WOOD REINFORCED WITH STEEL PLATE. (SPRING BUFFER TO BE APPLIED BETWEEN ENGINE AND TENDER.)
Front Drawbar height 30½"
Pilot NONE.
Back drawhead, center above rail 33½"
Coupler M. C. B. AUTOMATIC.
STEPS ACROSS REAR OF TENDER WITH HAND RAILS, ALSO STEPS AND HAND RAILS ON SLOPING BACK OF TANK.
Steps, HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks ARCH BAR TYPE, WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, MAKE: B. L. W.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 33" Tread 4½" Kind CHILLED CAST IRON PLATE.
Tires NONE. Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE.

Brake Position ON ALL WHEELS.
Brake sch. No. 6 ET. WESTINGHOUSE AUTO. AND STRAIGHT AIR, WITH 10" x 12" TENDER BRAKE CYLINDER.

List of tools, sch. #160
Photo sch. No. 2. Inspection B. L. W.
To be weighed YES. Material spec'ns B. L. W.
Certificate of boiler test (THREE COPIES B.L.W. FORM 1086, AND TWO COPIES B.L.W. FORM 191.
Junior laws to 3-1-21 Shipment ON OWN WHEELS.

Brass shop finish, No. 1
Machine shop finish D-165.

B. L. W. Patents: NONE.

Property plates B. L. W., FOR ENGINE AND TENDER.

Painting, style 29½, OLIVE GREEN AND ALUMINUM.

MARK ON TANK SIDES:- TEXAS - MEXICAN RY.
Mark on SIDES OF TANK TO BE AS LARGE AS POSSIBLE CONSISTENT WITH NEAT APPEARANCE, THE FIRST LETTERS OF EACH WORD BEING LARGER THAN THE OTHERS, SAME AS FOR 10 32 0 1295.
Road Nos. Pos. Road Nos. Name NONE.
F. No. PLATE. 21
CAB SIDES.
BACK OF TANK.

Actual Dimensions of Loco. Extreme height over all 14' 10"
Extreme Width: Cab boards 10' 1"; Cylinders or valve motion = 9' 11½"
Length outside face front bumper of engine to face of tender wedge = 29' 9"
Length face of tender wedge to outside face back bumper of tender = 23' 9"
Total length outside face front bumper of engine to outside face back bumper of tender = 53' 9"

SPECIFICATION FOR LOCOMOTIVES 6 36 D 347

FOR:- THE TEXAS MEXICAN RAILWAY

Specification for Type A Double Loop Superheater SPECN. #0-15879 DATED MARCH 9TH, 1921.

BOILER TUBES	144 in number 2 o. d 10 ft 5 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	22 in number 52 o. d #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18	Card 10731
BOILER FLUE SETTING	1/4 in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 8 rolls. Prosser to have at least 12 sections	Card 1137
TUBE SHEET LAYOUT		Card 3L-50795
UNITS	22 units 1½ o. d #9 SWG Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 1064-M
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls	ARM 3x8-2 Card 11375-C
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	Card 4L-11436-A
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card 1067A
PYROMETER	Model No. Pyrometer	Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 4L-40793
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 11311-M	**S. H. UNIT BOLT WASHER**	Card 1071
DAMPER CYL. ARM	Card 1074	**S. H. UNIT CLAMP**	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	**S. H. UNIT CLAMP WASHER**	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	**S. H. PIPE END**	Card 344
DAMPER CYCL. PIPE CONNECTION	Card 4L-11437	**S. H. PIPE BAND**	Card 1988
DAMPER CYL. PIPING DIAGRAM	Card 3L-11440	**SPACING OF BANDS & SUPPORTS**	Card 10759
DAMPER CYL. SUPPORT	Card	**TYPE OF RETURN BENDS**	FORGED
DAMPER SHAFT	Card 10928D RS 1235N LS	**RETURN BENDS**	Card 11022
DAMPER SHAFT ARM	Card 1234F RS 1074C LS	**LUBRICATOR CONNECTION**	Card 3023
DAMPER SHAFT BEARING (O. S.)	Card 2L-11484F RS 1148 LS	**DEFLECTING PLATE HANDLE**	Card 1487
DAMPER SHAFT BEARING (I.S.)	Card 10386F L. S. ONLY	**DEFLECTING PLATE STUDS**	Card 10809
DAMPER SHAFT LINK	Card 1070	**DEFLECTING PLATE CLAMP**	Card 10809-A
PATENT PLATE	Card 3367A		
DAMPER RIGGING	Card 3L-11509		

SPECIFICATION FOR LOCOMOTIVES 6 36 D 347.

FOR THE TEXAS MEXICAN RAILWAY CO.

HNW.

279

277

1 OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX.
FEED PIPE FROM OIL TANK TO BE 2" IN DIAMETER.
OLMSTEAD COIL HEATER IN OIL TANK AS TWO CUTS (HEREWITH), THIS HEATER TO BE MADE BY THE B. L. W.
ROYALTY, IF ANY, PAYABLE BY THE BALDWIN LOCOMOTIVE WORKS.
FOR FLEXIBLE PIPE CONNECTIONS BETWEEN ENGINE AND TENDER, SEE EXTRA ORDER 10444, 1921.

2 SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBER. ROYALTY PAYABLE BY THE B. L. W.

3 SUPERHEATER TO BE IN ACCORDANCE WITH THE LOCOMOTIVE SUPERHEATER COMPANY'S SPECIFICATION NO. 0-15879, DATED 3-9-21, (COPY ATTACHED).

4 PATENT PLATE (HEREWITH) FROM THE SUPERHEATER COMPANY COVERING SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO SUPERHEATER DAMPER CYLINDER.

5 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

6 LOCOMOTIVE TO OPERATE UNDER I. C. C. REQUIREMENTS.

7 CHICAGO FLANGE OILER ON FRONT DRIVERS.

8 FRONT AND BACK PAIRS OF DRIVING WHEELS TO BE SET 53" BETWEEN INSIDE OF TIRES, I.E., TRACK PLAY 15/16".

9 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEELS HUBS INCLUDING LATERAL PLAY IN DRIVING BOX PEDESTAL FITS, 7/32" TOTAL.

THE BALDWIN LOCOMOTIVE WORKS As Spec. C-8000

Memorandum Spec'n 23021.

SPECIFICATION FOR LOCOMOTIVES 6 36 D 356.

FOR THE TEXAS-MEXICAN RAILWAY COMPANY.

HHW.

Gen. as PHOTO. 7986.

Engine Drawing No. 44.

2-13-23.

Gauge of Road 4' 8½" Play ⅜", EXCEPT:-(SUP.19)
Wheelbase, Rigid 11' 0" Driving 11' 0" Total 11' 0"
Total wheelbase, eng. and tend. Actual 41' 7" / Limited to ---

Curves 6 DEGREES.

Limits, Height --- Width ---
Weight (approximate) in working order, Total 141,000 POUNDS.
On F. tr'k --- lbs. Drivers 141,000 lbs. B. tr'k ---- lbs.

Tractive power 34,400 lbs. Ratio of adhesion 4.1
Work'g St'm Pres. 180 lbs. Service SWITCHING.
1 Fuel OIL.

Boiler STEEL. Thick 1 1/16" Bill 9370.
Front Tube Sheet ½" Thick
Boiler, Diam. 68" Plan STRAIGHT TOP.
Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.25 — **Tested to** 200 lbs. steam pres. / 240 lbs. water pres.
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

5 **Dome,** diam. 29" Pos. CENTRAL.

Firebox STEEL. Combustion chamb. NONE.
6 Firebox, length 97¾" Width 40" Depth F. 65" B. 62"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" DIAM.
Water space, Front 4½" Sides 3½" Back 3½"
Water space frame DOUBLE Riveted
Water space stays ⅞" DIAM. WITH 3½" HOLES 1¼" DEEP FROM C.S.
7 Radial stays 1" DIAM. Sling stays front TWO ROWS B. L. W. / EXPANSION STAYS.
~~Button~~ Heads below crown on EIGHT central rows (SEE SUP.
Crown bars NONE. Plate --- above crown
Crown bolts ----

Flues No. 9 B. W. G. CHARCOAL IRON.
Tubes No. 11 B. W. G. CHARCOAL IRON.
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 22 / 144 Diam. 5⅛" / 2" Length 10' 5"

Heating Surface — Flues 3270 lbs. Combus. Chamb. --- Total 1255 lbs.
Tubes 779 lbs. Fire Box 149 lbs. Fire Brick Tubes ---
Grate area 27.1 Ratio to Heating Surface 1: 46.3
Superheater 255 lbs.

8 **Fire Brick** ARCH, NONE.

Grates NONE.
Ash Pan, Dampers FRONT ONLY.

9 **Throttle** BALANCE. Pos. DOME.
Dry pipe STEEL.

Superheater SCHMIDT TYPE, (SEE SUP. 10 TC)

Smokebox extension WITH. 12 Cleaning hole and cap NONE.
Spark ejector or hopper NONE.
~~Heating surface~~ SUPERHEATER deflector plates WITH.

Exhaust nozzles DOUBLE, LOW.
CLEANING PIPE, WITH.
Stack STRAIGHT. Dia. 18"

Safety Valves TWO ASHTON 2½" OPEN. (NOT SPEC.)
Safety valves NONE. with relief lever, Set to 180 POUNDS.
Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: ASHTON. (SPEC)
Steam gauge stem IRON. **Clock** NONE.

Water Gauge ONE B. L. W. IRONCLAD. **Cab Lamps** ELECTRIC.
Gauge Cocks THREE BACK. Surface valve NONE.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock ONE B. L. W. Pos: FRONT.
Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.
Firebox, CORNERS DIAGONAL, SIDES AND BACK.
Crown, THREE EACH SIDE AND THREE BACK.
Waist, ONE UNDER FRONT.
Front tube sheet. ONE. Fusible plug ONE.

Pump NONE.

Injectors TWO MONITOR, SCREW TYPE. (SPEC) No. 9.
Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.
Pipes, Check IRON. Feed IRON. Overflow IRON.
Check B. L. W. Pos. RIGHT AND LEFT.

Steam Heat NONE.

Cab STEEL.

CAB BOARDS TO BE COVERED WITH WOOD.
Cab boards STEEL. Nosing T-IRON.
Running boards STEEL. Nosing T-IRON.
Hand rail IRON. Located on BOILER.

13 **Back Bumper** BAR STEEL. Back drawbar height 31½"

Pilot NONE.
Front Bumper COMMONWEALTH CAST STEEL Bumper plate WITH
Steps ACROSS FRONT, WITH HAND RAILS.
STEPS, HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.
14 **Front Drawhead,** Center above rail 33½"
Coupler M. C. B. AUTOMATIC.

Signal fixtures IRON ON BUMPER.

15 **Headlight** TWO ROUND CASE 14" Reflector,
Headlight, Nos. on sides WITH. H'd'l't step NONE.
Lamp shelf NONE. Nosing ---

Bell 92 POUNDS.
Sand Box TWO Diam. 28" Body IRON PAINTED. Pipes IRON.
Sander (NOT SPEC) LEACH AIR, TRAP A-1 IN EACH BOX, TO SAND FRONT OF FRONT AND BACK OF BACK DRIVERS.
Dome casing STEEL PAINTED, WITH PRESSED STEEL TOP AND BOTTOM RINGS

Boiler Jacket #18 Soft STEEL PTD. Bands STEEL. Style 9.
Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS
H. K. HARWICK. July 1923

SPECIFICATION FOR LOCOMOTIVES 6 36 D 356.

FOR THE TEXAS-MEXICAN RAILWAY COMPANY.

HHW.

Frames CAST STEEL.

Cylinders, Diam. 21" Stroke 26"
St'm ports, Length 23-3/16" Width 1¾" Bridges ---
Exh. ports, Length --- Width --- Valve lead 3/16"
Valve travel 5" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 13⅜" By-pass valve NONE.
16 (SPEC) F. Lubr. NATHAN FIVE FEED BULL'S EYE.
Cyl'r heads CAST IRON. LUBR. PIPES OF IRON UNDER JACKET.
Cyl'r casings STEEL PAINTED. Head covers STEEL PAINTED.
St'm chest casings ---- Covers ----
St'm chest valves 10" DIAM., PISTON TYPE.
Met. pkg. (NOT SPEC) PISTON RODS PISTON RINGS VALVE RODS UNITED STATES, KING TYPE.

17 Pistons HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.
Guides ALLIGATOR TYPE, STEEL. Oil cups NEEDLE.
Crossheads CAST STEEL, WITH BEARINGS OF BRONZE.
18 **Wrist Pins** STEEL. Rod cups GREASE CUPS, FORGED ON.

Valve Motion WALSCHAERTS.
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboltsl) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings MAKE: B. L. W.
Driving wheel hub liners BRONZE.
19 **Drivers,** O. S. Diam. 51" Cen. diam. 45", CENTERS CAST STEEL.

Tires STANDARD STEEL. Held by SHRINKAGE AND SHOULDER.
20 Tires, Flanged, Pos. ALL. Size 3" x 5½"
Tires, Plain, Pos. NONE. Size ---
Lateral play between driving boxes and wheel hubs = (SEE SUP. 21)
Driving Boxes CAST STEEL, WITH GREASE CELLARS.
Journals, Diam. 9" Length 11"

Springs. Make B. L. W.

Front Engine Truck NONE. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck NONE. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating Parts — Engine, sch. No. 6 ET. WESTG. COMBINED AUTO. AND STRAIGHT AIR. / Eng. Tr'k, sch. ---
Foundation Parts — Drivers, sch. MM-2-BC, AMERICAN OUTSIDE EQUALIZED. / Eng. Tr'k, sch. ---
22 Air pump ONE 9½" Pos. LEFT SIDE.
Train connections FRONT AND BACK.
Train signal, sch. NONE.
AIR RESERVOIR TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1660. TENDER TO BE WEIGHED: YES.
Weight, with fuel and water, about 86,500 POUNDS.
1 Tank — OIL, 1500 5637 / WATER, 4000 Gallons, Bill 5631
4½ TANK "U" SHAPE, SLOPING BACK.

Tool Boxes STEEL, TOP.

Frame STEEL, 8" AND 10" CHANNELS WITH FRONT AND BACK BUMPERS OF WOOD REINFORCED WITH STEEL PLATE.
Front Drawbar height 30¾"
Pilot NONE.
Back drawhead, center above rail 33½"
Coupler M. C. B. AUTO., WITH MINER DRAFT GEAR, CLASS A-18-S.

STEPS, HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.
Steps ACROSS REAR, WITH HAND RAILS.
STEPS AND HAND RAILS ON SLOPING BACK OF TANK.
Trucks ARCH BAR TYPE WITH BOLSTERS OF CAST STEEL.
BACK TRUCKS TO HAVE SIDE BEARINGS.
Springs ELLIPTIC, MAKE: B. L. W.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 33" Tread 4½" Kind CHILLED CAST IRON PLATE.
Tires NONE. Cen. diam. --- Size ---
Tires held by. ---
Safety chains SINGLE.

Brake Position ON ALL WHEELS.
Brake sch. No. 6 ET. WESTG. AUTO. AND STRAIGHT AIR, WITH 10" x 12" TENDER BRAKE CYLINDER.

List of tools, sch. 160
Photo sch. No. 2. Inspection B. L. W.
To be weighed No. Material specns B. L. W.
Certificate of boiler inst (SEE SUP. 4)
Interlaws to 3-1-21. Shipment ON OWN WHEELS.

Brass shop finish, No. 1.
Machine shop finish D-165.

B. L. W.
Patents NONE.

Property plates B. L. W., FOR ENGINE AND TENDER.

25 **Painting,** style 291, OLIVE GREEN AND ALUMINUM.

25 LETTERING, ETC., TO BE SAME AS FOR 6 36 D 347.
Mark on TANK SIDES:- TEXAS - MEXICAN RY.

Road Nos. Pos. Road Nos. Name NONE.
F. NO. PLATE. 22
CAB SIDES.
BACK OF TANK.

Actual Dimensions of Loco. Extreme height over all 14' 10"
Extreme Width: Cab boards 10' 1"; Cylinders ~~over valve motion~~ 9' 11½"
Length outside face front bumper of engine to face of tender wedge 29' 1½"
Length face of tender wedge to outside face back bumper of tender 24' 7½"
Total length outside face front bumper of engine to outside face back bumper of tender 53' 9"

SPECIFICATION FOR LOCOMOTIVES:- 6 36 D 356.

FOR:- THE TEXAS - MEXICAN RAILWAY COMPANY.

HNW.

1 FUEL OIL GRAVITY SAME AS FOR 6 36 D 347, I.E., FUEL IS MEXICAN OIL, WITH GRAVITY OF 11 TO 12 DEGREES.

2 OIL BURNING ARRANGEMENT B. L. W. STANDARD WITH BURNER IN FRONT END OF FIRE BOX.
FEED PIPE FROM OIL TANK TO BE 2" DIAMETER.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

3 OIL BURNING DETAILS TO INCLUDE BARCO FLEXIBLE JOINTS FOR OIL AND STEAM CONNECTIONS BETWEEN ENGINE AND TENDER.

4 CERTIFICATE OF BOILER TEST:- THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

5 MAIN DOME, ONE-PIECE TYPE.
AUXILIARY DOME, NONE.

6 CROWN AND SIDES OF FIRE BOX IN ONE SHEET.

7 RADIAL STAYBOLTS IN CROWN SHEET TO HAVE TAPER TAP, TAPERING 2" IN 12".

8 FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.
FIRE BRICK PAVEMENT IN PAN.

9 THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.

10 SUPERHEATER AS THE SUPERHEATER CO'S SPECN NO. O-20919, DATED MARCH 12, 1923, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTION TO VALVE CHAMBER.
ROYALTY PAYABLE BY THE B. L. W.

11 PATENT PLATE FROM THE SUPERHEATER CO., COVERING THE SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO SUPERHEATER DAMPER CYLINDER.

12 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

13 SPRING BUFFER BETWEEN ENGINE AND TENDER.

14 FRONT DRAWHEAD TO HAVE LARGER POCKETS THAN FOR B. L. W. CLASS 6 36 D 347, ROAD NO. 21.

15 HEADLIGHTS TO BE PYLE CAST CABES NO. 20-C-125, WITH PYLE TYPE E-2 TURBO GENERATOR.

16 CYLINDER LUBRICATOR CONNECTIONS TO BE PIPED TO STEAM CHESTS, CYLINDERS AND AIR PUMP.

17 PISTON RODS TO BE KEYED TO CROSSHEADS.

18 PARALLEL RODS TO HAVE SOLID ENDS.

19 FRONT AND BACK PAIRS OF DRIVING WHEELS TO BE SET 53" BETWEEN INSIDE OF TIRES, I.E., TRACK PLAY 1".

20 FLANGE LUBRICATOR TO BE CHICAGO, TO FEED TO FRONT AND BACK DRIVERS.

21 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

22 AIR GAUGES TO BE ASHTON.
AIR BRAKE TO HAVE BARCO FLEXIBLE CONNECTIONS BETWEEN ENGINE AND TENDER.

25 PAINT TO BE IN ACCORDANCE WITH RY. CO'S SPECIFICATION RECEIVED IN CONNECTION WITH LOCO., B. L. W. CLASS 10 32 D 1301, I.E., FLAT COLORS WILL NOT STAND IN THIS HOT CLIMATE, NOR WILL WHITE LEAD PRIMERS. TEXAS-MEXICAN RY. SYSTEM IS ONE COAT OF CELOX LIQUID PRIMER, ROUGH STUFFED; THEN TWO COATS OF VALSPAR BLACK, LETTERED, THEN TWO COATS OF VALENTINES VALSPAR VARNISH.
PAINTING TO BE SAME AS FOR B. L. W. CLASS 6 36 D 347.

TENDER

41 OIL TANK TO HAVE TWO MANHOLES, ONE TO BE PLACED SAME AS FOR B. L. W. CLASS 6 36 D 347, ROAD NO. 21, AND THE OTHER TO BE AS SHOWN ON SKETCH GIVEN TO ENGDER HERMAN, IN CONNECTION WITH 10 32 D 1301.

283

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SPECIFICATION FOR LOCOMOTIVES:- 6 36 D 356.

FOR:- THE TEXAS-MEXICAN RAILWAY COMPANY.

Specification for Type A Double Loop Superheater..SPECN. No. 20919, DATED MARCH 12, 1923.

BOILER TUBES	..144...in number.....2"....o. d.....10.....ft.....5.....in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification ~~XXXXXX~~	
BOILER FLUES	..22.....in number.....5½"....o. d...#9 B.W.G.....of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification ~~XXXXXX~~.....Card	10731
BOILER FLUE SETTING	⅛ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections.....Card	1137
TUBE SHEET LAYOUT	.....Card	3L-10795.
UNITS	..22..units....12"....o. d.....#9 B.W.G. AM.....Pipes in accordance with the American Society for Testing Materials Specification ~~XXXXXX~~. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide.....Card	2L-10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints.....Card	1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A.....Card	1064-A.
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or shaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be right under water pressure of 250lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls.....Card	A H M 3x8-2 11375-C
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place.....Card	1323.
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units.....Card	SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing.....Card	4L-11436-A
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer.....Card	1067-A
PYROMETER	Model No.....Pyrometer.....Card	
PYROMETER ARRANGEMENT	Generally in accordance with.....Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration.....Card	
S. H. ARRANGEMENT	In accordance with.....Card	4L-10793-A
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 11311-A.	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYCL. PIPE CONNECTION	Card 1L-11437	S. H. PIPE BAND	Card 1988
DAMPER CYL. PIPING DIAGRAM	Card 3L-11440	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER ~~XXXXXXXX~~ SHAFT,	Card 10928-O, (RS)	TYPE OF RETURN BENDS	FORGED.
DAMPER SHAFT	Card 1235-A, (LS)	RETURN BENDS	Card 2L-11625
DAMPER SHAFT ARM	Card 1234F, RS; 1074, LS.	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O. S.)	Card 2L-11481-F, (RS)	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT BEARING ~~XX~~ (ee)	Card 2L-11575, (LS)	DEFLECTING PLATE STUDS	Card 10809
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE CLAMP	Card 10809-A.
PATENT PLATE	Card 3L-3367-A,		
DAMPER RIGGING CARD,	3L-11699-O.		

THE BALDWIN LOCOMOTIVE WORKS As Spec'n C-6151

Memorandum Spec'n 19084

SPECIFICATION FOR LOCOMOTIVES 10 32 D 1295

FOR THE TEXAS MEXICAN RAILWAY COMPANY.

RTL

12-3-19.

Gen. as PHOTO 6222 | EXCEPT TO HAVE ELECTRIC HEADLIGHT AND CHILLED PLATE ENGINE TRUCK WHEELS.

Engine Drawing No. 117

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 11' 4" Driving 11' 4" Total 21' 10"

Total wheelbase, eng. and tend. { Actual 51' 3½" / Limited to ---

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 137,500 POUNDS

On F. tr'k 32,000 lbs., Drivers 105,500 lbs., B. tr'k --- lbs.

Tractive power 25,600 lbs., Ratio of adhesion 4.1

Work'g St'm Pres. 180 lbs., Service PASSENGER

2 **Fuel** OIL WITH GRAVITY OF 14 TO 16 DEGREES.

1 **Boiler** STEEL Thick ⅜" & 11/16" Bill 8809

Front Tube Sheet ½" Thick

Boiler, Diam. 60" Plan EXTENDED WAGON TOP

{ Allowable st'm pres. 180 lbs. / With Factor of Safety of 4.9 } **Tested to** { 200 lbs. steam pres. / 240 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

HOME - ONE-PIECE TYPE.

3 **Dome,** diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL Combustion chamb. NONE

Firebox, length 96 3/16" Width 42¼" Depth F. 65 3/16" B. 63 3/16"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame DOUBLE Riveted

Water space stays ⅞" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front { TWO ROWS B.L.W. EXPANSION STAYS

Button heads below crown on EIGHT central rows

Crown bars NONE Placed --- above crown

Crown bolts ---

Flues #9 W. G. STEEL

Tubes #12 W. G. CHARCOAL IRON

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS

Number 21 / 188 Diam. 5⅜" / 2" Length 13' 6"

Heating Surface	Flues 3984	Combus. Chamb. ---	Total 1574
	Tubes 1040	Fire Box 135	Fire Brick Tubes ---
Grate area 28.3	Ratio to Heating Surface 1: 55.5		
Superheater 332			

Fire Brick ARCH - NONE

FIRE BOX LINED WITH FIRE BRICK FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

2 **Grates** NONE

Ash Pan, Dampers FRONT ONLY

THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater SCHMIDT TYPE (See Sup. 4)

Smokebox extension NONE 5 Cleaning hole and cap NONE

Spark ejector or hopper NONE

Netting and deflect. plates WITH

Exhaust nozzles SINGLE LOW

CLEANING PIPE - WITH

Stack STRAIGHT Dia. 21"

3 **Safety Valves** TWO COALE 3" OPEN (Not Spec)

Safety valves NONE with relief lever, Set to 180 POUNDS

3 **Whistle** ONE B. L. W. PLAIN

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (Not Spec)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. (IRONCLAD) **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE B.L.W. Pos.: FRONT

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR

Firebox, CORNERS, BACK ONES DIAGONAL, AND BACK

Crown, TWO EACH SIDE AND FOUR BACK

Waist, ONE UNDER FRONT

Front tube sheet, TWO Fusible plug ONE

Pump NONE

Injectors TWO NATHAN MONITOR (Spec) No. 8

Injectors, Pos. R. AND L. Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B. L. W. Pos. R. AND L.

Steam Heat NONE

Cab WOOD

Cab boards WOOD Nosing NONE

Running boards WOOD Nosing NONE

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 35⅞"

Pilot WOOD Pushing shoes NONE

Front Bumper OAK Bumper plate WITH

Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler M.C.B. AUTO.

Signal fixtures IRON ON BUMPER

6 **Headlight** ONE ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH H'dl't step WITH

Lamp shelf NONE Nosing ---

Bell 92 POUNDS

Sand Box ONE Diam. 31" Body IRON PAINTED Pipes IRON

Sander LEACH AIR TRAP A-1 (Not Spec)

Dome casing IRON PAINTED

Boiler Jacket #18 SOFT STEEL PTD Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

E. Steele March, 1920. 285

SPECIFICATION FOR LOCOMOTIVES 10 32 D 1295

FOR THE TEXAS MEXICAN RAILWAY COMPANY.

RTL

{ FURNISH TO RAILWAY COMPANY ONE COMPLETE SET OF BLUE PRINTS. 284

Frames CAST STEEL

Cylinders, Diam. 19" Stroke 26"

St'm ports, Length 20.84" Width 1⅜" Bridges ---

Exh. ports, Length --- Width --- Valve head 3/16"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ---

Eccentric crank throw 14" By-pass valve NONE

S. F. Lubr. DETROIT FIVE-FEED No. 42 BULL'S EYE (Not Spec)

Cyl'r heads CAST IRON LUBR. PIPES OF IRON UNDER JACKET

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED

St'm chest casings --- Covers ---

St'm chest valves 9½" DIAM. PISTON TYPE

Met. pkg. { PISTON RODS / VALVE STEMS } UNITED STATES, KING TYPE (Not Spec)

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST IRON WITH CAST IRON RINGS SPRUNG IN.

Guides ALLIGATOR TYPE, STEEL Oil cups NEEDLE

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL Rod cups MUNGER

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE

Drivers, O. S. Diam. 56" Cen. diam. 50" CENTERS CAST IRON

Tires STANDARD STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. ALL Size 3" x 5½"

Tires, Plain, Pos. NONE Size ---

Lateral play between driving boxes and wheel hubs = 3/16" TOTAL

Driving Boxes STEELED CAST IRON

Journals, Diam. 8" Length 10"

Springs. Make STANDARD STEEL WORKS

Front Engine Truck FOUR Wheeled SWING BOLSTER, CENTER BEARING

To swing 12" each side of cen., Cen. pin liners NONE

Journals, Diam. 5½" Length 10" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 30" Tread 4¼" Kind CHILLED CAST IRON PLATE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck NONE Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Parts { Engine, sch. No. 6-ET Westg. COMBINED AUTO. AND STRAIGHT AIR / Eng. Tr'k, sch. ---

Foundation Parts { Drivers, sch. WI-2 AMERICAN O.S. EQUALIZED / Eng. Tr'k, sch. ---

Air pump ONE 9½" Pos. LEFT SIDE

Train connections FRONT AND BACK

Train signal, sch. "L"

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1478 { TENDER TO BE WEIGHED - YES

Weight, with fuel and water, about 109,000 POUNDS

Tank { OIL 2000 5129 / WATER 5000 Gallons, Bill 5125

TANK "U" SHAPE, STRAIGHT TOP.

Tool Boxes HARD WOOD, TOP

Frame STEEL 8" AND 10" CHANNELS WITH BUMPERS OF WOOD AND STEEL PLATE.

Front Drawbar height 31⅞"

Pilot NONE Pushing shoes NONE

Back drawhead, center above rail 33½"

Coupler M.C.B. AUTO.

Steps AND HAND HOLDS, TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC - STANDARD STEEL WORKS

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4¼" Kind CHILLED CAST IRON PLATE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake Position ON ALL WHEELS

Brake sch. No. 6-ET Westg. AUTO. AND STRAIGHT AIR, WITH 12" x 12" CYLINDER.

List of tools, sch 31

Photo sch. No. 2 Inspection B. L. W.

To be weighed YES Material spec'ns B. L. W.

Certificate of boiler test DUPLICATE

Junior laws to 12-20-19 Shipment ON OWN WHEELS

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents { FEED WATER STRAINER, PAT'D SEPT. 1, 1903 (CAST ON)

Property plates B. L. W. FOR ENGINE AND TENDER

Painting, style 291 OLIVE GREEN AND ALUMINUM

1/ Mark on TANK SIDES, TEXAS-MEXICAN RYS

Road Nos. Pos.	Road Nos.	Name NONE
FRONT NO. PLATE	1	
CAB SIDES		
BACK OF TANK		

Actual Dimensions of Loco. Extreme height over all 14' 6"

Extreme Width: Cab boards 10' 3"; Cylinders at valve motion 9' 5"

Length outside face front bumper of engine to face of tender wedge = 32' 9"

Length face of tender wedge to outside face back bumper of tender = 23' 11"

Total length outside face front bumper of engine to outside face back bumper of tender = 56' 8"

SPECIFICATION FOR LOCOMOTIVES 10 32 D 1295

FOR THE TEXAS MEXICAN RAILWAY COMPANY.

RTL

1 LOCO. TO BE OPERATED IN TEXAS, I. E., BOILER TO CONFORM TO ALL THE I. C. C. REQUIREMENTS.

2 OIL BURNING ARRANGEMENT, B. L. W. STANDARD, WITH BURNER IN FRONT OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

3 AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

4 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO.'S SPECIFICATION No. O-12533, DATED 12-13-19 (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. W.

5 ADDITIONAL HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

6 HEADLIGHT EQUIPMENT TO BE SCHROEDER ELECTRIC, (Not Spec) WITH INCANDESCENT HEADLIGHT.

7 MARK ON SIDES OF TANK TO BE AS LARGE AS POSSIBLE CONSISTENT WITH NEAT APPEARANCE, THE FIRST LETTERS OF EACH WORD BEING LARGER THAN THE OTHERS.

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SPECIFICATIONS FOR LOCOMOTIVES 10 32 D 1295

FOR THE TEXAS MEXICAN RAILWAY COMPANY

Specification for Type A Double Loop Superheater....O-12533, DEC. 13, 1919.

BOILER TUBES	118 in number 2 o. d. 13 ft. 6 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	21 in number 5-3/8 o. d. #9 BWG of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 Card 1409-M
BOILER FLUE SETTING	1/2 in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and prosseted except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections Card
TUBE SHEET LAYOUT	Card
UNITS	21 units 1-1/2 d. #9 BWG Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide Card 10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on Card 10k3
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A Card 10695
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card 10893
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with Card SEE ARRGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 1119-H
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer Card 1067
S. H. ARRANGEMENT	Card 1901-A
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 10916	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. PIPE BAND	Card 1988
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1068	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O.S.)	Card 1148	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 1075-H	DEFLECTING PLATE HANDLE	Card 1187
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A
PYROMETER	None		

THE BALDWIN LOCOMOTIVE WORKS {ENGINE TO BE DUPLICATE OF 10 32 D 1295, / TENDER TO BE DUPLICATE OF 10 34 D 1141, &c.

Memorandum Spec'n 22068.

SPECIFICATION FOR LOCOMOTIVES 10 32 D 1301. Gen. as PHOTO. 7410.

FOR THE TEXAS MEXICAN RAILWAY COMPANY. **Engine Drawing No.** 117.

HNW.

7-26-22. (NOT SPEC)

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 11' 4" Driving 11' 4" Total 21' 10"

Total wheelbase, eng. and tend., {Actual 51' 6½" / Limited to ----

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 139,500 POUNDS.

On F. tr'k 32,500 lbs., Drivers 107,000 lbs., B. tr'k ---- lbs.

Tractive power 25,600 lbs., Ratio of adhesion 4.17

Work'g St'm Pres. 180 lbs., Service PASSENGER.

Fuel OIL, (SEE SUP. 3)

Boiler STEEL. Thick ⅜" & 11/16" Bill 9638.

Front Tube Sheet ½" Thick

Boiler, Diam. 60" Plan EXTENDED WAGON TOP.

{Allowable st'm pres. 180 lbs. / With Factor of Safety of 4.9} **Tested to** {200 lbs. steam pres. / 240 lbs. water pres.

Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

DOME, ONE-PIECE TYPE.

Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL. Combustion chamb. NONE.

Firebox, length 96-3/16" Width 42¼" Depth F. 65-3/16" B. 63-3/16"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame DOUBLE Riveted

Water space stays ⅞" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front {TWO ROWS B. L. W. / EXPANSION STAYS.

Button heads below crown on EIGHT central rows

Crown bars NONE. Placed ---- above crown

Crown bolts ----

Flues No. 9 B. W. G. CHARCOAL IRON.

Tubes No. 11 B. W. G. CHARCOAL IRON.

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number {21 / 148} Diam. {5⅜" / 2"} Length 13' 6"

Heating Surface {Flues 396 sq. ft. / Tubes 1040 sq. ft.} Combus. Chamb. --- Total 1574 sq. ft. / Fire Box 138 sq. ft. Fire Brick Tubes ---

Grate area 28.3 sq. ft. Ratio to Heating Surface 1: 55.5

Superheater 332 sq. ft.

Fire Brick ARCH, NONE.

FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

Grates NONE.

Ash Pan, Dampers FRONT ONLY.

THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.

Throttle BALANCE. Pos. DOME.

Dry pipe STEEL.

Superheater SCHMIDT TYPE. (SEE SUP. 6 ETC)

Smokebox extension NONE. Cleaning hole and cap NONE.

Spark ejector or hopper NONE.

Netting and deflect. plates WITH.

Exhaust nozzles SINGLE, LOW.

CLEANING PIPE, WITH.

Stack STRAIGHT. Dia 21"

Safety Valves TWO COALE 3" OPEN. (NOT SPEC)

Safety valves NONE. with relief lever, Set to 180 POUNDS.

Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: ASHCROFT. (NOT SPEC)

Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC.

Gauge Cocks THREE BACK. Surface valve NONE.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE B. L. W. POS: FRONT.

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS, BACK ONES DIAGONAL, AND BACK.

Crown, TWO EACH SIDE AND FOUR BACK.

Waist, ONE UNDER FRONT.

Front tube sheet, TWO Fusible plug ONE.

Pump NONE.

Injectors TWO MONITOR. (SPEC) No. 8

Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.

Pipes, Check IRON. Feed IRON. Overflow IRON.

Check B. L. W. Pos. RIGHT AND LEFT.

Steam Heat NONE.

Cab STEEL.

CAB BOARDS TO BE COVERED WITH WOOD.

Cab boards STEEL. Nosing T-IRON.

Running boards STEEL. Nosing T-IRON.

Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 34"

Pilot WOOD.

Front Bumper CAST STEEL. Bumper plate WITH.

Steps HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. AUTO.

Signal fixtures IRON ON BUMPER.

Headlight ONE ROUND CASE 18" Reflector.

Headlight, Nos. on sides WITH. H'dl't step WITH.

Lamp shelf NONE. Nosing ---

Bell 92 POUNDS.

Sand Box ONE Diam. 31" Body IRON PAINTED. Pipes IRON. (NOT SPEC)

Sander LEACH AIR, TRAP A-1.

Dome casing IRON PAINTED.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON. Style 9.

Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

H.V.M. Neil. Oct 1922

SPECIFICATION FOR LOCOMOTIVES 10 32 D 1301.

FOR THE TEXAS MEXICAN RAILWAY COMPANY.

HNW.

Frames CAST STEEL.

Cylinders, Diam. 19" Stroke 26"

St'm ports, Length 20.8" Width 1⅜" Bridges ----

Exh. ports, Length ---- Width ---- Valve lead 3/16"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ----

Eccentric crank throw 14" By-pass valve NONE.

S. F. Lubr. NATHAN FIVE FEED BULL'S EYE. (SPEC)

Cyl'r heads CAST IRON. LUBR. PIPES OF IRON UNDER JACKET.

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED.

St'm chest casings ---- Covers ----

St'm chest valves 9½" DIAM., PISTON TYPE. (NOT SPEC)

Met. pkg. {PISTON RODS / VALVE STEMS} UNITED STATES, KING TYPE.

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN.

Guides ALLIGATOR TYPE, STEEL. Oil cups NEEDLE.

Crossheads CAST STEEL, WITH BEARINGS OF BRONZE.

Wrist Pins STEEL. Rod cups FOR GREASE.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS.

(Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE.

Drivers, O. S. Diam. 56" Cen. diam. 50", CENTERS CAST IRON.

Tires STANDARD STEEL. Held by SHRINKAGE AND SHOULDER.

Tires, Flanged, Pos. ALL. Size 3" x 5½"

Tires, Plain, Pos. NONE. Size ----

Lateral play between driving boxes and wheel hubs = (SEE SUP. 14)

Driving Boxes STEELED CAST IRON. (SEE SUP. 13)

Journals, Diam. 8" Length 10"

Springs. Make STANDARD STEEL WORKS.

Front Engine Truck FOUR Wheeled SWING BOLSTER, CENTER BEARING.

To swing 12" each side of cen., Cen. pin liners NONE.

Journals, Diam. 5½" Length 10" Boxes CAST IRON.

Wheel hub liners NONE.

Wheels, Diam. 30" Tread Kind CAST IRON PLATE CENTERS.

Tires STEEL. Cen. diam. 25" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE. Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating Parts {Engine, sch. No. 6 ET. WESTG. COMBINED AUTO. AND STRAIGHT AIR. / Eng. Tr'k, sch. ---}

Foundation Parts {Drivers, sch. WA-2 AMERICAN OUTSIDE EQUALIZED. / Eng. Tr'k, sch. ---}

Air pump ONE 9½" Pos. LEFT SIDE.

Train connections FRONT AND BACK.

Train signal, sch. "L"

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1739. {TENDER TO BE WEIGHED: YES.

Weight, with fuel and water, about 131,600 LBS.

Tank {OIL, 3,000 5636 / WATER, 6,000 Gallons, Bill 5632

TANK "U" SHAPE, STRAIGHT TOP.

Tool Boxes STEEL, TOP.

Frame STEEL, 12" CHANNELS, WITH BUMPERS OF WOOD AND 12" CHANNELS. SPRING BUFFER BETWEEN ENGINE AND TENDER.

Front Drawbar height 30⅞"

Pilot NONE.

Back drawhead, center above rail 33½"

Coupler M. C. B. AUTO. WITH MINER DRAFT GEAR.

Steps HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH BOLSTERS OF CAST STEEL.

BOTH TRUCKS TO HAVE SIDE BEARINGS.

Springs ELLIPTIC - STANDARD STEEL WORKS.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind CHILLED CAST IRON PLATE.

Tires NONE. Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE.

Brake Position ON ALL WHEELS.

Brake sch. No. 6 ET. WESTG. AUTO. AND STRAIGHT AIR, WITH 12" x 12" CYLINDER.

List of tools, sch. 160

Photo sch. No. 2. Inspection B. L. W.

To be weighed No. Material specns B. L. W.

Certificate of boiler test (SEE SUP. 2)

Junior laws to 8-4-22 Shipment ON OWN WHEELS.

Brass shop finish, No. 1.

Machine shop finish D-165.

B. L. W. {Patents NONE

Property plates B. L. W., FOR ENGINE AND TENDER.

Painting, style 291, OLIVE GREEN AND ALUMINUM.

MARKING TO BE SAME AS FOR 10 32 D 1295.

Mark on TANK SIDES:- TEXAS-MEXICAN RY.

Road Nos. Pos. Road Nos. Name NONE.

F. No. PLATE. 2

CAB SIDES.-

BACK OF TANK.-

Actual Dimensions of Loco. Extreme height over all 14' 6"

Extreme Width: Cab boards 10' 3"; Cylinders ~~over casings~~ 9' 5"

Length outside face front bumper of engine to face of tender wedge = 32' 10"

Length face of tender wedge to outside face back bumper of tender = 24' 4½"

Total length outside face front bumper of engine to outside face back bumper of tender = 57' 2½"

SPECIFICATION FOR LOCOMOTIVES:- 10 32 D 1301.

FOR:- THE TEXAS MEXICAN RAILWAY COMPANY.

Specification for Type A Double Loop Superheater SPECN. O-18904, DATED AUG. 17TH, 1922.

BOILER TUBES	148 in number 2 o. d. 13 ft. 6 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	21 in number 5½ o. d. #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18.	Card 1409-M
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossected except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections.	Card 1136
TUBE SHEET LAYOUT		Card 5871
UNITS	21 units 1½ o. d. #9 B. W. G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 1043
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 10695
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls.	A T 3 x 7 Card 10893.
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Pistons to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	Card 4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card 1067
PYROMETER	Model No. Pyrometer	Card
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 4901-A.
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 10916	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYCL. PIPE CONNECTION	Card 1L-11437	S. H. PIPE BAND	Card 1988
DAMPER CYL. PIPING DIAGRAM	Card 2L-11442	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED.
DAMPER SHAFT	Card 1068	RETURN BENDS	Card
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O. S.)	Card 1148	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT BEARING (I.S.)	Card 1275-H	DEFLECTING PLATE STUDS	Card 10809
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE CLAMP	Card 10809-A.
PATENT PLATE	Card 3L-3367		

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SPECIFICATION FOR LOCOMOTIVE 10 32 D 1301.

FOR: THE TEXAS MEXICAN RAILWAY COMPANY.

HNW.

1 LOCOMOTIVE TO BE OPERATED IN TEXAS, I.E., BOILER TO CONFORM TO ALL THE I. C. C. REQUIREMENTS.

2 BOILER TEST CERTIFICATES:- THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

3 FUEL OIL GRAVITY SAME AS FOR 10 34 D 1142, I.E., GRAVITY OF 11 TO 12 DEGREES.

4 OIL BURNING ARRANGEMENT, B. L. W. STANDARD, WITH BURNER IN FRONT OF FIRE BOX. (SEE SUP. 28)
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.
OIL FEED PIPE FROM OIL TANK TO BE 2" DIAM. (SEE SUP. 27 ETC)

5 AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

6 SUPERHEATER AS THE SUPERHEATER CO'S SPECN. NO. O-18904, DATED 8-17-22, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. W.

7 PATENT PLATE (FROM STOCK) FROM THE SUPERHEATER COMPANY COVERING THE SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDERS.

8 ADDITIONAL HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

9 SPRING BUFFER BETWEEN ENGINE AND TENDER.

10 FRONT BUMPER FROM COMMONWEALTH.

11 HEADLIGHT EQUIPMENT TO BE SCHROEDER ELECTRIC, TYPE RE-3, WITH INCANDESCENT HEADLIGHT. SUNBEAM CASES.

12 OHIO FLANGE LUBRICATOR APPLIED TO BACK OF FRONT DRIVERS.

13 DRIVING BOXES TO HAVE GREASE CELLARS.

14 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

15 LATERAL PLAY BETWEEN FRONT FRONT ENGINE TRUCK BOX AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

16 AIR BRAKE TO HAVE BARCO FLEXIBLE CONNECTIONS BETWEEN ENGINE AND TENDER.

17 PAINTING TO BE IN ACCORDANCE WITH RY. CO'S SPECIFICATION AS COVERED IN LETTER DATED AUGUST 22, 1922, FROM J. J. BARNETT, MASTER MECHANIC, TO R. A. HEY, AS FOLLOWS:-
FLAT COLORS WILL NOT STAND IN THIS HOT CLIMATE, NOT WILL WHITE LEAD PRIMERS. TEXAS-MEXICAN RY. SYSTEM IS: ONE COAT OF CELOX LIQUID PRIMER, ROUGH STUFFED, THEN TWO COATS OF VALSPAR BLACK, LETTERED, THEN TWO COATS OF VALENTINES VALSPAR VARNISH.

18 MARK ON SIDES OF TANK TO BE AS LARGE AS POSSIBLE CONSISTENT WITH NEAT APPEARANCE, THE FIRST LETTERS OF EACH WORD BEING LARGER THAN THE OTHERS.

TENDER.-

26 OLMSTEAD COIL HEATER IN OIL TANK, TO BE MADE BY THE B.L.W. ROYALTY TO BE PAID BY THE B. L. W.

27 OIL FEED PIPE FROM OIL TANK TO BE 2" DIAM. (SEE SUP. 4)

28 OIL BURNING ARRANGEMENT TO HAVE BARCO FLEXIBLE CONNECTION BETWEEN ENGINE AND TENDER, FOR OIL AND STEAM. (SUP. 4)

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7011.

Memorandum Spec'n 21006

SPECIFICATION FOR LOCOMOTIVES 10 34 D 1141 and 1142.

FOR The Texas-Mexican Ry. Co.

HNW.

Gen. as Photo. 5336, {except to have short smoke box extension.

Engine Drawing No. 84.

2-24-21.

Gauge of Road 4' 8½" Play ¾". except 1" for front driver.
Wheelbase, Rigid 14' 0" Driving 14' 0" Total 24' 9"
Total wheelbase, eng. and tend. {Actual 53' 3½" {Limited to ----

Curves 6 degrees.

Limits, Height --- Width ---
Weight (approximate) in working order, Total 156,500 pounds.
On F. tr'k 45,500 lbs., Drivers 111,000 lbs., B. tr'k ---- lbs.

Tractive power 27,400 lbs. Ratio of adhesion 4.06
Work'g St'm Pres. 180 lbs., Service Freight.
Fuel Mexican oil, with gravity of 11 to 12 degrees.

Boiler Steel. Thick ⅝" & 11/16" Bill 9365.
Front Tube Sheet ½" Thick
Boiler, Diam. 64" Plan Extended wagon top.
{Allowable st'm pres. 200 lbs. **Tested to** {220 lbs. steam pres.
{With Factor of Safety of 4.5 {267 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips.

Dome, diam. 29" Pos. Forward of fire box.

Firebox Steel. Combustion chamb. None.
Firebox, length 102-3/16" Width 40⅛" Depth F. 70⅞" B. 66⅞"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" diam. Crown and sides in one sheet.
Water space, Front 4½" Sides 3½" Back 3½"
Water space frame Double Riveted
Water space stays ⅝" diam. with 3/16" holes 1¼" deep from O. S.
Radial stays 1" diam. Sling stays front {Three rows B. L. W. {Expansion stays.
Button heads below crown on Eight central rows
Crown bars None. Placed ---- above crown
Crown bolts ----

Flues No. 9 B.W.G. Steel.
Tubes No. 12 B.W.G. Charcoal iron or steel, (B.L.W. Option).
Tube ends Swaged for copper ferrules, fire box ends.
Number {24 {157 Diam. {5½" {2" Length 13' 5½"

Heating {Flues 452 sq. ft. Combus. Chamb. ---- Total 1714 sq. ft.
Surface {Tubes 1100 sq. ft. Fire Box 162 sq. ft. Fire Brick Tubes ----
Grate area 28.5 sq. ft. Ratio to Heating Surface 1:60.2
Superheater 363 sq. ft.

Fire Brick Arch, None.
Fire box lined with fire brick, for oil burning.
Fire brick pavement in pan.
Grates None.
Ash Pan, Dampers Front and back.

Throttle Balance. Pos. Dome.
Dry pipe Steel.

Superheater Schmidt type, (See sup. 9c)

Smokebox extention Short. Cleaning hole and cap None.
Spark ejector or hopper None.
Superheater deflect. plates With.

Exhaust nozzles Double, low.
Cleaning pipe, with.
Stack Straight. Dia. 18"

Safety Valves Two Ashton 3" Open. (Not spec.)
Safety valves None with relief lever, Set to 180 pounds.
Whistle One B. L. W. Plain.

Steam Gauge One Iron 7" Maker: Ashton.
Steam gauge stand Iron. **Clock** None.

Water Gauge One B.L.W. Ironclad. **Cab Lamps** Electric.
Gauge Cocks Three back. Surface valve None.
Lowest gauge cock 3¼" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.
Cleaning Plugs One plug above fire door.
Firebox, Corners, back ones diagonal, sides and back.
Crown, Two each side and three back.
Waist, One under front.
Front tube sheet, Two Fusible plug One.

Pump None.

Injectors Two Monitor, screw type. (Spec) No. 9.
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check B. L. W. Pos. Right and left.

Steam Heat None.

Cab Wood.

Cab boards Wood. Nosing None.
Running boards Wood. Nosing None.
Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 32"

Pilot Wood.
Front Bumper Oak. Bumper plate With.
Steps, Hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"
Coupler M.C.B. Automatic.

Signal fixtures Iron on bumper.

Headlight One round case 18" Reflector,
Headlight, Nos. on sides With. H'd'l't step With.
Lamp shelf None. Nosing ----

Bell 92 pounds.
Sand Box (Not spec) One Diam. 28" Body Iron painted. Pipes Iron.
Sander Leach air, trap 4-10 double, to sand front of front drivers and back of main drivers.
Dome casing Iron painted, with pressed steel top and bottom rings.

Boiler Jacket #18 Soft steel pt'd. Bands Iron. Style 9.
Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

H.W. Howitz June 1921

SPECIFICATION FOR LOCOMOTIVES 10 34 D 1141 and 1142.

FOR The Texas - Mexican Ry. Co.

HNW.

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Frames Cast steel.

Cylinders, Diam. 20" Stroke 26"
St'm ports, Length 23-3/16" Width 1⅞" Bridges ----
Exh. ports, Length ---- Width ---- Valve lead 3/16"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 13-13/16" By-pass valve None.
S. F. Lubr. (Not spec) Detroit five-feed No. 42 Bull's Eye.
Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings ------ Covers ------
St'm chest valves 10" diam., Piston type.
Met. pkg. (Not spec) {Piston rods {Valve stems United States, King type.

Pistons Heads of cast iron, rings of cast iron sprung in.
Guides Steel. Oil cups Needle.
Crossheads Cast steel, with bearings of cast iron, tinned.
Wrist Pins Steel. Rod cups Plunger, forged on.

Valve Motion Walschaerts.
Links, sliding blocks, pins, lifting links and eccentric rod laws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners Bronze.
Drivers, O. S. Diam. 58" Cen. diam. 52", Centers cast steel.

Tires Steel, (Sup. 16) Held by Shrinkage and shoulder.
Tires, Flanged, Pos. Front and back. Size 3" x 5½"
Tires, Plain, Pos. Middle. Size 3" x 6½"
Lateral play between driving boxes and wheel hubs = (See sup. 20)
Driving Boxes Cast steel, with grease cellars.
Journals, Diam. 9" Length 11"

Springs. Make B. L. W.

Front Engine Truck Four Wheeled Swing bolster, center bearing.
To swing 3" each side of cen., Cen. pin liners None.
Journals, Diam. 5½" Length 10" Boxes Cast iron.
Wheel hub liners None.
Wheels, Diam. 28" Tread ---- Kind Cast iron spoke center.
Tires Steel. Cen. diam. 23" Size 2½" x 5½"
Tires held by Shrinkage and shoulder.

Back Engine Truck None Wheeled ----
To swing ----each side of cen., Cen. pin liners ----
Journals, Diam. ---- Length ---- Boxes ----
Wheel hub liners ----
Wheels, Diam. ---- Tread ---- Kind ----
Tires ---- Cen. diam. ---- Size ----
Tires held by ----

Brake, position On all driving and tender wheels.
Operating Parts | Engine, sch. No. 6 ET. Westg. combined auto. and straight air.
Foundation Parts | Eng. Tr'k, sch. ----
Drivers, sch. WM-2-American outside equalized.
Eng. Tr'k, sch. ----
Air pump One 9½" Pos. Left side.
Train connections Front and back.
Train signal, sch. ----
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1662. {Tender to be designed: Yes.
Weight, with fuel and water, about 132,500 lbs.
Tank {Oil, 3000 5636
{Water, 6000 Gallons. Bill 5632
Tank "U" shape, straight top.

Tool Boxes Steel, top.

Frame Steel, 12" channels with bumpers of wood and channels.
Spring buffer between engine and tender.
Front Drawbar height 30⅞"
Pilot None.
Back drawhead, center above rail 33½"
Coupler M. C. B. Automatic.

Steps, hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.
Both trucks to have side bearings.
Springs Elliptic, B. L. W. make.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.
Tires None. Cen. diam. ---- Size ----
Tires held by ----
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6 ET. Westg. auto. and straight air, with 12" x 12" tender brake cylinders.

List of tools, sch. 160
Photo sch. No. 2. Inspection B. L. W.
To be weighed Yes. Material specns B. L. W.
Certificate of boiler test (See sup. 6)
Junior laws to 4-5-21. Shipment On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

Front {To B. L. W. None.
Patents

Property plates B. L. W., for engine and tender.

Painting, style 291, Olive green and aluminum.
Mark on sides of tank to be as large as possible consistent with neat appearance, the first letters of each word being larger than the others, same as for 10 32 D 1295.
Mark on tank sides:- Texas-Mexican Ry.
Road Nos. Pos. Road Nos. Name None.
F. No. Plate. 11
Cab sides. 12
Back of tank.

Actual Dimensions of Loco. Extreme height over all 14' 11"
Extreme Width: Cab boards 10' 4" ; Cylinders or valve motion = 10' 1"
Length outside face front bumper of engine to face of tender wedge = 34' 6"
Length face of tender wedge to outside face back bumper of tender = 24' 4½"
Total length outside face front bumper of engine to outside face back bumper of tender = 58' 10½"

SPECIFICATION FOR LOCOMOTIVES:- 10 34 D 1141 AND 1142.

FOR:- THE TEXAS-MEXICAN RY. CO.

MW.

1 LOCOMOTIVE TO OPERATE UNDER I. C. C. REQUIREMENTS.

2 OIL BURNING ARRANGEMENT, B. L. W. STANDARD WITH BURNER IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

3 OLMSTEAD COIL HEATER IN OIL TANK AS TWO CUTS (HEREWITH). THIS HEATER TO BE MADE BY B. L. W. ROYALTY PAYABLE BY B. L. W.

4 FEED PIPE FROM OIL TANK, 2" DIAM.

5 OIL CONNECTIONS BETWEEN ENGINE AND TENDER TO BE BARCO JOINTS.

6 BOILER TEST CERTIFICATE:- THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

7 MAIN DOME, ONE-PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

8 THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.

9 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPEC. NO. O-15880, DATED 3-9-21, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY PAYABLE BY THE B. L. W.

10 PATENT PLATES (HEREWITH) FROM THE SUPERHEATER CO., COVERING SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDERS.

11 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

12 SPRING BUFFER BETWEEN ENGINE AND TENDER.

13 HEADLIGHT TO BE SUNBEAM INCANDESCENT ELECTRIC, WITH TYPE RE-3 GENERATOR.

14 PISTON RODS TO BE KEYED TO CROSSHEAD.

15 PARALLEL RODS TO HAVE SOLID ENDS.

16 DRIVING TIRES FROM STANDARD STEEL WORKS.

17 FRONT PAIR OF DRIVING WHEELS TO BE SET 53" BETWEEN INSIDE OF TIRES, I.E., TRACK PLAY 1".

18 CHICAGO FLANGE OILER WITH CONNECTIONS TO FRONT DRIVERS.

19 DRIVING JOURNALS TO BE INTERCHANGEABLE WITH 6 36 D 347.

20 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

21 ENGINE TRUCK WHEELS FROM STANDARD STEEL WORKS.

22 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 1/4" TOTAL.

23 AIR GAUGE TO BE ASHTON.

24 FOR HEREAFTER:- RAISE QUESTION ABOUT USING BARCO FLEXIBLE JOINTS FOR THE STEAM CONNECTION BETWEEN ENGINE AND TENDER TO THE OIL HEATER.

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SPECIFICATION FOR LOCOMOTIVES 10 34 D 1141 & 1142.

FOR:- TEXAS MEXICAN RY. COMPANY

Specification for Type A Double Loop Superheater SPECN. #O-15880 DATED MARCH 9TH, 1921.

BOILER TUBES	157 ...in number... 2 ...o. d... 13 ...ft... 5½ ...in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18	
BOILER FLUES	24 ...in number... 5½ ...o. d... #9 B.W.G. ...of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 ...Card	11308-D
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections ...Card	1136
TUBE SHEET LAYOUT	...Card	3-50796
UNITS	24 ...units... 1½ ...o. d... #9 B.W.G. ... Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide ...Card	10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints ...Card	1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A ...Card	1064-M
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls ...Card	AHM 3x8 11375-A
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place ...Card	1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units ...Card	SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing ...Card	4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer ...Card	1067
PYROMETER	Model No. ... Pyrometer ...Card	NONE
PYROMETER ARRANGEMENT	Generally in accordance with ...Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration ...Card	
S. H. ARRANGEMENT	In accordance with ...Card	4L-40791
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	2L-11463-I	S. H. UNIT BOLT WASHER	1071
DAMPER CYL. ARM	1074	S. H. UNIT CLAMP	1073
DAMPER CYL. PIPE FITTING	11115	S. H. UNIT CLAMP WASHER	10305
DAMPER CYL. PIPE UNION	11114	S. H. PIPE END	1344
DAMPER CYL. PIPE CONNECTION	1L-11437	S. H. PIPE BAND	1988
DAMPER CYL. PIPING DIAGRAM	2L-11442	SPACING OF BANDS & SUPPORTS	10759
DAMPER CYL. SUPPORT		TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	1068	RETURN BENDS	11022
DAMPER SHAFT ARM	1065	LUBRICATOR CONNECTION	3023
DAMPER SHAFT BEARING (C. S.)	1148	DEFLECTING PLATE HANDLE	1487
DAMPER SHAFT BEARING (L.S.)	10386-4, R.&L.	DEFLECTING PLATE STUDS	10809
DAMPER SHAFT LINK	1070	DEFLECTING PLATE CLAMP	10809-A
PATENT PLATE	3367		
DAMPER RIGGING	11384		

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7940

Memorandum Spec'n 23104.

SPECIFICATION FOR LOCOMOTIVES 10 3½ D 1145

FOR The Texas Mexican Ry. Co.

Gen. as Photo. 8001.

Engine Drawing No. 86.

12-12-23.

Gauge of Road 4' 8½" Play ¾" except (See sup. 19)
Wheelbase, Rigid 14' 0" Driving 14' 0" Total 24' 9"
Total wheelbase, eng. and tend. {Actual 53' 3½" {Limited to ---

Curves 6 degrees.

Limits, Height --- Width ---
Weight (approximate) in working order, Total 158,000 pounds.
On F. tr'k 34,500 lbs., Drivers 123,500 lbs., B. tr'k --- lbs.

Tractive power 30,000 lbs., Ratio of adhesion 4.1
Work'g St'm Pres. 190 lbs., Service Freight (Sup. 1)
Fuel Mexican Oil, with gravity of 11 to 12 degrees.

Boiler Steel. Thick ⅜" & 11/16" Bill 9955
Front Tube Sheet ½" Thick
Boiler, Diam. 64" Plan Extended Wagon Top.
{Allowable st'm pres. 200 lbs. {With Factor of Safety of 4.5 **Tested to** {220 lbs. steam pres. {267 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips.

Dome, diam. 29" Pos. Forward of firebox.

Firebox Steel. Combustion chamb. None.
Firebox, length 102-3/16" Width 40⅛" Depth F. 70⅞" B. 66⅞"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" diam. Crown and sides in one sheet.
Water space, Front 4½" Sides 3½" Back 3½"
Water space frame Double Riveted
Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O. S.
Radial stays (Sup. 9) Sling stays front {Three rows B. L. W. {Expansion Stays.
~~Button~~ Heads below crown on Eight central rows (See sup. 9)
Crown bars None. Placed --- above crown.
Crown bolts ---

Flues No. 9 B. W. G. Charcoal Iron.
Tubes No. 11 B. W. G. Charcoal Iron.
Tube ends Swaged for copper ferrules, fire box ends.
Number {24 {157 Diam. {2⅝" {2" Length 13' 5½"

Heating Surface {Flues 452.5 {Tubes 1100.5 Combus. Chamb. --- Total 1714.0
Fire Box 162.5 Fire Brick Tubes ---
Grate area 28.5 Ratio to Heating Surface 1: 60.2
Superheater 363.0

Fire Brick Arch, None.
Fire box lined with fire brick, for oil burning.
Fire brick pavement in pan.
Grates None.
Ash Pan, Dampers Front and Back.

Throttle Balance. Pos. Dome.
Dry pipe Steel.

Superheater Schmidt type. (See sup. 10a)

Smokebox extenstion Short. ~~Cleaning~~ hole and cap None.
Spark ejector or hopper None.
~~Superheater~~ Netting and deflect. plates With.

Exhaust nozzles Double, Low.
Cleaning pipe, With.
Stack Straight. Dia. 18"

Safety Valves Two Ashton 3" Open. (Spec)
Safety valves None with relief lever, Set to 190 pounds.
Whistle One B. L. W. Plain.

Steam Gauge One Iron 7" Maker: Ashton.
Steam gauge stand Iron. **Clock** None.

Water Gauge Two (Sup. 12) **Cab Lamps** Electric.
Gauge Cocks Three (Sup. 12) Surface valve None.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.
Cleaning Plugs One plug above fire door.
Firebox, Corners, back ones diagonal, sides and back.
Crown, Two each side and three back.
Waist, One under front.
Front tube sheet, Two. Fusible plug One.

Pump None.

Injectors Two Monitor, Screw-Type. (Spec) No. 9
Injectors, Pos. Right and Left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check B. L. W. Pos. Right and Left.

Steam Heat None.

Cab Steel.

Cab boards to be covered with wood.
Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler.

Back Bumper Bar Steel. Back drawbar height 31"

Pilot Wood.
Front Bumper Cast Steel. (Sup. 14) Bumper plate With.
Steps, hand holds, etc., to conform to I. C. C. Requirements.

Front Drawhead, Center above rail 33½"
Coupler M. C. B. Automatic.

Signal fixtures Iron on Bumper.

Headlight One Round Case 14" Reflector,
Headlight, Nos. on sides With. H'd'l't step With.
Lamp shelf None. Nosing ---

Bell 92 pounds. Gollmar Air Bell Ringer.
Sand Box One Diam. 28" Body Iron Painted. Pipes Iron.
Under Leach Air Trap A-10 double, to sand front of front drivers and back of main drivers.
Dome casing Steel painted, with pressed steel top and bottom rings.

Boiler Jacket #18 Soft Steel Pto. Sands Steel. Style 9 and 14.
Boiler Lagging Magnesia Sectional.
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

H. B. Lichetti 17 March 1926

SPECIFICATION FOR LOCOMOTIVES 10 3½ D 1145.

FOR The Texas - Mexican Ry. Co.

297
296

Frames Cast Steel.

Cylinders, Diam. 20" Stroke 26"
St'm ports, Length 23-3/16" Width 1⅜" Bridges ---
Exh. ports, Length --- Width --- Valve lead 3/16"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 13-13/16" By-pass valve None.
(Not Spec) Cyl. F. Lubr. Nathan Five-Feed Bull's Eye.
Cyl'r heads Cast Iron.
Cyl'r casings Steel Painted. Head covers Steel Painted.
St'm chest casings --- Covers ---
St'm chest valves 10" diam., Piston Type.
(Not Spec) Met. pkg. {Piston rods {Valve stems United States, King Type.

Pistons Heads of cast iron, rings of cast iron sprung in.
Guides Steel. Oil cups Needle.
Crossheads Cast Steel, with bearings of Bronze.
Wrist Pins Steel. Rod cups for grease, forged on.

Valve Motion Walschaerts.
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings Make, B. L. W.
Driving wheel hub liners Bronze, pressed into hubs of wheels.
Drivers, O. S. Diam. 56" Cen. diam. 50", Centers Cast Steel.

Tires Steel. Held by Shrinkage and Shoulder.
Tires, Flanged, Pos. All. Size 3" x 5½"
Tires, Plain, Pos. None. Size ---
Lateral play between driving boxes and wheel hubs = (See sup. 21)
Driving Boxes Cast Steel, with Franklin Grease Cellars.
Journals, Diam. 9" Length 11"

Springs. Make B. L. W.

Front Engine Truck Four Wheeled Swing Bolster, Center Bearing.
To swing 3" each side of cen., Cen. pin liners None.
Journals, Diam. 5½" Length 10" Boxes Cast Iron.
Wheel hub liners None.
Wheels, Diam. 28" Tread --- Kind Cast Iron Spoke Center.
Tires Steel. Cen. diam. 23" Size 2½" x 5½"
Tires held by Shrinkage and Shoulder.

Back Engine Truck None Wheeled ---
To swing ---each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels.
Operating {Engine, sch. No. 6 ET. Westg. Combined Auto. and {Eng. Tr'k, sch. --- Straight Air.
Foundation {Drivers, sch. H-2 American Outside Equalized.
Parts {Eng. Tr'k, sch. ---
Air pump One 11" Pos. Left Side.
Train connections Front and Back.
Train signal, sch. ---
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1662 {Tender to be {Weighed: Yes.
Weight, with fuel and water, about 132,500 lbs.
Tank {Oil, 3000 5636
{Water, 6000 Gallons, Bill 5632
Tank "U" shape, straight top.

Tool Boxes Steel, Top.

Frame Steel, 12" channels with bumpers of wood and 12" channels
B. L. W. Spring Buffer, between engine and tender.
Front Drawbar height 30⅞"
Pilot None.
Back drawhead, center above rail 33½"
Coupler M. C. B. Automatic with Miner Friction Draft Gear, type A-18-S.

Steps, hand holds, etc., to conform to I. C. C. Requirements.

Trucks Arch bar type with bolsters of cast steel.
Both trucks to have side bearings.
Springs Elliptic, B. L. W. make.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 1⅛" Kind Chilled Cast Iron Plate.
Tires None. Cen. diam. --- Size ---
Tires held by ---
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6 ET. Westg. Auto. and Straight Air, with 12" x 12" tender brake cylinders.

List of tools, sch. 160.
Photo sch. ~~No. 2~~ None. Inspection B. L. W.
To be weighed Yes. Material spec'ns B. L. W.
Certificate of boiler test (See sup. 1-6)
Junior taws to 12-19-23 Shipment On own wheels. (Sup 27)

Brass shop finish, No. 1.
Machine shop finish D-165.

Property plates B. L. W., for engine and tender.

Painting, style 291, Olive Green and Aluminum.
Lettering etc. to be same as for 10 32 D 1301.
Mark on tank sides:- Texas-Mexican Ry.

Road Nos. Pos.	Road Nos.	Name None.
F. No. Plate.	13-14	
Cab Sides.		
Back of Tank.		

Actual Dimensions of Loco. Extreme height over all 14' 10¼"
Extreme Width: Cab boards 10' 3"; Cylinders ~~or valve motion~~ 9' 8½"
Length outside face front bumper of engine to face of tender wedge 36' 6"
Length face of tender wedge to outside face back bumper of tender 24' 1½"
Total length outside face front bumper of engine to outside face back bumper of tender 58' 10½"

SPECIFICATION FOR LOCOMOTIVES 10 34 D 1145.

FOR THE TEXAS - MEXICAN RY. CO.

LBK.

1 LOCOMOTIVE TO OPERATE UNDER I. C. C. REQUIREMENTS.

2 OIL BURNING ARRANGEMENT B. L. W. STANDARD WITH BURNER IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

3 OLMSTEAD COIL HEATER IN OIL TANK SAME AS FOR 10 34 D 1141 AND 1142. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

4 FEED PIPE FROM OIL TANK, 2" DIAMETER.

5 STEAM CONNECTIONS BETWEEN ENGINE AND TENDER TO HAVE BARCO JOINTS. OIL CONNECTIONS BETWEEN ENGINE AND TENDER TO HAVE RUBBER HOSE.

6 BOILER TEST CERTIFICATE: THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

7 MAIN DOME, ONE-PIECE TYPE.

8 AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

9 RADIAL STAYS TO HAVE 1⅛" DIAM. TAPER TAP IN CROWN SHEET, WITH TAPER OF 2" IN 12"; STAYS 1" DIAM. IN ROOF SHEET.

10 SUPERHEATER AS THE SUPERHEATER CO'S. SPECN. NO. O-23924, DATED DEC. 21, 1923 (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY PAYABLE BY THE B. L. W.

11 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

12 WATER COLUMN WITH WATER GAUGE AND GAUGE COCKS TO BE APPLIED ON RIGHT SIDE AND AN ADDITIONAL WATER GAUGE ON LEFT SIDE, OF BACK HEAD.

13 B. L. W. SPRING BUFFER, BETWEEN ENGINE AND TENDER.

14 FRONT BUMPER FROM COMMONWEALTH STEEL CO.

15 HEADLIGHT AND EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, SAME AS FOR 6 36 D 356, I.E., HEADLIGHTS TO BE PYLE CAST CASES NO. 20-C-125, WITH PYLE TYPE "E-2" TURBO-GENERATOR.

16 LUBRICATOR PIPES OF COPPER TO RUN UNDER JACKET TO STEAM CHESTS, CYLINDERS AND AIR PUMP.

17 PISTON RODS TO BE KEYED TO CROSSHEADS.

18 PARALLEL RODS TO HAVE SOLID ENDS.

19 FRONT PAIR OF DRIVING WHEELS TO BE SET 53" BETWEEN INSIDE OF TIRES, I.E. TRACK PLAY 1".

20 OHIO FLANGE OILER WITH CONNECTIONS TO FRONT DRIVERS.

21 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 7/32" TOTAL.

22 FRONT ENGINE TRUCK FRAME OF WROUGHT STEEL.

23 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 5/16" TOTAL.

25 AIR GAUGES TO BE ASHTON.

26 PAINT TO BE IN ACCORDANCE WITH RY. CO'S. SPECIFICATION RECEIVED FOR 10 32 D 1301, AND 6 36 D 356, I.E.
"FLAT COLORS WILL NOT STAND IN THIS HOT CLIMATE NOR WILL WHITE LEAD PRIMERS. TEXAS-MEXICAN RAILWAY SYSTEM IS, - ONE COAT OF CELOX LIQUID PRIMER, ROUGH STUFFED: THEN TWO COATS OF VALSPAR BLACK, LETTERED, THEN TWO COATS OF VALENTINE'S VALSPAR VARNISH."

27 TEXAS OILS AND GREASE TO BE USED FOR INITIAL LUBRICATION.

298 399

SPECIFICATION FOR LOCOMOTIVES: 10 34 D 1145.

FOR THE TEXAS - MEXICAN RY. CO.

Specification for Type A Double Loop Superheater SPEC. #O-23924, DATED DECEMBER 21ST, 1923.

BOILER TUBES	157 in number 2" o. d. 13 ft. 5½ in over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-83-16.
BOILER FLUES	24 in number 5" o. d. #9 B.W.G. AV of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-83-16. Card 11308-D
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card 1136
TUBE SHEET LAYOUT	
UNITS	24 units 1½" o. d. #9 B.W.G. AV Pipes in accordance with the American Society for Testing Materials Specification A-83-16. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in. Card 3L-50796
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card 2L-11754
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card 2L-11752
UNIT CLAMP BOLT	In accordance with The Superheater Company Material Specification No. 12-A. Card 1094-N
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card 11375-A
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units. Card SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from beads as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card 1067
PYROMETER	Model No. Pyrometer NONE. Card
PYROMETER ARRANGEMENT	Generally in accordance with. Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration. Card
S. H. ARRANGEMENT	In accordance with. Card
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler. Card 4L-10791-A

DAMPER	Card 2L-11463-T	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 2L-1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 2L-10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPE CONNECTION	Card 1L-11437	S. H. PIPE BAND	Card 2L-1988
DAMPER CYL. PIPING DIAGRAM	Card 2L-11442	SPACING OF BANDS AND SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	Card FORGED
DAMPER SHAFT	Card 1068	RETURN BENDS	Card 2L-11623
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O.S.)	Card 2L-11575	DEFLECTING PLATE HANDLE	Card 1L-1487
DAMPER SHAFT BEARING (I.S.) (L.S.)	Card 10386-Q	DEFLECTING PLATE STUDS	Card 2L-10809
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE CLAMP	Card 2L-10809-A
PATENT PLATE	Card 3L-3367	UNIT CLAMP BOLT NUT	CARD 1P-1107-A
DAMPER RIGGING	CARD 3L-11626-D		

THE BALDWIN LOCOMOTIVE WORKS DUPLICATE TO 3+ D 1145, SAME EXTRAS, EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 2403+.

SPECIFICATION FOR LOCOMOTIVES 10 3+ D 1146.

WKS **FOR** THE TEXAS-MEXICAN RAILWAY COMPANY.

Gen. as PHOTO. 8001.

Engine Drawing No. 86.

6-30-24 (SPEC)

WEK.

Gauge of Road 4' 8½" Play 2" EXCEPT (SEE SUP. 26)
Wheelbase, Rigid 14' 0" Driving 14' 0" Total 24' 9"
Total wheelbase, eng. and tend. {Actual 53' 3½" / Limited to ---

Curves 6 DEGREES.

Limits, Height --- Width ---
Weight (approximate) in working order, Total 158,000 POUNDS.
On F. tr'k 34,500 lbs., Drivers 123,500 lbs., B. tr'k --- lbs.

Tractive power 30,000 lbs., Ratio of adhesion 4.1
Work'g St'm Pres. 190 lbs., Service FREIGHT. (SUP. 1)
2. **Fuel** MEXICAN OIL, WITH GRAVITY OF 11 TO 12 DEGREES.

1. **Boiler** STEEL. Thick ⅝" & 11/16" Bill 9955
Front Tube Sheet ½" Thick
Boiler, Diam. 84" Plan EXTENDED WAGON TOP.
{Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.
{With Factor of Safety of 4.5 267 lbs. water pres.
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

5. **Dome,** diam. 29" Pos. FORWARD OF FIREBOX.

Firebox STEEL. Combustion chamb. NONE.
Firebox, length 102-3/16" Width 40½" Depth F. 70⅞" B. 66⅝"
6. Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" DIAM.. CROWN AND SIDES IN ONE SHEET.
Water space, Front 4½" Sides 3½" Back 3½"
Water space frame DOUBLE Riveted
8. Water space stays ⅜" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S. {THREE ROWS TATE
9. Radial stays (SUP. 7) Sling stays front {EXPANSION STAYS.
~~Sutton~~ Heads below crown on EIGHT central rows (SEE SUP. 7)
Crown bars NONE. Placed --- above crown
Crown bolts ---

Flues No. 9 B. W. G. CHARCOAL IRON.
Tubes No. 11 B. W. G. CHARCOAL IRON.
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number {24 / 157 Diam {2" / 2" Length 13' 5½"

Heating Surface Flues 452⁰ Combus. Chamb. --- Total 1711⁴
Tubes 1100⁰ Fire Box 162⁰ Fire Brick Tubes ---
Grate area 28.5 Ratio to Heating Surface 1: 60.2
Superheater 363⁰

Fire Brick ARCH, NONE.
2. FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.
FIRE BRICK PAVEMENT IN PAN.
Grates NONE.
Ash Pan, Dampers FRONT AND BACK.

Throttle BALANCE. Pos. DOME.
Dry pipe STEEL.

Superheater SCHMIDT TYPE. (SEE SUP. 9 ETC)

Smokebox extension SHORT. 10 Cleaning hole and cap NONE.
Spark ejector or hopper NONE.
~~Nettings~~ deflect. plates WITH.

Exhaust nozzles DOUBLE, LOW.
CLEANING PIPE, WITH.
11. **Stack** STRAIGHT. Dia. 18"

Safety Valves TWO ASHTON 3" OPEN.
Safety valves NONE with relief lever, Set to 190 POUNDS.
Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: ASHTON.
Steam gauge stand IRON. **Clock** NONE.

Water Gauge TWO. (SUP. 12) **Cab Lamps** ELECTRIC.
Gauge Cocks THREE. (SUP. 12) Surface valve NONE.
Lowest gauge cock 3+" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock TWO. (SEE SUP. 13) POS: (SEE SUP. 13)
14. **Cleaning Plugs** ONE PLUG ABOVE FIRE DOOR.
Firebox, CORNERS, BACK ONES DIAGONAL, FRONT AND BACK.
Crown, TWO EACH SIDE AND THREE BACK.
Waist, TWO UNDER, ONE FRONT AND (SEE SUP. 15)
Front tube sheet, TWO. Fusible plug NONE.

Pump NONE.

Injectors TWO MONITOR, SCREW TYPE. (SPEC) No. 9.
Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.
Pipes, Check IRON. Feed IRON. Overflow IRON.
Check B. L. W. Pos. RIGHT AND LEFT

Steam Heat NONE.

Cab STEEL.
Steps, right and left, on inside of Cab on side sheet
CAB BOARDS TO BE COVERED WITH WOOD.
Cab boards STEEL. Nosing T-IRON.
Running boards STEEL. Nosing T-IRON.
Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 31"
B.L.W. SPRING BUFFER, BETWEEN ENGINE AND TENDER.

21. **Pilot** WOOD.
Front Bumper CAST STEEL. (SUP. 22) Bumper plate WITH.
1. **Steps,** HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

23. **Front Drawhead,** Center above rail 33½"
Coupler M.C.B. AUTOMATIC.

Signal fixtures IRON ON BUMPER.

24. **Headlight** ONE ROUND CASE 14" Reflector,
Headlight, Nos. on sides WITH. H'dl't stop WITH.
Lamp shelf NONE. Nosing ---

Bell 92 POUNDS. GOLLMAR AIR BELL RINGER.
Sand Box ONE. Diam. 28" Body IRON PAINTED. Pipes IRON.
Sander (not spec) LEACH AIR, TRAP A-10 DOUBLE, TO SAND FRONT OF FRONT DRIVERS AND BACK OF MAIN DRIVERS.
Dome casing STEEL PAINTED, WITH PRESSED STEEL TOP AND BOTTOM RINGS

Boiler Jacket #18 SOFT STEEL PTD. Sands STEEL. Style 9 AND 14.
Boiler Lagging MAGNESIA SECTIONAL.
BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

H.B. LICHETTI March 1925

SPECIFICATION FOR LOCOMOTIVES 10 3+ D 1146.

FOR THE TEXAS - MEXICAN RY. CO.

301

300

WEK.

Frames CAST STEEL.

Cylinders, Diam. 20" Stroke 26"
St'm ports, Length 23-3/16" Width 1⅞" Bridges ---
Exh. ports, Length --- Width --- Valve lead 3/16"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 13-13/16 By-pass valve NONE.
25. S. F. Lubr. (not spec) NATHAN FIVE-FEED BULL'S EYE.
Cyl'r heads CAST IRON.
Cyl'r casings STEEL PAINTED. Head covers STEEL PAINTED.
St'm chest casings --- Covers ---
St'm chest valves 10" DIAM., PISTON TYPE.
Met. pkg. (not spec) PISTON RODS / VALVE STEMS UNITED STATES, KING TYPE.
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.
Guides STEEL. Oil cups NEEDLE.
Crossheads CAST STEEL, WITH BEARINGS OF BRONZE.
Wrist Pins STEEL. Rod cups FOR GREASE, FORGED ON.
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS.
{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings MAKE, B. L. W.
Driving wheel hub liners BRONZE, PRESSED INTO HUBS OF WHEELS.
26. **Drivers,** O. S. Diam. 56" Cen. diam. 50", CENTERS CAST STEEL.

27. **Tires** STEEL. Held by SHRINKAGE AND SHOULDER.
Tires, Flanged, Pos. ALL. Size 3" x 5½"
Tires, Plain, Pos. NONE. Size ---
{LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS --- 7/32" TOTAL
Driving Boxes CAST STEEL, WITH FRANKLIN GREASE CELLARS.
Journals, Diam. 9" Length 11"

Springs. Make B. L. W.

28. **Front Engine Truck** FOUR Wheeled SWING BOLSTER, CENTER BEARING.
To swing 3" each side of cen., Cen. pin liners NONE.
Journals, Diam. 5½" Length 10" Boxes CAST IRON.
Wheel hub liners NONE.
{LATERAL PLAY BETWEEN FRONT TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 5/16" TOTAL
Wheels, Diam. 28" Tread --- Kind CAST IRON SPOKE CENTER.
Tires STEEL. Cen. diam. 23" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
{LATERAL PLAY BETWEEN BACK TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS --- TOTAL
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating Parts {Engine, sch. No. 6 ET. WEST'G. COMBINED AUTO. AND STRAIGHT AIR. / Eng. Tr'k, sch. ---
Foundation Parts {Drivers, sch. WA-2-BC AMERICAN OUTSIDE EQUALIZED. / Eng. Tr'k, sch. ---
29. Air pump ONE 11" Pos. LEFT SIDE.
Train connections FRONT AND BACK.
Train signal, sch. ---
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1662 {TENDER TO BE WEIGHED: YES.
Weight, with fuel and water, about 132,500 LBS.
2½" Tank {OIL, 3000 5636
4½" Tank {WATER, 6000 Gallons, Bill 5632
TANK "U" SHAPE, STRAIGHT TOP.

Tool Boxes STEEL, TOP.

Frame STEEL, 12" CHANNELS WITH BUMPERS OF WOOD AND 12" CHANNELS
B. L. W. SPRING BUFFER BETWEEN ENGINE AND TENDER.
Front Drawbar height 30⅞"
Pilot NONE.
Back drawhead, center above rail 33½"
Coupler M.C.B. AUTOMATIC WITH MINER FRICTION DRAFT GEAR, TYPE A-18-S.

1. Steps, HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH BOLSTERS OF CAST STEEL.
BOTH TRUCKS TO HAVE SIDE BEARINGS.
Springs ELLIPTIC, B. L. W. MAKE.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4½" Kind CHILLED CAST IRON PLATE.
Tires NONE. Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE.

Brake Position ON ALL WHEELS.
Brake sch. No. 6 ET. WEST'G. AUTO. AND STRAIGHT AIR, WITH 12"x 12" TENDER BRAKE CYLINDERS.

List of tools, sch. 160.
Photo sch. No. 2. Inspection B. L. W.
To be weighed YES. Material spec'ns B. L. W.
Certificate of boiler test (SEE SUP. 4)
Junior laws to 12-19-23. Shipment ON OWN WHEELS. (SUP. 31)

Brass shop finish, No. 1.
Machine shop finish D-165.

B. L. W. Patents } NONE.

Property plates B. L. W., FOR ENGINE AND TENDER.

30. **Painting,** style 291, OLIVE GREEN AND ALUMINUM.

30. LETTERING ETC. TO BE SAME AS FOR 10 3+ D 1145.
Mark on TANK SIDES:- TEXAS-MEXICAN RY.

Road Nos. Pos. Road Nos. Name NONE.
F. No. PLATE. 15
BACK OF TANK.
CAB SIDES

Actual Dimensions of Loco. Extreme height over all 14' 10½"
Extreme Width: Cab boards 10' 3" ; Cylinders ~~or valve motion~~ 9' 8½"
Length outside face front bumper of engine to face of tender wedge = 34' 6"
Length face of tender wedge to outside face back bumper of tender = 24' 4½"
Total length outside face front bumper of engine to outside face back bumper of tender } = 58' 10½"

SPECIFICATION FOR LOCOMOTIVES 10 3+ D 1146.

FOR THE TEXAS - MEXICAN Ry. Co.

JBK.

1 LOCOMOTIVE TO OPERATE UNDER I. C. C. REQUIREMENTS.

2 OIL BURNING ARRANGEMENT B. L. W. STANDARD WITH BURNER IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

3 OLMSTEAD COIL HEATER IN OIL TANK SAME AS FOR 10 3+ D 1141 ETC. AND 1145. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.
FEED PIPE FROM OIL TANK, 2" DIAMETER.
STEAM CONNECTIONS BETWEEN ENGINE AND TENDER TO HAVE BARCO JOINTS. OIL CONNECTIONS BETWEEN ENGINE AND TENDER TO HAVE RUBBER HOSE.

4 BOILER TEST CERTIFICATE: THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

5 MAIN DOME, ONE-PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

6 ANGLE OF FLANGE ON BACK FLUE SHEET TO BE MADE AS SHARP AS POSSIBLE WITHOUT CRACKING SHEET.

7 RADIAL STAYS TO HAVE 1⅛" DIAM. TAPER TAP IN CROWN SHEET, WITH TAPER OF 2" IN 12", STAYS 1" DIAM. IN ROOF SHEET. RADIAL STAYS ARE NOT TO HAVE BUTTON-HEAD. (

8 STAYBOLTS AS LIST IN B. L. W. LETTER OF AUGUST 4, 1924 TO R. A. HEY, (COPY ATTACHED.)

9 SUPERHEATER AS THE SUPERHEATER Co's. SPECN. No. LO-25968, DATED JULY 7, 1924, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY PAYABLE BY THE B. L. W.

10 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

11 COVER FOR STACK TO BE APPLIED.

12 WATER COLUMN WITH WATER GAUGE AND GAUGE COCKS TO BE APPLIED ON RIGHT SIDE AND AN ADDITIONAL WATER GAUGE ON LEFT SIDE, OF BACK HEAD.
WATER COLUMN TO HAVE DRAIN PIPE AS SHOWN ON PENCIL SKETCH No. 2 (HEREWITH), WITH PLUG ON THE BOTTOM TO FACILITATE CLEANING OUT THE WATER COLUMN.

13 BLOW OFF COCKS TO BE OMITTED, BUT HOLES 2+" DIAM., 12 THREADS PER INCH TO BE PROVIDED RIGHT AND LEFT, BETWEEN EIGHT AND NINTH ROWS OF STAYS; BOTTOM OF HOLE TO BE ¼" ABOVE MUD RING.
BLOW OFF COCKS WILL BE FURNISHED AND APPLIED BY Ry. Co. AFTER DELIVERY OF LOCOMOTIVE.

14 ALL WASHOUT PLUGS TO HAVE SQUARE HEADS, SIMILAR TO THE PLUGS APPLIED ALONG MUD RING FOR 10 3+ D 1145.
WASHOUT PLUGS ALONG CROWN SHEET LINE AND THE BELLY PLUGS TO BE MADE LONGER THAN FOR 10 3+ D 1145, I.E. TOP OF THREADS TO BE FLUSH WITH JACKET AND SQUARE HEADS TO EXTEND OUT BEYOND JACKET.

15 ONE EXTRA PLUG UNDER WAIST TO BE APPLIED 35" FROM OUTSIDE OF THROAT SHEET.

21 POINT OF PILOT TO EXTEND 12" FURTHER OUT THAN FOR 10 3+ D 1145.

22 FRONT BUMPER FROM COMMONWEALTH STEEL Co.

23 FRONT DRAWBAR POCKET TO BE AT LEAST 7½" HIGH, WITH WIDTH SAME AS FOR 10 3+ D 1145.

24 HEADLIGHT AND EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, WITH PYLE CAST CASES No. 20-C-125 AND WITH PYLE TYPE "E-2" TURBO-GENERATOR SAME AS FOR 10 3+ D 1145.

25 LUBRICATOR PIPES OF COPPER TO RUN UNDER JACKET TO STEAM CHESTS, CYLINDERS AND AIR PUMP.

26 FRONT PAIR OF DRIVING WHEELS TO BE SET 53" BETWEEN INSIDE OF TIRES, I.E. TRACK PLAY 1".

27 OHIO FLANGE OILER WITH CONNECTIONS TO FRONT DRIVERS.

28 FRONT ENGINE TRUCK FRAME OF WROUGHT STEEL.

29 AIR GAUGES TO BE ASHTON.

30 PAINT TO BE IN ACCORDANCE WITH Ry. Co's. SPECIFICATION RECEIVED FOR 10 32 D 1301, AND 6 36 D 356, I.E.
"FLAT COLORS WILL NOT STAND IN THIS HOT CLIMATE NOR WILL WHITE LEAD PRIMERS. TEXAS-MEXICAN RAILWAY SYSTEM IS, - ONE COAT OF CELOX LIQUID PRIMER, ROUGH STUFFED; THEN TWO COATS OF VALSPAR BLACK, LETTERED; THEN TWO COATS OF VALENTINE'S VALSPAR VARNISH."

31 TEXAS OILS AND GREASE TO BE USED FOR INITIAL LUBRICATION.

TENDER

41 WATER TANK TO HAVE MAN HOLE OF SHEET METAL, AS SHOWN ON PENCIL SKETCH No. 1

42 OIL TANK TO HAVE TWO MANHOLES OF CAST IRON, Ry. Co's. STANDARD PATTERN, IN TOP OF TANK. THE CENTER LINE OF FRONT ONE TO BE 30" FROM FRONT OF TANK AND THE BACK ONE TO BE LOCATED SAME AS FOR 10 3+ D 1145.
RAILWAY WILL FURNISH PATTERN OF THEIR STANDARD MANHOLE. SEND ORDER FOR THIS PATTERN PROMPTLY AS POSSIBLE TO Mr. J. J. BARNETT.

43 Hereafter. Top bars and truss bars of tender trucks to be 1⅜"

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304

SPECIFICATION FOR LOCOMOTIVE 10 3+ D 1146.

FOR THE TEXAS-MEXICAN Ry. Co.

Specification for ELESCO Type A Locomotive Superheater LO-25968 Inquiry No. DATED JULY 7TH, 1924.

	CARD		CARD
S. H. ARRANGEMENT	4-40791-A	UNIT CLAMP BOLT	2-1084
TUBE SHEET LAYOUT	3-50796	UNIT CLAMP BOLT NUT	1F-1102-A.
HEADER - 4 HH 3 x 8	11375-A	UNIT CLAMP BOLT WASHER	2-1071.
DAMPER	2-11463-T	UNIT CLAMP	2-1073
DAMPER CYLINDER	4-11436	UNIT CLAMP WASHER	2-10305
DAMPER RIGGING	3-11626-D	UNIT PIPE BAND	2-1988
DAMPER SHAFT R.S.	1068	UNIT PIPE SUPPORT	2-11754
DAMPER SHAFT L.S.		UNIT PIPE SHIELD	
DAMPER SHAFT COUNTERWEIGHT	1067	SPACING OF BANDS AND SUPPORTS	10759
DAMPER SHAFT ARM R.S.	2-1065	UNIT PIPE END	1344
DAMPER SHAFT ARM L.S.		UNIT PIPE JOINT	2-11752
DAMPER SHAFT BEARING (O.S.—R.S.)	2-11575	DEFLECTING PLATE	SEE ABRGT.
DAMPER SHAFT BEARING (O.S.—L.S.)		DEFLECTING PLATE HANDLE	1L-1487
DAMPER SHAFT BEARING (INSIDE)	10386-A	DEFLECTING PLATE STUD	2-10809
DAMPER SHAFT LINK	2-1070	DEFLECTING PLATE CLAMP	2-10809-A
DAMPER CYLINDER ARM	2-1074	HEADER SUPPORT	1323
DAMPER CYLINDER SUPPORT		RETURN BEND	2-11623
DAMPER CYLINDER PIPE FITTING	11115	RETURN BEND TYPE	Forged.
DAMPER CYLINDER PI. UNION	11114	PATENT PLATE	3L-3367
DAMPER CYLINDER PIPE CONNECTION	1L-11437	BOILER FLUE	11308-D
DAMPER CYLINDER PIPING DIAGRAM	2-11442	BOILER FLUE SETTING	1136
LUBRICATOR CONNECTION	2023		

157 BOILER TUBES 2" O.D. 13 B.W.G. 5½" To. Over Tube Sheets.

24 BOILER FLUES. Of cold drawn seamless steel 5½" O.D. No. 10 B.W.G. (Minimum). To American Society for Testing Material Specification A 83-22-T.

24 UNITS. Of cold drawn seamless steel 1½" O.D. No. 10 B.W.G. (Minimum). To American Society for Testing Material specification A 83-22-T.

BOILER TUBES. Tubes located between and adjacent to boiler flues are to be beaded over at front end.

BOILER FLUE SETTING. 1/16-in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prosecred except for copper sheets. Front end rolled and beaded. Rollers to have at least 3 rolls. Prosser to have at least 12 sections

UNITS. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.

UNIT PIPE SUPPORTS. Of steel fastened securely on superheater pipes so as not to slide.

UNIT PIPE JOINT. Made in best possible manner to insure absolutely tight joints.

UNIT CLAMP BOLT. In accordance with The Superheater Company Material Specification No. 12-B.

HEADER. Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No pencil plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 300 lbs. per sq. in. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls.

HEADER SUPPORTS. Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place.

STEAM PIPE JOINT RINGS. Of cast iron.

DEFLECTING PLATE. To permit of easy inspection and removal of superheater units.

DAMPER CYLINDER. Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing.

DAMPER SHAFT COUNTERWEIGHT. Painted a light color to render it easily visible to the engineer.

TEST. (FINAL) The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 50 lb. more than the working pressure of the boiler.

304

303

CLASS: 10 34 D 1146 — AUGUST 4, 1924.

FOR: THE TEXAS MEXICAN RAILWAY CO.

MR. R. A. HEY, MANAGER,
HOUSTON, TEXAS.

DEAR SIR:-

AS DIRECTED IN MR. METZGER'S LETTER OF JULY 2ND WE ARE ENCLOSING PRINTS, IN DUPLICATE, ILLUSTRATING THE STAYBOLTS WHICH WE CONTEMPLATE APPLYING TO THE ABOVE LOCOMOTIVE. THESE BOLTS WILL BE AS OUTLINED IN THE FOLLOWING LIST:-

EXPANSION BOLTS

18 - SLEEVES "H.K."
18 - " "J.K."
36 - TOTAL.

36 - "K" CAPS
36 - "K.N." NUTS - 1" DIA.

EXPANSION BOLTS, STYLE "E", AS B/P TRACING NO. 26873, 1" DIA.

6 - BOLTS, 16" LONG
6 - " 19" "
6 - " 21" "
6 - " 22½" "
6 - " 23½" "
6 - " 24" "
36 - TOTAL

RADIAL STAYBOLTS - TAPERED HEADS, STYLE "E", AS B/P TRACING NO. 26873, 1" DIAMETER.

4 - BOLTS 27½" LONG
8 - " 27" "
8 - " 26½" "
12 - " 26" "
12 - " 25½" "
12 - " 25" "
16 - " 24½" "
16 - " 24" "
24 - " 23½" "
12 - " 23" "
12 - " 22½" "
8 - " 22" "
8 - " 21½" "
8 - " 21" "
160 - TOTAL

CLASS: 10 34 D 1146

FOR: TEXAS MEXICAN RAILWAY CO.

RADIAL STAYBOLTS - STRAIGHT HEADS, STYLE "C" AS B/P TRACING NO. 51910, 1" DIAMETER

2 - BOLTS	27½" LONG	6 - BOLTS	17" LONG
2 - "	27" "	6 - "	16½" "
2 - "	26" "	2 - "	16" "
2 - "	24½" "	10 - "	15½" "
4 - "	22½" "	8 - "	15" "
6 - "	22" "	6 - "	14½" "
6 - "	21½" "	6 - "	14" "
6 - "	21" "	6 - "	13½" "
6 - "	20½" "	6 - "	13" "
6 - "	20" "	6 - "	12½" "
10 - "	19½" "	8 - "	11½" "
8 - "	19" "	8 - "	11" "
6 - "	18½" "	8 - "	10½" "
6 - "	18" "	8 - "	10" "
6 - "	17½" "	16 - "	9½" "

TOTAL - 188

HOLLOW STAYBOLTS - STYLE "A", AS B/P TRACING NO. 51910

20 - BOLTS 6½" LONG
120 - " 5½" "
94 - " 5" "
234 - TOTAL

WATERSPACE STAYS, STYLE "B" AS B/P TRACING NO. 51910, ⅞" DIAMETER.

16 - BOLTS 8½" LONG
16 - " 8" "
16 - " 7½" "
32 - " 7" "
114 - " 6½" "
144 - " 6" "
394 - " 5½" "
6 - " 5" "
738 - TOTAL.

VERY TRULY YOURS,

FOR MANAGER OF ORDERS.

THE BALDWIN LOCOMOTIVE WORKS Dup. 10 26 ½ D 1½ WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 29050

SPECIFICATION FOR LOCOMOTIVES 10 26 ½ D 1½

FOR TEXAS, OKLAHOMA & EASTERN RAILROAD COMPANY

HW

Engine is PHOTO 6/19

Engine Drawing No. 38

Gauge of Road 4' 8½" Play ⅜".

Wheelbase, Rigid 10' 0" Driving 10' 0" Total 26' 0"

Total wheelbase, engine and tend. { Actual 47' 3" 51' 11" / Limited to ---

RAILS, 56 POUNDS PER YARD. ROUGH TRACK.

Curves 30 DEGREES

Limits, Height --- Width ---

Weight (approximate) in working order, Total 104,500 POUNDS

On F. truck 13,000 lbs. Drivers 77,500 lbs. B. truck 14,000

Tractive power 20,200 lbs., Ratio of adhesion 3.8

Work'g St'm Pres. 180 lbs. Service FREIGHT AND SWITCHING

Fuel COAL

Boiler STEEL Thick ⅜" & 9/16" Bill 8936

Front Tube Sheet ½" Thick

Boiler, Diam. 52" Plan EXTENDED WAGON TOP.

Tested to { Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.92 } 200 lbs. steam pres. / 240 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL Combustion chamb. NONE

Firebox, length 9 7/16" Width 9 1/16" Depth F. 39" B. 53½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3½" Back 3"

Water space frame SINGLE Riveted

Water space stays ⅞" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O. S.

Radial stays 1" DIAM. Sling stays front { TWO ROWS B. L. W. EXPANSION STAYS

Button heads below crown on EIGHT central rows

Crown bars NONE Placed --- above crown

Crown bolts ---

Flues ---

Tubes #12 W.G. CHARCOAL IRON OR STEEL.

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 178 Diam. 2" Length 11'9"

Heating Surface { Flues --- Combus. Chamb. --- Total 1466 sq. ft. / Tubes 1367 sq. ft. Fire Box 88 sq. ft. Fire Brick Tubes 11 sq. ft.

Grate area 20.6 sq. ft. Ratio to Heating Surface 1: 71.2

Superheater ---

Fire Brick ARCH, TO BE SECURITY ON THREE TUBES OF SEAMLESS STEEL, 3" O.S. DIAMETER, 3/16" THICK.

Grates ROCKING BARS AND DROP PLATE.

Ash Pan, Dampers FRONT AND BACK

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L. S. ONLY

Spark ~~arrester~~ hopper WITH

Netting and deflect. plates WITH

Exhaust nozzles DOUBLE-HIGH

Stack STRAIGHT Dia. 16"

Safety Valves TWO (Speed) CROSBY 2½" OPEN

Safety valves NONE with relief valves set to 180 POUNDS.

Whistle ONE B. L. W. PLAIN

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (Not Speed)

Steam gauge stem IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC (SUP. 2)

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve WITHOUT separate pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE BRIDLE, Pos. FRONT

Cleaning Plugs

Firebox, CORNERS DIAGONAL, AND SIDES.

Crown, TWO EACH SIDE AND TWO BACK.

Waist, ONE UNDER FRONT

Front tube sheet, ONE Fusible plug ONE

Pump NONE

INJECTORS SELF ACTION TYPE SUITABLE FOR HOT WATER.

Injectors TWO SELLERS, CLASS "K" (Speed) No. 72

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B.L.W., WITH STOP VALVE. Pos. RIGHT AND LEFT

Steam Heat NONE

Cab STEEL, LINED WITH WOOD; VENTILATOR IN CAB ROOF.

Cab boards WOOD Nosing ANGLE-IRON

Running boards WOOD Nosing NONE

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 34"

Pilot WOOD Pushing shoes NONE

Front Bumper OAK Bumper plate WITH

Steps HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler SHARON M.C.B. AUTO., WITH 13" FACE.

Signal fixtures IRON ON BUMPER

Headlight TWO ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH H'd'l't step NONE

Lamp shelf NONE Nosing ---

Bell 85 POUNDS

Sand Box TWO Diam. 28" Body IRON PAINTED Pipes IRON

Sander LEACH AIR TRAP A-1, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED

Boiler Jacket #22 PLAN. STEEL Bands IRON Style 9 AND 14

Boiler Lagging MAGNESIA SECTIONAL

BACKHEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

D. G. TANDY May 1920

SPECIFICATION FOR LOCOMOTIVES 10 26 ½ D 1½

FOR TEXAS, OKLAHOMA & EASTERN RAILROAD COMPANY

HW.

Frames CAST STEEL

Cylinders, Diam. 16" Stroke 24"

Steam ports, Length 15" Width 1¼" Bridges 1"

Exh. ports, Length 15" Width 2½" Valve lead 3/32"

Valve travel 5½" Steam lap 1" Exhaust clearance ---

Exhaust rank throw 2½" By-pass valve NONE

(Speed) Lubr. NATHAN TRIPLE #9 BULL'S EYE

Cyl'r heads CAST IRON Lubr. PIPES OF IRON UNDER JACKET

Cyl'r casings IRON P'TD. Head covers STEEL PAINTED

Steam chest casings IRON P'TD. Covers STEEL PAINTED

Safety valves RICHARDSON BALANCED, WITH VACUUM VALVES.

(Speed) JEROME

Pistons CAST IRON RINGS SPRUNG INTO SOLID HEAD

Guides STEEL Of type NEEDLE

Crossheads CAST STEEL WITH BRASS BEARINGS

Wrist Pins STEEL Rod ups GREASE CUPS, FORGED ON.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be of case hardened or to have hardened bushings.

All bronzes on bolts (except stayboltsto be Ounce Strength Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE

Drivers, O. S. Diam. 46" Cen. diam. 40" CENTERS CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER.

Tires, Flange, Pos. ALL Size 3" x 5"

Tires, Plain, Pos. NONE Size ---

Lateral play between driving boxes and wheel hubs = 3/16" TOTAL

Driving Boxes CAST IRON, FITTED WITH OIL CELLARS.

Journals, Diam. 7" Length 8"

Springs, Make B.L.W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CEN. BEARING

To swing 5" each side of cen. Cen. pin liners NONE

Journals, Diam. 4½" Length 7½" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 28" Tread 1½" Kind CHILLED CAST IRON PLATE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck TWO Wheeled SWING BOLSTER, SIDE BEARING

To swing 5½" each side of cen. Cen. pin liners NONE

Journals, Diam. 4½" Length 7½" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 28" Tread 1½" Kind CHILLED CAST IRON PLATE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating { Engine, sch. No. 6 ET. EST'G COMBINED ATO. AND STRAIGHT AIR

Parts { Eng. T'k sch. ---

Foundation { Drivers, sch. M-1 AMERICAN OUTSIDE EQUALIZED.

Parts { Eng. T'k sch. ---

Air pump ONE 11" Pos. LEFT SIDE

Train connections FRONT AND BACK

Train signal, sch. NONE

AIR RESERVOIR TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled. Drawing No. 1526

Weight, with fuel and water, about 70,000 POUNDS.

TENDER TO BE WEIGHED: YES

Tank 3,500 Gallons. Bill 5258

TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY, 6 TONS.

Tool Boxes OF HARD WOOD, TOP AND BACK.

Frame STEEL, 8" CHANNELS, WITH BUMPERS OF WOOD REINFORCED BY PLATE.

Front Drawbar height 31"

Pilot NONE Pushing shoes WITH

Back drawhead, center above rail 33½"

Coupler SHARON M. C. B. AUTO. WITH 13" FACE.

Steps HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE, WITH CAST STEEL BOLSTERS.

SIDE BEARINGS ON BOTH TRUCKS.

Springs ELLIPTIC, B. L. W. MAKE

Journals, Diam. 3½" Length 7"

Wheels, Diam 33" Tread 4½" Kind CHILLED CAST IRON PLATE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety Chains DOUBLE

Brake Position ON ALL WHEELS.

Brake sch. No. 6 ET WESTINGHOUSE AUTOMATIC WITH STRAIGHT AIR, WITH 10"x12" TENDER CYLINDER.

List of tools, sch. 26 TWO ALEXANDER REHAILERS FOR 60 POUND RAIL.

Photo sch. No. 2 Inspection B. L. W.

To be weighed No. Material specified B. L. W.

Certificate of boiler test THREE COPIES OF B. L. W. FORM 1036

Junior fawns to 3.26.20. Shipped ON OWN WHEELS.

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents { FEED PIPE STRAINER, PAT'D SEPT. 1, 1903 (CAST ON)

Property plates B. L. W., FOR ENGINE AND TENDER.

Painting, style 291, OLIVE GREEN AND GOLD

Mark on TANK SIDES:- TEXAS, OKLAHOMA & EASTERN R. R.

Road Nos. Pos. Road Nos. Name NONE

F. No. PLATE 209

DOME

CAB SIDES

BACK OF TANK

Actual Dimensions of Loco. Extreme height over all 13' 7"

Extreme Width { Cab boards 9' 1½" Cylinders ~~---~~ 9' 5½"

Length outside face front bumper of engine to face of tender wedge 31' 3½"

Length face of tender wedge to outside face back bumper of tender 20' 7½"

Total length outside face front bumper of engine to outside face back bumper of tender 51' 11"

SPECIFICATION FOR LOCOMOTIVES ID 26 ½ D 172

FOR TEXAS, OKLAHOMA & EASTERN RAILROAD COMPANY

HW

307
306

1 FIRE BOX TO BE PLACED ON TOP OF FRAMES.

2 INCANDESCENT LIGHTS TO BE PROVIDED IN CAB FOR GAUGES AND FIRE DECK.

3 INJECTORS TO BE LOCATED ~~DIRECTLY IN FRONT~~ OUTSIDE OF CAB.

4 SYPHON VALVE IN RIGHT SIDE OF CAB.
McLAUGHLIN FLEXIBLE METALLIC CONNECTION BETWEEN ENGINE AND STEAM SYPHON LOCATED ON TENDER.

5 CAB ROOF TO BE RAISED 6".
CAB TO BE MADE 3" WIDER.
CAB SIDES TO BE RAISED TO BE IN LINE WITH RUNNING BOARDS.

6 BACK FOOT PLATE OF CAST STEEL.

7 FACE OF WEDGE ON CHAFING BLOCK ON ENGINE TO BE 10"x18" AND CHAFING BLOCK ON TENDER TO BE 8"x10".

8 LOCOMOTIVE TO CONFORM TO ALL I.C.C. REQUIREMENTS FOR BOTH SWITCHING AND ROAD SERVICE.

9 HEADLIGHT EQUIPMENT TO BE PYLE-NATIONAL ELECTRIC, LATEST IMPROVED, WITH INCANDESCENT HEADLIGHTS.

10 SAND PIPES TO BE LARGE, SAME AS FOR ID 26 ½ D 107.

11 BOILER LAGGING AND JACKET NOT TO BE APPLIED OVER STAY BOLTS OUTSIDE OF CAB. THESE BOLTS ARE TO BE LEFT EXPOSED.
BOILER HEAD JACKETING IN CAB TO BE APPLIED IN SECTIONS SO TO BE READILY REMOVABLE FOR INSPECTION OF STAY BOLTS.

12 VALVE GEAR TO BE DESIGNED TO GIVE MAXIMUM CLEARANCE ABOVE RAIL AND TO BE COMPACT AS POSSIBLE.

13 FLANGE OILER TO BE CHICAGO FOUR FEED.

14 FRONT AND BACK TRUCK JOURNALS TO BE EQUIPPED FOR OIL INSTEAD OF FOR GREASE LUBRICATORS.

15 EQUALIZING LINK CONNECTIONS TO BACK TRUCK TO BE ARRANGED TO GIVE LIBERAL VERTICAL PLAY FOR ROUGH TRACK.
FULCRUM CASTING FOR EQUALIZER TO BACK TRUCK TO BE MADE OF CAST STEEL.

16 AIR RESERVOIR TO BE PLACED FURTHER FROM THE RAIL, AND ARRANGED FOR CONVENIENT INSPECTION OF REAR TRUCK.

TENDER

26 TANK WING BACK OF COAL BOARD TO BE OMITTED AND TANK TO BE WIDENED TO CONFORM TO THE WIDTH OF THE CAB.

27 SYPHON TO BE MADE BY THE LIMA LOCOMOTIVE & MACHINERY CO. HAVING 4" SECTION (RY. CO. TO PROVIDE HOSE FOR SYPHON.)
SYPHON TO BE LOCATED UNDER TENDER, BETWEEN THE TRUCKS, JUST INSIDE OF OUTSIDE SILL. DISCHARGE PIPE TO BE FLARED THROUGH BOTTOM SHEET ON TANK UP THROUGH THE TOP SHEET AND BACK DOWN THROUGH THE TOP SHEET IN ORDER TO PREVENT WATER SPLASHING BACK OUT THROUGH THE SYPHON.

28 McLAUGHLIN FLEXIBLE METALLIC CONNECTION BETWEEN ENGINE AND STEAM SYPHON LOCATED ON TENDER.

29 FACE OF WEDGE ON FACING BLOCK OF ENGINE TO BE 10"x18" AND CHAFING BLOCK ON TENDER TO BE 8" x 10".

30 OMIT PILOT ON REAR OF TENDER, AND APPLY FOOT BOARD AND HAND RAIL.

31 LOCOMOTIVE TO CONFORM TO ALL I.C.C. REQUIREMENTS FOR BOTH SWITCHING AND ROAD SERVICE.

32 TENDER TRUCKS TO HAVE INSIDE HUNG BRAKES, WITH PARTICULAR ATTENTION TO BRAKE GEAR TO PREVENT LOCKING OF SHOES AGAINST WHEELS WHEN SHOE IS WORN DOWN, AND WITH MAXIMUM CLEARANCE ABOVE RAIL AND TIES.

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-6536, Dup. 10 30 D 609 except where otherwise specified.

Memorandum Spec'n 20094

SPECIFICATION FOR LOCOMOTIVES 10 32 D 1299

FOR Texas South-Eastern Railroad Co.

P

Gen. as Photo. 3717 {except to have piston valves and outside steam pipe connections.

Engine Drawing No. 122

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 12' 0" Driving 12' 0" Total 23' 1½"

Total wheelbase, eng. and tend. {Actual 54' 11½" {Limited to ---

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 140,000 pounds

On F. tr'k 27,000 lbs., Drivers 113,000 lbs., B. tr'k --- lbs.

Tractive power 25,600 lbs., Ratio of adhesion 4.41

Work'g St'm Pres. 180 lbs., Service Freight

Fuel Coal

11. **Boiler** Steel Thicks 3/8" & 11/16" Bill 9110

Front Tube Sheet ½" Thick

Boiler, Diam. 62" Plan Wagon top

{Allowable st'm pres. 200 lbs. **Tested to** {220 lbs. steam pres. {With Factor of Safety of 4.65 {267 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips

Main Dome, one-piece type. Auxiliary Dome, None

Dome, diam. 29" Pos. Wagon top

Firebox Steel Combustion chamb. None

Firebox, length 107¾" Width 33⅜" Depth F. 68" B. 5⅝"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

1. Firedoor opening 16" diam.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

2. Water space stays ⅞" diam. with 3½" holes 1½" deep from O.S.

Radial stays 1" diam. Sling stays front {Two Rows B. L. W. {Expansion Stays

Button heads below crown on Six central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G. Steel

4. **Tubes** No. 12 B.W.G. Charcoal Iron or Steel (B.L.W. Option)

Tube ends Swaged for copper ferrules, fire box ends

Number {22 {140 Diam. {2⅝" {2" Length 12' 5"

Heating Surface {Flues 378 sq. ft. {Tubes 945 sq. ft. Combus. Chamb. --- Total 1475 sq. ft. Fire Box 154 sq. ft. Fire Brick Tubes ---

Grate area 25 sq. ft. Ratio to Heating Surface 1: 59

Superheater 340 sq. ft.

Fire Brick Arch, On Studs.

5. **Grates** Rocking Bars with drop plate

Ash Pan, Dampers Front and Back

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater Schmidt type (See Sup. 6)

8. **Smokebox** extension With 7. Cleaning hole and cap L.S. only

Spark ejector or hopper With

Netting and deflect. plates With

Exhaust nozzles Single, High

Stack Straight (See Sup. 9) Dia. 18"

4-14-20 (Speed)

Safety Valves Two Consolidated 3" Open

Safety valves None with relief lever, Set to 180 pounds

Whistle Nathan Freight Chime

Steam Gauge One Iron 7" Maker: Crosby.

Steam gauge stand Iron **Clock** None

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3¼" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One Johnstone Pos: Front

Cleaning Plugs One filling plug in top of boiler

Firebox, Corners diagonal. One plug above fire door.

Crown, Two R. S., three L. S., and two back

Waist, One under front

Front tube sheet, One Fusible plug One

One plug each side above crown, front of back tube sheet.

Washout plugs to be same as 10 26 ½ D 157

Pump None

(Speed)

Injectors Two "Monitor", Lever movement. No. 8

Injectors, Pos. R. and L. Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B. L. W. Pos. R. and L.

Steam Heat None

10. **Cab** Steel (entirely) Ventilator in roof of cab.

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

10. **Back Bumper** Bar Steel Back drawbar height 33½"

Pilot Wood

Front Bumper Oak

11. **Steps** on front of bumper Bumper plate With

Steps, hand holds etc. to conform to I. C. C. requirements

Front Drawhead, Center above rail 33½"

Coupler Sharon Steel M. C. B. Auto. with 13" face.

12. Signal fixtures Iron on bumper

11. 13. **Headlight** One Round Case 18" Reflector,

Headlight, Nos. on sides With H'dl't step With

Lamp shelf None Nosing ---

Bell 92 pounds Gollmar Auto. Bell Ringer.

Sand Box Two Diam. 28" Body Iron painted Pipes Iron

(Speed) Sander Leach Air, Trap A-1, in each box to sand front and back.

Dome casing Iron painted

Boiler Jacket #18 Soft Steel ptd. Bands Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

H. Howitz Aug. 1920

SPECIFICATION FOR LOCOMOTIVES 10 32 D 1299

FOR Texas- South Eastern Railroad Co.

P

10. **Frames** Cast Steel

Cylinders, Diam. 19" Stroke 26"

16. St'm ports, Length 23.94" Width 1½" Bridges ---

Exh. ports, Length --- Width --- Valve lead ⅛"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ---

Eccentric crank throw 12⅝" By-pass valve None

(Speed) S. P. Lubr. Nathan Five Feed Bull's Eye

Cyl'r heads Cast Iron Lubr. Pipes of iron under jacket

Cyl'r casings Iron painted Head covers Steel painted

St'm chest casings --- Covers ---

St'm chest valves 9½" diam., Piston Valve

(Speed) Met. pkg: Piston rods Valve stems U. S. King Type

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron with rings of cast iron sprung in

Guides Alligator type, Steel Oil cups Needle

14. **Wrist Pins** Steel Rod cups (See Sup. 15)

Parallel rods to have solid ends.

Rods to be "I" or channelled section.

16. **Valve Motion** Walschaerts

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except stayboits) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Brass

20. **Drivers,** O. S. Diam. 56" Cen. diam. 50" Cast Steel

18. **Tires** Steel (Sup. 17) Held by Shrinkage only. (See Sup

19. Tires, Flanged, Pos All Size 3" x 5½"

Tires, Plain, Pos. None Size ---

Lateral play between driving boxes and wheel hubs = 3/16" total

Driving Boxes Cast Steel, with Elvin Lubricators

Journals, Diam. 8" Length 9"

Spring rigging to be same as for 10 30 D 609

Springs. Make Standard Steel Works

Front Engine Truck Four Wheeled Swing Bolster, center bearing

To swing 2¾" each side of cen., Cen. pin liners None

Journals, Diam. 5½" Length 10" Boxes Cast Steel

Wheel hub liners Brass

Wheels, Diam. 28" Tread --- Kind Cast Iron Spoke Center

21. Tires Steel (See Sup. 18) Cen. diam. 23" Size 2½" x 5½"

Tires held by Shrinkage and shoulder

Back Engine Truck None Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels

Operating {Engine, sch. No. 6-ET Weste. Combined Auto. and Parts {Eng. Tr'k, sch. --- Straight Air

Foundation {Drivers, sch. WM-2 American O. S. Equalized Parts {Eng. Tr'k, sch. ---

26. Air pump One 11" Pos. Left Side

Train connections Front and Rear

Train signal, sch. None

Air reservoirs to have hydrostatic test of 210 pounds.

31. **Tender** Eight Wheeled, Drawing No. 1581 {Tender to be weighed: Yes

Weight, with fuel and water, about 111,000 pounds

Tank 6,000 Gallons, Bill 5397

Tank "U" shape, straight top. Fuel capacity 10½ tons.

Tool Boxes Hard Wood, Top

Frame Steel, 10" channels with bumpers of steel plate.

10. Front Drawbar height 32¼"

Pilot None

Back drawhead, center above rail 33½"

Coupler Sharon Steel, M. C. B. Auto. with 13" face.

Steps Hand holds., etc. to conform to I. C. C. requirements.

Trucks Equalized pattern with bolsters of cast steel.

Springs Half-elliptic, Standard Steel Works

33. Journals, Diam. 5" Length 9"

34. Wheels, Diam. 33" Tread --- Kind Cast Iron Spoke Center

Tires Steel (Sup. 18) Cen. diam. 28" Size 2½" x 5½"

Tires held by Bolted type fastening

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET Westinghouse Automatic and Straight Air, with 12" x 12" tender brake cylinders.

List of tools, sch. 29

Photo sch. None Inspection B. L. W.

To be weighed Yes Material specifications B. L. W.

Certificate of boiler test Three copies of B. L. W. form 1036

Junior laws to 7-22-20 Shipment On own wheels (Sup. 27)

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. {None

Patents {

Property plates B. L. W., for engine and tender.

Painting, style—Olive Green, No Striping

Lettering and numbering to be same style as for Texas and Pacific Railway, except to be in white paint.

Mark on Tank Sides: TEXAS SOUTH-EASTERN

Mark on Back of Tank, 6000 GALLS

Road Nos. Pos. Road Nos. Name None

F. No. Plate 13

F. Sand Box

Cab Sides

Back of tender frame

Actual Dimensions of Loco. Extreme height over all 13' 6"

Extreme Width: Cab boards 9' 10"; Cylinders or valve motion 9' 8"

Length outside face front bumper of engine to face of tender wedge 33' 11"

Length face of tender wedge to outside face back bumper of tender 26' 7½"

Total length outside face front bumper of engine to outside face back bumper of tender 60' 6½"

SPECIFICATION FOR LOCOMOTIVES 10 32 D 1299

FOR TEXAS SOUTH-EASTERN RAILROAD CO.

P

1 FIRE DOOR TO BE FRANKLIN BUTTERFLY TYPE.

2 TATE (Speed) FLEXIBLE-STAYBOLTS, IN BREAKING ZONE AND THROAT SHEET, ABOUT 400 TO 450.
FLEXIBLE STAYBOLTS TO HAVE WELDED SLEEVES.
APPLICATION OF TATE STAYBOLTS AS B. L. W. TRACING 42603.

3 STAYBOLTS ON SIDES TO BE LEFT BARE, SAME AS FOR 10 26 ¼ D 157.

4 TUBES OF CHARCOAL IRON PREFERRED.
FLUES NOT TO BE WELDED TO TUBE SHEET.

5 DUMP GRATE TO BE LOCATED IN BACK OF FIRE BOX UNDER FIRE DOOR.

6 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S. SPECN. NO. O-14248 DATED JUNE 28, 1920 (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBER.
ROYALTY PAYABLE BY THE B. L. W.

7 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

8 FRONT END ARRANGEMENT, MASTER MECHANIC'S STYLE.

9 STACK TO BE SAME AS FOR 10 30 D 609, EXCEPT TO BE 10" SHORTER

10 DECK CASTING, CHAFING PLATES, AND DRAWBAR CASTING OF STEEL, SAME AS FOR 10 26 ¼ D 157, I. E., CAST STEEL DECK PLATE, WITH EXTRA HEAVY DRAWBAR CONNECTION BETWEEN ENGINE AND TENDER AND STEEL CHAFING IRONS WITH 10" VERTICAL FACE AND LONG SWEEP TO PROVIDE FOR EXTRA ROUGH SERVICE.

11 ALL I.C.C. REQUIREMENTS TO BE CARED FOR, INCLUDING HEADLIGHT DIMMER.

12 MARKER SOCKETS TO BE PROVIDED ON FRONT END.

13 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2 WITH INCANDESCENT HEADLIGHTS.

14 WRIST PIN FASTENINGS TO BE MADE WITH HEXAGON NUTS, ON OUTSIDE, SAME AS FOR 10 26 ¼ D 157.

15 GREASE CUPS TO BE FORGED SOLID ON RODS, SAME SIZE AS APPLIED ON 10 26 ¼ D 157.

16 PARTICULAR ATTENTION TO BE GIVEN TO VALVE GEAR AND SETTING OF VALVES. PREVIOUS ENGINES HAVE BEEN RECEIVED WITH VALVE GEAR OUT OF LINE AND THIS ENGINE IS TO BE AS NEARLY PERFECT AS POSSIBLE.

17 DRIVING TIRES OF HARDEST GRADE STEEL FROM STANDARD STEEL WORKS.

18 TIRE SHRINKAGE ALLOWANCE 3/32" ACCOUNT HOT CLIMATIC CONDITIONS.

19 CHICAGO FLANGE OILER TO BE OMITTED.

20 RAIL WASHERS TO BE PIPED TO BACK OF DRIVING WHEELS

21 FRONT ENGINE TRUCK WHEEL TIRES OF HARDEST GRADE STEEL.
ENGINE TRUCK WHEELS FROM STANDARD STEEL WORKS.

26 AIR PUMP TO HAVE U. S. METALLIC PACKING.
AIR PUMP TO HAVE C-54 AIR STRAINER.
AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.

27 SPARE PARTS COVERED ON EX. ORDER NO. 18304 DATED 7-26-20 TO BE SHIPPED WITH LOCOMOTIVE.

TENDER

31 TENDER OF LONG, LOW DESIGN.

32 DRAIN PIPES THROUGH COPING TO REAR CORNERS OF TANK TO DRAIN OVERFLOW.

33 TENDER AXLES OF HAMMERED STEEL, HARDEST GRADE.

34 TENDER WHEELS FROM STANDARD STEEL WORKS.

311
310

CLASS: 10 32 D 1299

FOR: TEXAS SOUTHEASTERN RAILROAD CO.

Specification for Type A Double Loop Superheater. SPEC. NO. O-14248 DATED JUNE 28TH, 1920.

BOILER TUBES	140 in number 2 o.d. 12 ft. 5" in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	22 in number 5½ o.d #9 BWG of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 Card 1713-L
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and pressered except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections Card 1136
TUBE SHEET LAYOUT	Card 50551
UNITS	22 units 14" o. d #9 BWG Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide Card 10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on Card 1052
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A Card 1064-N
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card 1112-A
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with Card SEE ARRGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 1149-J
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer Card 1067
S. H. ARRANGEMENT	To be in accordance with Card 40568-A
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 1282-G	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 1115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 1114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. PIPE BAND	Card 1988
DAMPER CYL. SUPPORT	Card	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1063-W	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O.S.)	Card 1127-S	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 10386-A	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINK	Card 1070-K	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A
PYROMETER	NONE		

THE BALDWIN LOCOMOTIVE WORKS As Spec. C6169

Memorandum Spec'n 20045

SPECIFICATION FOR LOCOMOTIVES 8 20 D 164

ER,

FOR Townsville Railroad Company

HW

Gen. as PHOTO 5339 (Except to have straight stack and to omit wood rack from tender.

Engine Drawing No. 34

2.23.20

(Not Specd)

Gauge of Road 4'8½" Play ⅜"

Wheelbase, Rigid 12'0" Driving 12'0" Total 18'10"

Total wheelbase, eng. and tend. (Actual 38'11½" (Limited to ---

Curves ---

Grades 2%.

Limits, Height --- Width ---

Weight (approximate) in working order, Total 60,000 pounds

On F. trk 10,200 lbs., Drivers 49,800 lbs., B. trk --- lbs.

Tractive power 10,940 lbs. Ratio of adhesion 4.5

Work'g St'm Pres. 160 lbs., Service Passenger and Freight

Fuel Coal

* Boiler to have factor of safety of 4 to 4.5

Boiler Steel Thick 7/16" Bill 8948

Front Tube Sheet ½" Thick

Boiler, Diam. 44" Plan Straight Top.

(Allowable st'm pres. 160 lbs.

* (With Factor of Safety of 5.6 **Tested to** 180 lbs. steam pres / 214 lbs. water pres.

Longitud. seams ~~Double riveted lap joints~~ Butt jointed, double covering strips.

Dome, diam. 19" Pos. Central

Firebox Steel Combustion chamb. None

Firebox, length 49 3/16" Width 39⅜" Depth F. 52½" B. 51½"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

Firedoor opening 14" diam.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays ⅞" diam. with 3/16" holes 1½" deep from O.S.

Radial stays 1" diam." Sling stays front None

Button heads below crown on Four central rows

Crown bars None Placed --- above crown

Crown bolts ----

Flues ---

Tubes #12 W. G. Charcoal Iron or Steel (B.L.W. Option)

Tube ends Swaged for copper ferrules at fire box ends.

Number 112 Diam 2" Length 9' 2⅜"

Heating Surface (Flues ---- Combus. Chamb. --- Total 599⁰

(Tubes 536⁰ Fire Box 63⁰ Fire Brick Tubes ---

Grate area 11.7⁰ Ratio to Heating Surface 1: 51.2

Superheater ---

Fire Brick Arch None

Grates Rocking Bars with drop plates

Ash Pan, Dampers Front and Back

HEREAFTER: Ashpan and all other details to conform to I. C. C. requirements.

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater None

Smokebox extension With Cleaning hole and cap L. S. Only

Spark ~~ejector or~~ stopper With

Netting and deflect. plates With

Exhaust nozzles Double-High

Stack Straight Dia 13"

Safety Valves Two Coale 2" Open

Safety valves None with relief lever, Set to 160 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Maker: Ashcroft (Not Specd)

Steam gauge stand Iron **Clock** None

Water Gauge One B.L.W. (Ironclad) **Cab Lamps** to burn oil

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve WITHOUT separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One B.L.W. Pos:- Left Side

Cleaning Plugs One filling plug in top of boiler

Firebox, Corners, front ones diagonal, R.S. and back

Crown, Two each side and two back.

Waist, One under front

Front tube sheet. One Fusible plug One

Pump None

Boiler to meet all I. C. C. requirements.

Steam connection to be provided for use with syphon.

Injectors Two Monitor (Not Specd) No. 5

Injectors, Pos. R. and L. Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B. L. W. Pos. R. and L.

Steam Heat None

Cab Wood

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 28½"

Pilot Wood

Front Bumper Oak Pushing shoes None

Steps None Bumper plate With

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Auto.

Signal fixtures Iron on Bumper

Headlight Two Round Case 16" Reflector, To burn Kerosene

Headlight, Nos. on sides With H'd'l't step None

Lamp shelf None Nosing ---

Bell 45 pounds

Sand Box Two Diam. 19" Body Iron Painted Pipes Iron

(Not Specd)

Sander Leach Air Trap A-1 in each box, to sand front and back.

Dome casing Iron Painted

Boiler Jacket #22 Soft Steel Ptd. Bands Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

L.G.Takey Apr. 1920

SPECIFICATION FOR LOCOMOTIVES 8 20 D 164

FOR Townsville Railroad Company

HW.

3/9

3/12

Frames Cast Steel

Cylinders, Diam. 13" Stroke 20"

St'm ports, Length 12" Width 1" Bridges ⅞"

Exh. ports, Length 12" Width 2" Valve lead 1/16"

Valve travel 4½" Steam lap 1 1/16" Exhaust clearance ---

Eccentric ~~crank~~ throw 4" By-pass valve None

(Not Specd)

S. F. Lubr. Nathan Triple Bull's Eye.

Cyl'r heads Cast Iron Lubr. Pipes of Iron, under jacket

Cyl'r casings Iron Ptd. Head covers Steel Painted

St'm chest casings Iron Ptd. Covers Steel Painted

St'm chest valves Richardson balanced, with vacuum valves

(Not Specd)

Met. pkg Piston rods ~~Yarnall~~ U. S. King Type

Piston rods to be keyed to crossheads

Pistons heads cast iron with rings of cast iron sprung in.

Guides Steel Oil cups Needle

Crossheads Cast Steel with bearings of cast iron, tinned.

Wrist Pins Steel Rod cups Plunger

Parallel rods to have solid ends.

Valve Motion Stephenson

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case-hardened or to have hardened bushings

All threads on bolts, except stay-bolts, to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners None

Drivers, O. S. Diam 50" Cen. diam 36" centres Cast Iron

Tires Steel Held by Shrinkage and Shoulder

Tires, Flanged, Pos. Front and Back Size 3" x 5½"

Tires, Plain, Pos. Middle Size 3" x 6½"

Lateral play between driving boxes and wheel hubs ¾" total

Driving Boxes Cast Iron

Journals, Diam 5½" Length 8"

Springs, Make B. L. W.

Front Engine Truck Two Wheeled, Swing Bolster, Center Bearing

To swing 4" each side of cen. Cen. pin liners None

Journals Diam. 4" Length 8" Boxes Cast Iron

Wheel hub liners None

Wheels, Diam. 26" Tread 1¼" Kind Chilled Cast Iron Plate

Tires --- Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck None Wheeled ---

To swing --- each side of cen. Cen. pin liners ---

Journals, Diam --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels

Operating Engine, sch. No. 6 ET Testg. Combined auto and

Parts Eng. Trk. sch. --- straight air

Foundation Drivers, sch. M-1 American O.S. Equalized

Parts Eng. Trk. sch. ---

Air pump One 9½" Pos L. S.

Train connections Front and back

Train signal, sch. None

Air reservoir to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1518

Weight, with fuel and water, about 50,500 pounds

Tender to be weighed: Yes

Tank 2,500 Gallons, Bill 5247

Tank "U" shape, straight top. Fuel capacity 3½ tons.

Tool Boxes of hard wood, top.

Frame steel, 6" and 8" channels, with bumpers of wood and steel plate

Front Drawbar height 25⅜"

Pilot None Pushing shoes None

Back drawhead, center above rail 33½"

Coupler M. C. B. Auto.

Steps hand holds, etc. to conform to I. C. C. requirements.

Trucks Arch bar type, with cast steel bolsters.

Springs Elliptic, B. L. W.

Journals, Diam 3¾" Length 7"

Wheels, Diam 28" Tread 1¼" Kind Chilled Cast Iron Plate

Tires --- Cen. diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6 ET Westg. Automatic and straight air, with 8" x 12" tender cylinder.

★ Sales Dept. is to be advised in time so Co. can be informed through Richmond Office, five (5) days before locomotive is ready for shipment.

List of tools, sch. 25

Photo sch ~~No. 6~~ None Inspection B. L. W.

To be weighed No Material spec'ns B. L. W.

Certificate of boiler test Three copies B.L.W. form 1936

Junior laws to 3-29-20 Shipment On own wheels (See ★ above)

Brass shop finish No. 1

Machine shop finish D-1-5

B. L. W. Feed Water Strainer, Patented Sept. 1, 1903 (cast on)

Patents

Property plates B. L. W. for engine and tender.

Painting, style 291, Olive Green and Aluminum

Mark on cab sides: T. R. R.

Mark on tank sides: Townsville Railroad

Road Nos. Pos Road Nos Name None

F. No. Plate 3

F. Sand box

Back of tank

Actual Dimensions of Loco. Extreme height over all 11' 6⅜"

Extreme Width Cab boards 8' 3" Cylinders 8' 3½"

Length outside face front bumper of engine to face of tender wedge 24' 7½"

Length face of tender wedge to outside face back bumper of tender 18' 11½"

Total length outside face front bumper of engine to outside face back bumper of tender 43' 7"

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-5230, dup. 6 38 D 99 with same extras, except where otherwise specified.

Memorandum Spec'n 20096

SPECIFICATION FOR LOCOMOTIVES 6 38 D 124

W&F **FOR** The Trumbull Steel Company

H.W.

Gen as Photo. 6352

Engine Drawing No. 19

4-19-20

Gauge of Road 4'8½" Play ¾"
Wheelbase, Rigid 11'0" Driving 11'0" Total 11'0"
Total wheelbase, eng. and tend. {Actual 44'1" / Limited to ---

Curves ---

Limits, Height 14'2" Width ---
Weight (approximate) in working order, Total 160,000 pounds
On F. tr'k --- lbs., Drivers 160,000 lbs., B. tr'k --- lbs.

Tractive power 31,750 lbs., Ratio of adhesion 4.25
Work'g St'm Pres. 180 lbs. Service Switching
Fuel Bituminous Coal

14 **Boiler** Steel (Sup. 26) Thick 13/16" Rivet 88/76
5 Front Tube Sheet: 9/16" thick
Boiler, Diam. 74" Plan Straight Top
3 Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.
6 With Factor of Safety of 5.42 270 lbs. water pres.
6-18 Longitud. seams Butt jointed, double covering strips.

5 **Dome,** diam. 33" Pos. Central
Dome to be large for inspection purposes.
5 **Firebox** Steel (Sup. 439) Combustion chamb. None
Firebox, length 96 1/16" Width 39" Depth F. 71¾" B 69¼"
10 Firebox, Tube 9/16" Crown ½" Sides ⅜" Back ⅜"
Firedoor opening 16" diam.
Water space, Front 4" Sides 4" Back 4"
Water space frame Double Riveted
4 4/28 Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O.S.
4 Radial stays 1" diam. Sling stays front Three rows B.L.W. Expansion Stays.
Button heads below crown on Six central rows
Crown bars None Placed --- above crown
Crown bolts ---

4 Plugs ---
18 **Tubes** #12 W.G. Charcoal Iron or Steel (B.L.W. Option)
Tube ends Swaged for copper ferrules, firebox ends.
Number 330 Diam. 2" Length 11'0"

Heating Surface Flues --- Combus. Chamb. --- Total 2046
Tubes 1886 Fire Box 160 Fire Brick Tubes ---
Grate area 28 Ratio to Heating Surface 1 : 18.7
Superheater ---

Fire Brick Arch, None

29 **Grates** Rocking bars with drop plate
Ash Pan, Dumpers None

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

5 30 **Smokebox** Extension With Cleaning hole and cap None
Spark ejector or hopper None
Netting and deflect. plates With

Exhaust nozzles Double High

Stack Straight Dia. 16"

8 (Not specd) **Safety Valves** Three Coale 3" One muffled
10 Safety valves All with relief lever. Set to {180 lbs. muffled / 183 pounds open
8 **Whistle** B.L.W. Chime

8-9 **Steam Gauge** One Iron 7" Maker: Ashcroft
Steam gauge stand Iron **Clock** None

8 **Water Gauge** One B.L.W. Ironclad **Cab Lamps** to burn oil
8 **Gauge Cocks** Three Back Surface valve None
Lowest gauge cock 4" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
8 **Blower Valve** B.L.W.

8 **Blow off Cock** One Crane 2" Pos: Front
17 **Cleaning Plugs** One plug above fire door.
Firebox, Corners diagonal, and sides
Crown, Two each side and one back.
31 Waist, Two under, one front and one back
Front tube sheet, One 10 Fusible plug, One

Pump None

32 (Speed) **Injectors** Two Sellers, Class "N" No. 9½
Injectors, Pos. Right and Left Steam pipes Copper
8-15 Pipes, Check Copper Feed Iron Overflow Iron
Check Sellers, withstop valve Pos. R. and L.

Steam Heat None

Cab Steel (See sup. 33) Ventilator in cab roof.

Cab boards Steel Plate Nosing T-Iron
34 Running boards Steel Plate Nosing T-Iron
Hand rail Iron Located on Boiler

37 **Back Bumper** Bar Steel Back drawbar height 32"

Pilot None Pushing shoes Cast in Bumper
35 **Front Bumper** Cast Steel Bumper plate None
35 Steps and hand holds, etc. to conform to I.C.C. requirements.

Front Drawhead, Center above rail 34½"
Coupler Sharon M.C.B. automatic, with slotted knuckle.

Signal fixtures Malleable Iron on Smoke Box.

38 **Headlight** Two Round case 16" Reflector, To burn Kerosene
Headlight, Nos. on sides With Position With (See sup. 36)
Lamp shell None Nosing ---

Bell 92 pounds Gollmar Air Bell Ringer
Sand Box Two Diam. 28" Body Iron Painted Plate Iron
(Spec) Sand Leach air trap A-1, in each sand box to sand front and back
Dome casing Iron Painted

39 **Boiler Jacket** #18 Steel Pto. Bands Iron Style 9 and 14
Boiler Lagging Franklin 85% Magnesia Sectional
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

H.E. Beehner Aug 1920

SPECIFICATION FOR LOCOMOTIVES 6 38 D 124

315
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FOR The Trumbull Steel Company

H.W.

40 (Spec) **Frames** Cast Steel

42 **Cylinders,** Diam. 22" Stroke 26"
St'm ports, Length 19" Width 1⅞" Bridges 1⅛"
Exh. ports, Length 19" Width 2¼" Valve lead ¼"
Valve travel 5¼" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 12-7/32" By-pass valve None
(Spec) S. P. Lubr. Detroit Triple #22 Bulls Eye.
Cyl'r heads Cast Iron Lubr. pipes of copper under jacket.
Cyl'r casings Iron Ptd. Head covers Steel Painted
St'm chest casings Iron Ptd. Covers Steel Painted
St'm chest valves Richardson balanced, with vacuum valves
(Spec) Mstr. pkg (piston rods, valve rods) United States, King Type.

Pistons Cast Iron Rings sprung into solid head
Guides Two bar type, steel Oil cups Needle
43 **Crossheads** Alligator, type, cast steel
44 **Wrist Pins** Steel Rod cups Plunger, for all rods
Parallel rods to have solid ends.

Valve Motion Walschaerts
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.
Driving wheel hub liners (See sup. 48)
Drivers, O.S. Diam. 51" Cen. diam. 44" centers, Cast Steel

Tires Steel Held by Shrinkage and Shoulder
Tires, Flanged, Pos. Front and Back Size 3½" x 5½"
47 Tires, Plain, Pos. Middle Size 3½" x 6½"
Lateral play between driving boxes and wheel hubs 3/16" total
49 **Driving Boxes** Cast Steel
Journals, Diam. 9" Length 12"

Springs. Make B.L.W.

Front Engine Truck None Wheeled ---
To swing --- each side of cen. Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck None Wheeled ---
To swing --- each side of cen. Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

50 (Spec) **Brake,** position On all driving and tender wheels
Operating Engine, sch. A-1 and SHA Westg. auto. and
Parts Eng. Trk, sch. --- straight air.
Foundation Drivers, sch. MA-3 and BC, American O.S. Equalized
Parts Eng. Trk. sch. ---
51 Air pump Two 9½" Right and Left; Pos: Both Left Side
Train connections Front and Back
Train signal, sch. None
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 435
Weight, with fuel and water, about 90,000
Tender to be weighed:- Yes
68 **Tank** 4,500 Gallons, Bill 4551
Tank "U" shape, sloping back. Fuel capacity 6 tons
Coal gates of steel.
Tool Boxes of steel, built into legs of tank.

Frame Steel, 10" channels with front and back bumpers of wood.
Front and back bumpers to have ⅜" plate in back of same.
37 Front Drawbar height 33"
Pilot None Pushing shoes at rear
Back drawhead, center above rail 34½"
Coupler Sharon M.C.B. auto. with 12½" head, and with Westing-house friction draft gear.
Coupler to have slotted knuckle.
66 Steps and hand holds to conform to I.C.C. requirements.

Trucks Arch bar type, with cast steel bolsters.
Trucks springs planks to be of channel iron.
Springs Elliptic, B.L.W. Make
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4½" Kind Rolled Steel
Tires None Cen. diam. --- Size ---
Tires held by --- Wheel rims 2½" thick.
Safety chains Single

Brake Position On all wheels
Brake sch. FL-1212-SHB Westg. auto. and straight air.

List of tools, sch. 29
Photo sch. None Inspection B.L.W. (except see sup. 1 etc 27)
To be weighed No Material specns B.L.W. (Except see sup. 4 etc)
24 Certificate of boiler test Three copies of B.L.W. form 1036
Junior laws to 2.2.18. Shipment On own wheels

Brass shop finish, No 1
Machine shop finish D-165

B. L. W. Patents Feed pipe strainer, pat'd. Sept. 1, 1903 (Cast on)

Property plates None

Painting, style 291, Olive Green and Aluminum.

Marking to be exactly same as for 6 38 D 99.
Mark on tank sides; The Trumbull Steel Company

Omit front number plate (account of location of the headlight.)
Road Nos. Pos. Road Nos. Name None
F. Sand Box 102
Cab Sides
Back of Tank

Actual Dimensions of Loco. Extreme height over all 14'0" 14' 1⅜"
Extreme Width: Cab boards 10'3¼" Cylinders or valve motion 10'5½"
Length outside face front bumper of engine to face of tender wedge 30'2½"
Length face of tender wedge to outside face back bumper of tender 24'9½"
Total length outside face front bumper of engine to outside face back bumper of tender 55'0"

SPECIFICATION FOR LOCOMOTIVES 6 38 D 124
FOR The Trumbull Steel Company
P

1 BOILER TO BE OPERATED IN THE STATE OF OHIO
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND-ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

Boiler and Fire Box Steel Material for One-piece Dome	A.S.M.E. Spec. Page 11
Boiler Rivet Steel	A.S.M.E. Spec. Page 15
Boiler Rivet Iron	A.S.M.E. Spec. Page 31
Boiler Brace Iron	A.S.M.E. Spec. Page 37
Boiler Staybolt Iron	A.S.M.E. Spec. Page 34
Boiler Tubes	A.S.M.E. Spec. Page 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1913)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
No. OF THREADS PER INCH.	11½	11½	8
MINIMUM No. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE No. OF THREADS.	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅝", (I. E., USE FUSIBLE PLUG GARD 4114 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG GARD 1219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER, THE FEED WATER TO DISCHARGE BELOW THE LOWEST SAFE WATER LINE.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6858.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG: ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE, OR THEY MAY BE PUNCHED OUT NOT TO EXCEED 4" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED 2" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ½". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(manufacturer's Serial Number)	OHIO (State in which boiler is to be used) No. 46 (Manufacturer's State Standard Number) THE BALDWIN LOCOMOTIVE WORKS (Name of Manufacturer) (LEAVE BLANK) (State's Number) (LEAVE BLANK) (Year put in service) 180 LBS. (maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVES 6 38 D 124
FOR The Trumbull Steel Company
HW

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26 BOILER TO CONFORM TO THE REQUIREMENTS OF THE INDUSTRIAL COMMISSION OF OHIO,
A.S.M.E. BOILER CODE (EDITION OF 1914 ONLY), COVERS THE CONSTRUCTION OF NEW BOILERS ONLY. FITTINGS AND APPURTENANCES MUST COMPLY STRICTLY WITH THE PRESENT OHIO BOILER CODE.
SAFETY VALVE OUTLETS MUST BE LARGE ENOUGH TO TAKE CARE OF A VALVE THE DIMENSIONS OF WHICH SHALL COMPLY WITH THE TABLE GIVEN ON PAGE 109, PART 3, SEC. 7, PARAGRAPH 3, OHIO BOILER INSPECTION LAW AND RULES, EDITION OF 1913.

27 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.

28 FLEXIBLE STAYBOLTS TO BE (Specify) TATE OF EWALD IRON 1" DIAM. ABOUT 400 IN BREAKING ZONE.
BOTTOM ROW OF STAYBOLTS IN WATER LEG AND RIVETS FOR MUD RING TO COME ABOVE FRAME AND BE ARRANGED SO THAT BOILER MAY BE PATCHED READILY AT THIS POINT.

29 ASH PAN TO BE DUMPING TYPE WITH CLEANING DOORS IN BOTTOM OF PAN. DOORS TO BE OPERATED FROM THE SIDE OF LOCOMOTIVE.

30 FRONT END ARRANGEMENT TO BE M.M. STANDARD SELF-CLEANING TYPE.

31 ONE PLUG EACH SIDE IN WAIST, BACK OF SAND BOX AND JUST ABOVE THE LONGITUDINAL SEAMS.

32 INJECTOR TO BE SELF ACTING TYPE AND TO BE LOCATED AS LOW AS POSSIBLE.

33 CAB TOOL BOXES AND CAB SEAT BOXES TO BE MADE OF STEEL.
CAB CURTAIN TO BE PROVIDED.

34 RUNNING BOARDS TO EXTEND UP TO STEAM CHESTS.
BRACKET SUPPORT FOR RUNNING BOARD ON FIRE BOX, AND NOT TO BE ATTACHED TO BOILER WITH FOOT TURNED UP.

35 STEP TO BE PROVIDED IN FRONT OF ENGINE WITH BRACKETS OF STEEL, SUPPORTING A STEEL PLATE ON WHICH IS BOLTED AN OAK PLANK. THIS STEP TO BE MADE IN SHORT SECTIONS, WITH SPACE BETWEEN TO CLEAR PILOT OF ANOTHER LOCOMOTIVE TO WHICH THIS LOCOMOTIVE MAY BE COUPLED.
ADDITIONAL STEPS ON BACK OF FRONT BUMPER BEAM.

36 ONE STEP ON RIGHT AND TWO STEPS ON LEFT SIDE OF SMOKE BOX.

37 ECONOMY DEVICES CORPORATION CAST STEEL (DOUBLE SPRING) RADIAL BUFFER TO BE APPLIED BETWEEN ENGINE AND TENDER.

38 HEADLIGHT TO BE PLACED IN CENTER OF THE SMOKE BOX DOOR.

39 TOP AND SIDES OF FIREBOX INSIDE OF CAB TO BE LAGGED AND JACKETED.

40 FRAMES TO BE THOROUGHLY ANNEALED TO HAVE DOUBLE FORWARD SECTION. FRAMES TO HAVE GOOD CROSS BRACES.

41 PEDESTAL WEDGES AND GIBS OF CAST IRON.

42 CYLINDERS TO BE BUSHED.

43 CROSSHEADS TO HAVE SIDE PLATES.
CROSSHEAD GIBS OF WROT IRON, BABBITTED.

46 WRIST PINS TO BE RIVETED OVER.

47 THE BLIND TIRES ON MIDDLE WHEELS TO BE AS WIDE AS PRACTICABLE.

48 DRIVING WHEELS TO HAVE HUB LINERS OF BRONZE.

49 DRIVING BOXES TO HAVE HEAVY BRONZE BEARINGS WITH SUITABLE OIL GROOVES.

50 MAIN RESERVOIRS TO HAVE DRAIN COCKS.

51 AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.

52 DRIVING BRAKE CYLINDERS TO BE 14" x 10".

TENDER

66 STEPS TO BE PROVIDED AT REAR OF TENDER WITH BRACKETS OF STEEL, SUPPORTING A STEEL PLATE ON WHICH IS BOLTED AN OAK PLANK. THIS STEP TO BE MADE IN SHORT SECTIONS WITH SPACE BETWEEN TO CLEAR PILOT OF ANOTHER LOCO. TO WHICH THIS LOCOMOTIVE MAY BE COUPLED.

67 SIDE STEPS TO BE PROVIDED AT REAR OF TENDER.

68 HANDRAIL ON TANK ONLY 26" HIGH.

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. 6704

Memorandum Spec'n 20121

SPECIFICATION FOR LOCOMOTIVES 10 32 E 176

FOR VREDENBURGH SAW MILL CO.

J.McD.

Gen. as PHOTO. 6102 { EXCEPT TO HAVE PLATE ENG. TRK. WHEELS AND TO OMIT OIL TANK.

Engine Drawing No. 23

7-24-20 (SPEC'D)

Gauge of Road 4' 8½" Play ¾"
Wheelbase, Rigid 14' 0" Driving 14' 0" Total 21' 8"
Total wheelbase, eng. and tend. { Actual 51' 7" / Limited to ---

Curves 25 DEGREES RAILS 58 POUNDS

Limits, Height --- Width ---
Weight (approximate) in working order, Total 134,400 POUNDS
On F. tr'k 13,400 lbs., Drivers 121,000 lbs., B. tr'k --- lbs.

Tractive power 29,000 lbs., Ratio of adhesion 4.1
Work'g St'm Pres. 200 lbs., Service LOGGING AND FREIGHT
Fuel SOFT COAL

Boiler STEEL Thick ⅝" Bill 9251
Front Tube Sheet ½" Thick
Boiler, Diam. 54" Plan WAGON TOP.
{ Allowable st'm pres. 200 lbs. / With Factor of Safety of 4.77 } **Tested to** { 220 lbs. steam pres. / 267 lbs. water pres.
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.
MAIN DOME, ONE PIECE TYPE. AUXILIARY DOME, NONE.
Dome, diam. 29" Pos. FORWARD OF FIRE BOX

Firebox STEEL Combustion chamb. NONE
Firebox, length 96-3/16" Width 41⅛" Depth F. 63⅛" B. 61⅛"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.
Water space, Front 4" Sides 3½" Back 3½"
Water space frame SINGLE Riveted
Water space stays ⅞" DIAM., WITH 3/16" HOLES 11" DEEP FROM O.S.
Radial stays 1" DIAM Sling stays front { TWO ROWS B.L.W. EXPANSION STAYS
Button heads below crown on SIX central rows
Crown bars NONE Placed --- above crown
Crown bolts NONE

Flues ---
Tubes No. 12 B.W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 207 Diam. 2" Length 13' 10"

Heating { Flues --- Combus. Chamb. --- Total 1622 sq. ft.
Surface { Tubes 1490 sq. ft. Fire Box 132 sq. ft. Fire Brick Tubes ---
Grate area 27.5 sq. ft. Ratio to Heating Surface 1: 59
Superheater ---

Fire Brick ARCH, ON STUDS

Grates ROCKING BARS AND DROP PLATE
Ash Pan, Dampers FRONT AND BACK

Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L. SIDE ONLY.
Spark ejector or hopper WITH
Netting and deflect. plates WITH

Exhaust nozzles DOUBLE, HIGH

Stack STRAIGHT Dia. 18"

Safety Valves TWO CONSOLIDATED 2½" OPEN (SPEC'D)
Safety valves NONE with relief lever, Set to 200 POUNDS
Whistle ONE B.L.W. CHIME

Steam Gauge ONE IRON 7" MAKER: ASHCROFT
Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC
Gauge Cocks THREE BACK Surface valve NONE
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B.L.W.

Blow off Cock ONE B.L.W. POS:- FRONT
Cleaning Plugs
Firebox, CORNERS DIAGONAL AND BACK
Crown, THREE EACH SIDE AND TWO BACK
Waist, ONE UNDER FRONT
Front tube sheet, TWO Fusible plug ONE

~~Pump~~ HANCOCK 5" SYPHON No. 10 UNDER CAB BOARD ON LEFT SIDE WITH PIPE CONNECTION TO TANK AND WITH 20 FEET OF SUCTION HOSE 5" DIAMETER.

INJECTOR STEAM PIPE FROM TURRET, OF COPPER.
Injectors TWO MONITOR (SPEC'D) No. 8
Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER
Pipes, Check IRON Feed IRON Overflow IRON
Check B.L.W. Pos. R. AND L.

Steam Heat NONE

Cab STEEL

Cab boards WOOD Nosing NONE
Running boards STEEL Nosing T-IRON
Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 31¼"

PILOT AS B.L.W. CARD 5019, APPROVED.
Pilot WOOD
Front Bumper CAST STEEL Bumper plate WITH
Steps, HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.
FRONT DRAW CASTING, AS B.L.W. PILOT CARD 5019.
Front Drawhead, Center above rail 33½"
Coupler M.C.B. AUTO., WITH 17" SPLIT KNUCKLE IN A THREE POCKET DRAW CASTING.
SIGNAL FIXTURES:- IRON ON BUMPER.
~~Signal fixtures~~ HEADLIGHT EQUIPMENT PYLE NATIONAL ELECTRIC, TYPE K-2 WITH INCANDESCENT HEADLIGHTS
ONE EXTENSION LIGHT WITH 20 FEET OF CORD, CONNECTED IN CAB.
Headlight TWO ROUND CASE 18" Reflector.
Headlight, Nos. on sides WITH H'd'l't step WITH
Lamp shelf NONE Nosing ---

Bell 92 POUNDS
Sand Box ONE Diam. 28" GOLLMAR BELL RINGER
Sander (SPEC'D) Body IRON PAINTED Pipes IRON
TEACH AIR, TRAP A-10, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED, PRESSED STEEL TOP AND BOTTOM RINGS.

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9 AND 14
Boiler Lagging MAGNESIA SECTIONAL
BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

C.M. BELL Dec. 1920

SPECIFICATION FOR LOCOMOTIVES 10 32 E 176

FOR VREDENBURGH SAW MILL CO

J.McD.

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Frames CAST STEEL

Cylinders, Diam. 19" Stroke 24"
St'm ports, Length 16" Width 1¼" Bridges 1¼"
Exh. ports, Length 16" Width 2⅝" Valve lead 3/32"
Valve travel 4¼" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 8⅝" By-pass valve NONE
S. F. Lubr. DETROIT TRIPLE No. 22 BULL'S EYE.
Cyl'r heads CAST IRON LUBR. PIPES OF COPPER UNDER JACKET.
Cyl'r casings IRON PAINTED Head covers STEEL PAINTED
St'm chest casings IRON PAINTED Covers STEEL PAINTED
St'm chest valves RICHARDSON BALANCED
Met. pkg. { PISTON RODS / VALVE STEMS } (NOT SPEC'D) UNITED STATES, KING TYPE.
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.
Guides ALLIGATOR TYPE, STEEL Oil cups NEEBLE
Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.
Wrist Pins STEEL Rod cups PLUNGER, FORGED ON
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS
{ Links, sliding blocks, pins, lifting links and eccentric rod jaws to be / well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.
Driving wheel hub liners BRASS (FOR 176 ONLY A/C ERROR)
Drivers, O. S. Diam. 50" Cen. diam. 44" CENTERS CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER
Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"
Tires, Plain, Pos. MIDDLE Size 3" x 6½"
LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS. 3/16" TOTAL
Driving Boxes CAST IRON
Journals, Diam. { MAIN 7½" / OTHERS 7" } Length 8½"

Springs. Make, B.L.W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING
To swing 4⅜" each side of cen., Cen. pin liners NONE
Journals, Diam. 5" Length 8" Boxes CAST IRON
Wheel hub liners NONE

Wheels, Diam. 30" Tread --- Kind CAST IRON PLATE CENTER.
Tires STEEL Cen. diam. 25" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER

Back Engine Truck NONE Wheeled
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS
Operating Parts { Engine, sch. No. 6-ET WEST'G. COMBINED AUTO. AND STRAIGHT AIR. / Eng. Tr'k, sch.---
Foundation Parts { Drivers, sch. WN-1 AMERICAN O.S. EQUALIZED / Eng. Tr'k, sch.
Air pump ONE 9½" Pos. LEFT SIDE
Train connections FRONT AND BACK
Train signal, sch. NONE
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS

Tender EIGHT Wheeled, Drawing No. 1627
Weight, with fuel and water, about 107,700 POUNDS
TENDER TO BE WEIGHED: YES
Tank 5,000 Gallons, Bill 5474
TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY: 9 TONS.
SYPHON CONNECTION TO LEFT SIDE OF TANK.
Tool Boxes OF STEEL, TOP.

Frame STEEL, 8" AND 10" CHANNELS, WITH BUMPERS OF WOOD AND STEEL PLATE.
Front Drawbar height 31"
Pilot NONE
Back drawhead, center above rail 33"
Coupler M.C.B. AUTO., WITH 17" SPLIT KNUCKLES IN A THREE POCKET DRAW CASTING.

Steps ACROSS REAR OF TENDER, WITH HAND RAIL.
STEPS, HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.
Trucks ARCH BAR TYPE, WITH BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B.L.W. MAKE
Journals, Diam. 4½" Length 8"
Wheels, Diam. 30" Tread 4½" Kind CHILLED CAST IRON PLATE
Tires NONE Cen. diam.--- Size ---
Tires held by ---
Safety chains SINGLE

Brake Position ON ALL WHEELS
Brake sch. No. 6-ET WEST'G. AUTO. AND STRAIGHT AIR, WITH 10"x 12" TENDER BRAKE CYLINDER.
ONE DRIVING BOX, ONE DRIVING SPRING, ONE SET GRATE BARS AND ONE GRATE PATTERN, TO BE FURNISHED ON EXTRA ORDER NO. 21684 DATED 10-22-20, WITHOUT EXTRA CHARGE.
List of tools, sch. 29 ONE PAIR OF WRECKING FROGS.
Photo sch. No. 2 Inspection B.L.W.
To be weighed NO Material spec'ns B.L.W.
Certificate of boiler test THREE COPIES B.L.W. FORM 1036
Junior laws to 11-1-20 Shipment ON OWN WHEELS

Brass shop finish, No. 1
Machine shop finish D-165

S. L. W. { NONE
Patents

Property plates B.L.W. FOR ENGINE AND TENDER.

LOCO. WILL OPERATE PRINCIPALLY OVER THE LINES OF THE GULF, FLORIDA AND ALABAMA R.R., IN THE STATE OF ALABAMA.

Painting, style 291, OLIVE GREEN AND ALUMINUM.

MARK ON CAB PANELS: V. S. M. CO.
Mark on TANK SIDES: VREDENBURGH SAW MILL COMPANY

Road Nos. Pos. Road Nos. Name NONE
F. No. PLATE 12
SAND BOX
BACK OF TANK

Actual Dimensions of Loco. Extreme height over all 14' 4"
Extreme Width: Cab boards 10' 4" ; Cylinders ~~or valve motion~~ = 10' 0"
Length outside face front bumper of engine to face of tender wedge = 33' 10"
Length face of tender wedge to outside face back bumper of tender = 24' 0"
Total length outside face front bumper of engine to outside face back bumper of tender = 57' 10"

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7207, dup. 8 32 D 789, except where otherwise specified.

Memorandum Spec'n 21030.

SPECIFICATION FOR LOCOMOTIVES 8 32 D 806.

FOR Wabash, Chester & Western Railroad.

Gen. as Photo. 3774, Except to have piston valve and Walschaerts valve motion.

Engine Drawing No. 78.

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 12' 0" Driving 12' 0" Total 20' 2"

Total wheelbase, eng. and tend. {Actual 49' 2½" / Limited to ---

Curves ---

Limits, Height --- Width ---

Weight (approximate) in working order, Total 126,500 pounds.

On F. tr'k 18,000 lbs., Drivers 108,500 lbs., B. tr'k ---- lbs.

Tractive power 26,500 lbs., Ratio of adhesion 4.1

Work'g St'm Pres. 180 lbs., Service Freight.

Fuel Soft coal.

Boiler Steel. Thick 11/16" Bill 9472.

Front Tube Sheet ½" Thick

Boiler, Diam. 66" Plan Straight top.

Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.

With Factor of Safety of 5.28 **Tested to** 240 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips.

Auxiliary dome, None.

Dome, diam. 29" Pos. Central.

Fire door to be Franklin Automatic, Butterfly type.

Firebox Steel. Combustion chamb. None.

Firebox, length 96-3/16" Width 41¼" Depth F. 63¾" B. 60¾"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" diam. Crown and sides in one sheet.

Water space, Front 4" Sides 3" Back 3"

Water space frame Single Riveted

Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O.S.

Radial stays 1" diam. Sling stays front {Two rows B. L. W. / Expansion stays.

Button heads below crown on Eight central rows

Crown bars None. Placed --- above crown

Crown bolts ---

Flues ---

Tubes No. 12 B. W. G. Globe Steel.

Tube ends Swaged for copper ferrules, fire box ends.

Number 260 Diam. 2" Length 11' 3"

Lowest tube not less than 3" from belly of boiler.

Tubes to have ¾" bridges.

Heating Surface Flues --- Combus. Chamb. --- Total 1658 sq. ft.

Tubes 1520 sq. ft. Fire Box 138 sq. ft. Fire Brick Tubes ---

Grate area 27.5 sq. ft. Ratio to Heating Surface 1: 60.3

Superheater ---

Fire Brick Arch, None.

Grates Rocking bars and drop plate.

Ash Pan, Dampers Front and back.

Ash pan to be self-cleaning type.

Throttle Balance. Pos. Dome.

Dry pipe Steel.

Superheater None.

Smoke box front and door of cast iron.

Smokebox extenstion With. Cleaning hole and cap None.

Spark ejector or hopper None.

Netting and deflect. plates With.

Front end arrangement to be self-acting type.

Exhaust nozzles Single, high.

Stack Straight. Dia. 18".

9-6-21 (Specn)

Safety Valves Two Crosby 3" Open.

Safety valves None with relief lever, Set to 180 and 185 pounds.

Whistle One B. L. W. Plain.

Steam Gauge One Iron 7". MAKER: Ashcroft.

Steam gauge stand Iron. **Clock** None.

Water gauge to have protector.

Water Gauge One B.L.W. Ironclad. **Cab Lamps** Electric.

Gauge Cocks Three back. Surface valve None.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One Everlasting. Pos: Front.

Cleaning Plugs One plug above fire door.

Firebox, Corners diagonal, sides and back.

Crown, Two each side and three back.

Waist, One under front.

Front tube sheet. One. Fusible plug None.

One washout plug each side of belly of boiler about half way between throat and front end.

Pump None.

(Specn) **Injectors** Two Sellers Class N Improved, No. 9½.

Injectors, Pos. Right and left. Steam pipes Copper.

Pipes, Check Iron. Feed Iron. Overflow Iron.

Check Sellers Main Stop and Check Valves. Pos: R. and L.

Steam Heat None.

Cab Wood, 10' 0" wide and to have large side windows.

Engine to be built with half deck.

Cab boards Wood. Nosing None.

Running boards Wood. Nosing None.

Hand rail Iron. Located on Boiler.

Back Bumper Cast steel deck. Back drawbar height 31"

Pilot Wood.

Front Bumper Oak.

Steps Hand holds, etc., to conform to I.C.C. requirements. Bumper plate With.

Front Drawhead, Center above rail 33½"

Coupler Sharon No. 2445 M. C B Automatic.

Coupler pocket to have plain face.

Signal fixtures Iron on bumper.

Headlight (Sup 2R30)

Headlight, Nos. on sides (Sup. 2R30) H'dl't step None.

Lamp shelf None. Nosing ---

Bell 85 pounds. Gollmar automatic bell ringer.

Sand Box One. Diam. 28" Body Iron painted. Pipes Iron.

(Specn) Sander Leach combination "A" and "D" air sander to sand front and rear of main driving wheels.

Dome casing Iron painted.

Boiler Jacket #16 Soft steel ptd. Bands Iron. Style 9.

Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

L.G. Tandy Nov 1921

SPECIFICATION FOR LOCOMOTIVES 8 32 D 806.

FOR Wabash, Chester & Western Railroad.

321

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Frames Cast steel.

Cylinders, Diam. 19" Stroke 26"

St'm ports, Length 23.17" Width 1⅝" Bridges ---

Exh. ports, Length --- Width --- Valve head 3/16"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ---

Eccentric crank throw 12⅞" By-pass valve None.

(Specn) S. P. Lubr. Nathan triple Bull's Eye.

Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

St'm chest casings --- Covers ---

St'm chest valves Piston valves, 10" diameter.

(Specn) Piston rods Valve stems United States, King type.

Pistons Heads of cast iron with bull rings and follower.

Guides Two bar type, steel. Oil cups Needle.

Crossheads Cast steel.

Wrist Pins Steel. Rod cups Grease cups forged on.

Valve Motion Walschaerts.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

Ragonnet Power Reverse Gear as covered on Extra Order No. 11227, dated 10-12-21.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners None.

Drivers, O. S. Diam. 54" Cen. diam. 48", Centers cast iron.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. All. Size 3" x 5½"

Tires, Plain, Pos. None. Size ---

Lateral play between driving boxes and wheel hubs (Sup. 8)

Driving Boxes Steeled cast iron with grease cellers.

Journals, Diam. 8" Length 10"

Tender Eight Wheeled. Drawing No. 1689 P

Weight, with fuel and water, about 109,500 pounds.

Tender to be weighed: Yes.

Tank 5,000 Gallons. Bill 5715.

Tank "U" shape, straight top.

Tool Boxes Hard wood, Pos: Top and back.

Frame Steel, 10" channels with front and back bumpers of wood.

Present Drawbar height 30"

Pilot None.

Back drawhead, center above rail 33½"

Coupler Sharon No. 2445 M. C. B. Automatic.

Coupler pocket to have plain face.

Steps and hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.

Arch bars of mild steel.

Springs Elliptic, Standard Steel Works.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.

Tires None. Cen. diam. --- Size ---

Tires held by ---

Safety chains Single.

Brake Position On all wheels. Sterlingworth brake beams.

Brake sch. No. 6 ET. Westinghouse automatic and straight air, with 12" x 12" tender brake cylinder.

Front Engine Truck Two Wheeled Swing bolster, center bearing.

To swing 2¾" each side of cen., Cen. pin liners None.

Journals, Diam. 5" Length 9" Boxes Cast iron.

Wheel hub liners None. Engine truck frame of mild steel.

Wheels, Diam. 28" Tread 4½" Kind Chilled cast iron plate.

Tires None. Cen. diam. --- Size ---

Back Engine Truck None. Wheeled ---

To swing -- each side of cen., Cen. pin liners --

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all drivers and tender wheels.

Operating Engine, sch. No. 6 ET. Westg. combined auto. and straight air.

Parts Eng. Trk, sch. ---

Foundation Drivers, sch. WM-2 American O.S. Equalized.

Parts Eng. Trk, sch. ---

Air pump One 9½" Pos. Left side.

Train connections Front and back.

Train signal, sch. None.

List of tools, sch. 158.

Photo sch. No. 2. Inspection B. L. W.

To be weighed Yes. Material specns B. L. W.

Certificate of boiler test {Three copies B.L.W. form 1036, and / Two copies B.L.W. form 491.

Junior laws to 9-30-21. Shipment On own wheels.

Brass shop finish, No. 1.

Machine shop finish D-165.

Springs. Make Standard Steel Works.

Engine Truck Frame of mild steel.

B. L. W.

Patents None.

Property plates B. L. W., for engine and tender.

Painting, style --- Black, No striping.

Lettering and numbering in aluminum leaf.

Lettering, etc., to be same as for 8 32 D 789.

Mark on cab sides:- W. C. & W.

Road Nos. Pos. Road Nos. Name None.

F. No. Plate. 33

Sand box.

Sides of tank.

Back of tank.

Actual Dimensions of Loco. Extreme height over all 15' 8½"

Extreme Width: Cab boards 10' 3" ; Cylinders ~~steam chests~~ 9' 9"

Length outside face front bumper of engine to face of tender wedge = 31' 0"

Length face of tender wedge to outside face back bumper of tender = 23' 10½"

Total length outside face front bumper of engine to outside face back bumper of tender = 54' 10½"

SPECIFICATION FOR LOCOMOTIVES 8 32 D 806.

FOR WABASH, CHESTER & WESTERN RAILROAD.

JEK.

322

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1 B. L. W. SPRING BUFFER BETWEEN ENGINE AND TENDER.

2 HEADLIGHT:- ONE "GOLDEN GLOW" LOCOMOTIVE HEADLIGHT, TYPE BC-1412, WITH TYPE "E" UNIVERSAL FOCUSING DEVICE, AND INCLUDING SIDE NUMBERS FOR FRONT OF ENGINE.

3 BUDA ROSS GENERATOR, TYPE GW, LOCATED JUST IN FRONT OF CAB.

4 PISTON RODS TO BE KEYED TO CROSSHEAD.

5 CROSSHEAD BEARINGS OF HUNT-SPILLER IRON, WITH BABBITT INSERTS.

6 GREASE PLUGS 1" DIAM., 12 THREADS PER INCH, WITH JAMB NUTS ½" THICK TO BE APPLIED TO CROSSHEAD PINS AND CONNECTING ROD KNUCKLE PINS.

7 PARALLEL RODS TO HAVE SOLID ENDS.

8 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 7/32" TOTAL.

9 EQUALIZING BEAMS OF MILD STEEL

10 ENGINE TRUCK FRAME OF MILD STEEL.

11 FOR HEREAFTER ENG. TRUCK FRAMES TO BE MADE OF CAST STEEL.

12 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

13 AIR DRUMS TO BE LOCATED AS B. L. W. TRACING 45629 (APPROVED) AND TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

14 BRAKE CYLINDER TO BE LOCATED FORWARD WITH BRAKE SHOES ON REAR OF DRIVERS.

TENDER

26 FRONT LEGS OF TANK TO BE "V" SHAPED, SIMILAR TO 8 32 D 789. TANK TO HAVE SLOPING BOSOM IN FUEL SPACE. FUEL CAPACITY, 10 TONS.

27 TANK TO BE BRACED WITH 2" ANGLE IRON.

28 WATER HOLE TO BE OBLONG, 18" x 36".

29 B. L. W. SPRING BUFFER BETWEEN ENGINE AND TENDER.

30 HEADLIGHT:- ONE "GOLDEN GLOW" LOCOMOTIVE HEADLIGHT, No. 26272, TYPE EF-128, WITH TYPE "E" UNIVERSAL FOCUSING DEVICE, WITHOUT SIDE NUMBERS. HEADLIGHT TO BE LOCATED AT REAR OF TANK BELOW TOP EDGES.

31 DRAWBAR POCKET FRONT OF TENDER TO BE 6" DEEP AND 10" WIDE.

32 STEP BOARDS AT REAR OF TENDER.

THE BALDWIN LOCOMOTIVE WORKS As Spec. C-7604 (Sup. 1a., 3&4)

Memorandum Spec'n 22062.

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3627 and 3628.

FOR Wabash, Chester & Western Railroad Company.

HNW.

1st Gen.al Photo. 5724.

Engine Drawing No. 107.

7-6-22.

Gauge of Road 4' 8½" Play ⅜", except ⅝" for F.& B.Drivers.

Wheelbase, Rigid 15' 3" Driving 15' 3" Total 23' 4"

Total wheelbase, eng. and tend. {Actual 54' 0½" / Limited to ----

Curves ----

Limits, Height ---- Width ----

Weight (approximate) in working order, Total 159,000 pounds.

On F. tr'k 18,000 lbs., Drivers 141,000 lbs., B. tr'k ---- lbs.

Tractive power 35,200 lbs., Ratio of adhesion 4.

Work'g St'm Pres. 195 lbs., Service FREIGHT.

Fuel SOFT COAL.

Boiler STEEL. Thick 11/16" Bill 9626.

Front Tube Sheet ½" Thick

Boiler, Diam. 66" Plan STRAIGHT TOP.

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 4.76 **Tested to** 267 lbs. water pres.

Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

MAIN DOME, ONE-PIECE TYPE. AUXILIARY DOME, NONE.

Dome, diam. 33" Pos. CENTRAL.

Firebox STEEL. Combustion chamb. NONE.

14 Firebox, length 84-3/16" Width 60" Depth F. 62½" B. 45½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

3 Firedoor opening OVAL, 13" x 18".

Water space, Front 4" Sides 4" Back 4"

Water space frame SINGLE Riveted

Water space stays ⅝" DIAM., WITH 3/16" HOLES 1¼" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front {TWO RODS B. L. W. / EXPANSION STAYS.

Button heads below crown on EIGHT central rows

Crown bars NONE. Placed ---- above crown

Crown bolts ----

Flues ----

Tubes No. 12 B. W. G. GLOBE STEEL.

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 276 Diam. 2" Length 14' 6"

LOWEST TUBES NOT LESS THAN 3" FROM BELLY OF BOILER.

Heating Surface Flues ---- Combus. Chamb. ---- Total 2203 sq. ft.

Tubes 2083 sq. ft. Fire Box 120 sq. ft. Fire Brick Tubes ----

Grate area 35.1 sq. ft. Ratio to Heating Surface 1: 62.8

Superheater ----

Fire Brick ARCH, NONE.

Grates ROCKING BARS AND DROP PLATE AT REAR.

5 **Ash Pan,** Dampers BACK ONLY.

Throttle BALANCE. Pos. DOME.

Dry pipe STEEL.

Superheater NONE.

6 **Smokebox** extension WITH. Cleaning hole and cap NONE.

Spark ejector or hopper NONE.

7 Netting and deflect. plates WITH.

Exhaust nozzles SINGLE HIGH.

Stack STRAIGHT. Dia. 16"

Safety Valves TWO CROSBY 3" OPEN, STYLE HE-300.

Safety valves NONE with relief lever, Set to 195 pounds.

Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON, 7" MAKER: ASHCROFT. (Spec'd)

Steam gauge stand IRON. **Clock** NONE.

WATER GAUGE TO HAVE PROTECTOR, (SEE SUP. 8)

Water Gauge ONE B.L.W. IRONCLAD. **Cab Lamps** ELECTRIC.

8 **Gauge Cocks** THREE BACK. Surface valve NONE.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE EVERLASTING, POS: FRONT.

9 **Cleaning Plugs** ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS DIAGONAL, SIDES AND BACK.

Crown, TWO EACH SIDE AND FOUR BACK.

Waist, ONE UNDER FRONT.

Front tube sheet. ONE. Fusible plug NONE.

ONE PLUG EACH SIDE OF BELLY OF BOILER ABOUT HALFWAY BETWEEN THROAT AND FRONT END.

Pump NONE.

(Not Spec'd) **Injectors** TWO SELLERS, CLASS "N" IMPROVED, No. 9½.

Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.

Pipes, Check IRON. Feed IRON. Overflow IRON.

Check SELLERS MAIN CHECK WITH STOP VALVE. Pos: R. AND L.

Steam Heat NONE.

10 **Cab** WOOD.

Cab boards WOOD. Nosing NONE.

Running boards WOOD. Nosing NONE.

Hand rail IRON. Located on BOILER.

11 **Back Bumper** CAST STEEL DECK. Back drawbar height 32"

Pilot WOOD.

Front Bumper CAST STEEL. Bumper plate WITH.

Steps HAND HOLDS, ETC., TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler SHARON No. 2445 M. C. B. AUTOMATIC.

COUPLER POCKET WITH PLAIN FACE.

Signal fixtures IRON ON BUMPER. (SEE SUP. 12, 41)

Headlight TWO (SEE SUP. 13.40) Reflector,

Headlight, Nos. on sides (SUP. 13.40) H'd'l't step WITH.

Lamp shelf NONE. Nosing ----

Bell 92 POUNDS. GOLLMAR AUTOMATIC BELL RINGER.

(Not Spec'd) **Sand Box** ONE. Diam. 28" Body IRON PAINTED. Pipes IRON.

Sander LEACH AIR, COMBINATION A AND D, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED.

Boiler Jacket #16 SOFT STEEL PTD. Bands IRON. Style 9

Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

E.M. Roberts. Sept. 1922

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3627 and 3628.

324

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FOR Wabash, Chester & Western Railroad Company.

HNW.

Frames CAST STEEL.

Cylinders, Diam. 21" Stroke 26"

St'm ports, Length 23.16" Width 1⅜" Bridges ----

Exh. ports, Length ---- Width ---- Valve lead 3/16"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ----

Eccentric crank throw 15⅝" By-pass valve NONE.

(Not Spec'd) S. F. Lubr. NATHAN TRIPLE No. 9 BULL'S EYE.

Cyl'r heads CAST IRON: LUBR. PIPES OF IRON UNDER JACKET.

Cyl'r casings IRON PAINTED. Head covers STEEL PAINTED.

St'm chest casings ---- Covers ----

St'm chest valves 10" DIAM., PISTON TYPE.

(Not Spec'd) Met. pkg. PISTON RODS / VALVE STEMS UNITED STATES, KING TYPE.

Pistons HEADS OF CAST IRON. (SEE SUP. 14)

Guides TWO BAR TYPE, STEEL. Oil cups (SEE SUP. 16)

Crossheads CAST STEEL, (SEE SUP. 15)

Wrist Pins STEEL. Rod cups FOR GREASE, FORGED ON RODS.

17 PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS.

18 Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

19 **Wearing Bearings** B. L. W.

Driving wheel hub liners BRONZE, FOR MAIN WHEELS ONLY.

Drivers, O. S. Diam. 54" Cen. diam. 48"

WHEEL CENTERS: MAIN, CAST STEEL; OTHERS, CAST IRON.

Tires STEEL. Held by SHRINKAGE AND SHOULDER.

Tires, Flanged, Pos. ALL. Size 3" x 5½"

Tires, Plain, Pos. NONE. Size ---

Lateral play between driving boxes and wheel hubs - (SEE SUP. 20)

21 **Driving Boxes** MAIN, CAST STEEL; OTHERS, STEELED CAST IRON.

Journals, Diam. {MAIN, 9½" Length 12 / OTHERS, 8"

22 **Springs.** Make B. L. W.

23 **Front Engine Truck** TWO Wheeled SWING BOLSTER, CENTER BEARING.

24 To swing 5" each side of cen., Cen. pin liners NONE.

Journals, Diam. 5" Length 9" Boxes CAST IRON.

Wheel hub liners NONE.

Wheels, Diam. 28" Tread 1¼" Kind CHILLED CAST IRON PLATE.

Tires NONE. Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck NONE. Wheeled ---

To swing ---each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating Engine, sch. No. 6 ET. WESTG. COMBINED AUTO. AND STRAIGHT AIR.

Parts Eng. Tr'k, sch. ---

Foundation Drivers, sch. WH-2-8C, AMERICAN OUTSIDE EQUALIZED.

Parts Eng. Tr'k, sch. ----

28 Air pump TWO 9½" Pos. BOTH LEFT SIDE.

Train connections FRONT AND BACK.

Train signal, sch. NONE.

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

3½ **Tender** EIGHT Wheeled, Drawing No. 1735 {TENDER TO BE WEIGHED: YES.

Weight, with fuel and water, about 124,000 POUNDS.

31 **Tank** 6,000 Gallons, Bill 5866.

TANK "U" SHAPE, WITH SLOPING HOPPER AND WITH STRAIGHT TOP.

FUEL CAPACITY, 10 TONS.

Tool Boxes WOOD, TOP AND BACK.

Frame STEEL, 12" CHANNELS, WITH BUMPERS OF WOOD AND CHANNEL IRON.

32 Front Drawbar height 31½"

Pilot NONE.

Back drawhead, center above rail 33½"

Coupler SHARON No. 2445 M. C. B. AUTOMATIC.

COUPLER POCKET WITH PLAIN FACE.

STEPS, HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Steps BOARDS AT REAR.

33 **Trucks** ARCH BAR TYPE WITH BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B. L. W.

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 1¼" Kind CHILLED CAST IRON PLATE.

Tires NONE. Cen. diam. --- Size ---

Tires held by ----

Safety chains SINGLE.

34 **Brake** Position ON ALL WHEELS.

Brake sch. No. 6 ET. WESTG. AUTO. AND STRAIGHT AIR, WITH 12" x 12" TENDER BRAKE CYLINDER.

List of tools, sch. 158.

Photo sch. No. 2. Inspection B. & W.

To be weighed YES. Material spec'ns B. L. W.

Certificate of boiler test (SEE SUP. 2)

Junior laws to 8-26-22. Shipment ON OWN WHEELS (SUP. 19)

Brass shop finish, No. 1.

Machine shop finish D-165.

B. L. W. Patents NONE.

Property plates B. L. W., FOR ENGINE AND TENDER.

Painting, style --- BLACK, NO STRIPING.

LETTERING, ETC., TO BE IN ALUMINUM LEAF.

LETTERING, ETC., SAME AS FOR 8 32 D 806. (Lodg. No. 33.)

Mark on CAB SIDES: W. C. & W.

Road Nos. Pos. Road Nos. Name NONE.

F. No. PLATE. 440

SAND BOX. 441

STOCK OF TANK.

BACK OF TANK.

Actual Dimensions of Loco. Extreme height over all 15' 2½" WIDTH OVER SUMMER PLATE, 10' 1"

Extreme Width: Cab boards 10' 0"; Cylinders as valve motion 10' 6"

Length outside face front bumper of engine to face of tender wedge - 33' 9"

Length face of tender wedge to outside face back bumper of tender - 26' 3"

Total length outside face front bumper of

SPECIFICATION FOR LOCOMOTIVES:- 10 36 E 3627 AND 3628.

FOR:- WABASH, CHESTER & WESTERN RAILROAD COMPANY.
MNW.

325
324

1 LOCOMOTIVE TO EMBODY THE FEATURES OF 8 32 D 806.

2 BOILER TEST CERTIFICATE: THREE COPIES B. L. W. FORM 1836, AND TWO COPIES B. L. W. FORM 491.

3 FIRE DOOR TO BE FRANKLIN, BUTTERFLY TYPE.

4 FIREBOX CROWN AND SIDES IN ONE SHEET.

5 ASHPAN TO BE SELF-CLEANING TYPE.
ASHPAN TO HAVE AIR SPACE AROUND ENTIRE PAN.
OPENING NOT LESS THAN 2" (PREFERABLY 3") TO BE PROVIDED BETWEEN ASHPAN AND MUDRING.

6 SMOKE BOX FRONT AND DOOR OF CAST IRON.
FRONT END DOOR TO HAVE CLAMPS INSTEAD OF CAB SCREWS.

7 FRONT END ARRANGEMENT TO BE SELF-ACTING TYPE.
SMOKE BOX NETTING TO BE DRAFTAC, WITH OPENINGS 5/16" x 3/16"

8 WATER GAUGE AND GAUGE COCKS TO BE APPLIED IN WATER COLUMN.

9 WASHOUT PLUGS ON EACH SIDE OF ROOF SHEET, SO FLUES MAY BE WASHED FROM TOP.

10 CAB TO BE SIMILAR TO 8 32 D 806.
CAB TO HAVE CLEAR VISION WINDOWS.
CAB WINDOWS TO BE OF LARGE SIZE.

11 SPRING BUFFER BETWEEN ENGINE AND TENDER.

12 CLASSIFICATION LAMPS (TWO) FOR FRONT OF ENGINE. THESE LAMPS TO BE WIRED FOR ELECTRIC LIGHTS. (SEE SUP. 41)

13 HEADLIGHT TO BE GOLDEN GLOW, TYPE FC-1412, WITH TYPE "E" UNIVERSAL FOCUSING DEVICE, WITH SIDE NUMBERS, AT FRONT OF ENGINE. (SEE SUP. 40)
HEADLIGHT GENERATOR TO BE BUDA ROSS, TYPE GW, LOCATED JUST IN FRONT OF CAB.

14 PISTONS TO HAVE BULL RINGS AND FOLLOWER.
PISTON RODS TO BE KEYED TO CROSSHEADS.

15 CROSSHEADS TO HAVE BEARINGS OF HUNT SPILLER IRON, WITH BABBITT INSERTS.
CROSSHEAD PINS TO HAVE PROVISION FOR GREASE LUBRICATION, WITH GREASE PLUGS SAME AS FOR LOCO. NO. 33, B.L.W. CLASS 8 32 D 806.

16 ALL GUIDES TO HAVE HANCOCK CUPS.

17 KNUCKLE JOINT PINS TO HAVE PROVISION FOR GREASE LUBRICATION WITH GREASE PLUGS SAME AS FOR LOCOMOTIVE NO. 33, B. L. W. CLASS 8 32 D 806.

18 RAGONNET POWER REVERSE GEAR TYPE "B" SAME AS FOR 8 32 D 806.
REVERSE GEAR COVERED ON EXTRA ORDER NO. 9358, DATED 8-19-22.

19 GALENA SIGNAL OIL CO'S MATERIALS TO BE USED FOR INITIAL LUBRICATION.

20 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

21 DRIVING BOXES TO HAVE ELVIN GREASE CELLARS.

22 EQUALIZING BEAMS OF MILD STEEL.

23 ENGINE TRUCK FRAMES OF CAST STEEL.

26 ENGINE TRUCK CENTER PIN TO HAVE KEY WAY CUT IN PIN, AND KEY TO BE FURNISHED.

27 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL

28 AIR PUMPS TO HAVE STRAINER No. 54 MADE BY THE WESTINGHOUSE AIR BRAKE COMPANY.

FOR HEREAFTER: NETTING IN SMOKE BOX TO BE 2½ x 2½ MESH
CLEANING PIPE TO RUN UP INTO SMOKE STACK, FITTING TIGHTLY INTO THE BASE OF THE STACK. (R.S.McC 2-8-23)

FOR HEREAFTER: PISTON FOLLOWER BOLTS TO BE SECURED WITH LOCK WASHERS. (R. S. McC. 4-23-23)

TENDER

36 TENDER TO EMBODY THE FEATURES OF 8 32 D 806.

37 FRONT LEGS OF TANK TO BE "V" SHAPED.
TANK TO BE BRACED WITH 2" ANGLE IRON.

38 TANK WATER HOLE TO BE OBLONG, 18" x 36"

39 SYPHONS INSTEAD OF TANK VALVES.

40 HEADLIGHT TO BE GOLDEN GLOW, No. 26272, TYPE EF-128, WITH TYPE "E" UNIVERSAL FOCUSING DEVICE, WITHOUT SIDE NUMBERS, AT REAR OF TENDER. (SEE SUP. 13)
HEADLIGHT TO BE LOCATED AT REAR OF TANK BELOW TOP EDGE.

41 MARKER LAMPS (TWO) FOR REAR OF TENDER, THESE LAMPS TO BE WIRED FOR ELECTRIC LIGHTS. (SEE SUP. 12)

42 SPRING BUFFER BETWEEN ENGINE AND TENDER.

43 DRAWBAR POCKET FRONT OF TENDER TO BE 6" DEEP AND 8" WIDE.

44 TENDER TRUCK SIDE BARS OF MILD STEEL.

46 TENDER BRAKE BEAMS TO BE OF SUITABLE CAPACITY.

THE BALDWIN LOCOMOTIVE WORKS As Spec. C-6599.

Memorandum Spec'n 20110

SPECIFICATION FOR LOCOMOTIVES 8 32 D 804.

FOR WAUSAU SOUTHERN LUMBER CO.

HNB.

Gen. as PHOTO. 5267. EXCEPT TO HAVE WALSCHAERT VALVE GEAR.

Engine Drawing No. 75

5-19-20.

(Not Specd)

Gauge of Road 4' 8½" Play ¾" EXCEPT ⅞" FOR F.& B. DRIVERS.
Wheelbase, Rigid 13' 0" Driving 13' 0" Total 20' 6"
Total wheelbase, eng. and tend. {Actual 48' 7" {Limited to ----

Curves 20 DEGREES.

Limits, Height ---- Width ----
Weight (approximate) in working order, Total 128,000 POUNDS.
On F. tr'k 18,000 lbs. Drivers 110,000 lbs., B. tr'k ---- lbs.

Tractive power 27,600 lbs. Ratio of adhesion 4.
Work'g St'm Pres. 180 lbs., Service LOGGING.
Fuel SOFT COAL.

Boiler STEEL. Thick 11/16" Bill 9207.
Front Tube Sheet ½" Thick
Boiler, Diam. 60" Plan EXTENDED WAGON TOP.
{Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.
{With Factor of Safety of 4.65 267 lbs. water pres.
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.
MAIN DOME, ONE-PIECE TYPE. AUXILIARY DOME, NONE.
Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL. Combustion chamb. NONE.
Firebox, length 84-3/16" Width 40⅛" Depth F. 63½" B. 60½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.
Water space, Front 4" Sides 4" Back 3"
Water space frame DOUBLE. Riveted
Water space stays ⅞" DIAM. WITH 3/16" HOLES 1⅛" DEEP FROM O.S.

Radial stays NONE. Sling stays front NONE.
Button heads below crown on ---- central rows
Crown bars 6" x 5/16" 1 Placed 4" above crown
Crown bolts 1" DIAM. WITH TAPER FIT THROUGH CROWN SHEET.

Flues ---
Tubes No. 12 B.W.G. CHARCOAL IRON OR STEEL, (B.L.W. OPTION).
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 240 Diam. 2" Length 11' 0"

Heating Surface {Flues ---- Combus. Chamb. ---- Total 1502⁰
{Tubes 1372⁰ Fire Box 130⁰ Fire Brick Tubes ----
Grate area 23.4⁰ Ratio to Heating Surface 1: 64.2
Superheater ----

Fire Brick ARCH, NONE.

Grates ROCKING BARS AND DROP PLATE.
Ash Pan, Dampers FRONT AND BACK.

Throttle BALANCE. Pos. DOME.
Dry pipe STEEL.

Superheater NONE.

Smokebox extension WITH. Cleaning hole and cap L. S. ONLY.
Spark ejector or hopper WITH.
Netting and deflect. plates WITH.

Exhaust nozzles DOUBLE, HIGH.

Stack STRAIGHT. Dia. 18"

Safety Valves TWO COALE, 2½" OPEN.
Safety valves NONE. with relief lever, Set to 180 POUNDS.
Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: ASHCROFT.
Steam gauge stand IRON. **Clock** NONE.

Water Gauge ONE B.L.W. IRONCLAD, **Cab Lamps** NONE.*
Gauge Cocks THREE BACK. Surface valve NONE.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve WITHOUT separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock ONE B. L. W. Pos: FRONT.
Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.
Firebox, CORNERS DIAGONAL.
Crown, THREE EACH SIDE AND FOUR BACK.
Waist, ONE UNDER FRONT.
Front tube sheet, ONE. Fusible plug ONE.

Pump NONE.
LOCOMOTIVE TO OPERATE IN THE STATE OF MISSISSIPPI.
ONE SELLERS NO. 9-8 EJECTOR UNDER CAB BOARD ON LEFT SIDE, WITH PIPE CONNECTION TO TANK, AND WITH 20 FT. OF 4" FOUR-PLY PLAIN SUCTION HOSE (USE EJECTOR PLACED IN STOCK FROM 10 30 D 673).
Injectors TWO SIMPLEX, TYPE "S" (Spec'd) No. 8
Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.
Pipes, Check IRON. Feed IRON. Overflow IRON.
Check B. L. W. Pos. RIGHT AND LEFT.

Steam Heat NONE.

Cab STEEL.

Cab boards STEEL. Nosing T-IRON.
Running boards STEEL. Nosing T-IRON.
Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 30½"

Pilot WOOD.
Front Bumper OAK. Bumper plate WITH.
Steps HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"
Coupler M. C. B. AUTOMATIC WITH SLOTTED KNUCKLE.

Signal fixtures IRON ON BUMPER.
* OMIT HEADLIGHTS, GENERATOR, CAB LIGHTS, LIGHT FIXTURES AND WIRING.
Headlight NONE.
Headlight, Nos. on sides ---- H'd'l't step WITH
Lamp shelf NONE Nosing ----

Bell 92 POUNDS.
Sand Box TWO Diam. 28" Body IRON PAINTED. Pipes IRON.
Sander (Not Spec'd) LEACH AIR, TRAP A-1, IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED.

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON. Style 9
Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

E. ELLIOTT Oct. 1920

SPECIFICATION FOR LOCOMOTIVES 8 32 D 804.

FOR WAUSAU SOUTHERN LUMBER COMPANY.

HNW.

Frames CAST STEEL.

Cylinders, Diam. 19" Stroke 24"
St'm ports, Length 19" Width 1¼" Bridges 1"
Exh. ports, Length 19" Width 2½" Valve lead ⅛"
Valve travel 5" Steam lap ⅞" Exhaust clearance ----
Eccentric crank throw 11-1 1/16" By-pass valve NONE.
S. F. Lubr. NATHAN TRIPLE NO. 9 BULL'S EYE.
Cyl'r heads CAST IRON. LUBR. PIPES OF COPPER UNDER JACKET.
Cyl'r casings IRON PAINTED. Head covers STEEL PAINTED.
St'm chest casings IRON PAINTED. Covers STEEL PAINTED.
St'm chest valves BALANCED, WITH VACUUM VALVES.
Met. pkg. {PISTON RODS {VALVE STEMS UNITED STATES, KING TYPE.
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.
Guides ALLIGATOR TYPE - STEEL. Oil cups NEEDLE.
Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON TINNED.
Wrist Pins STEEL. Rod cups PLUNGER, FORGED ON.
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS.
{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be {well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings MAKE: B. L. W.
Driving wheel hub liners BRONZE.
Drivers, O. S. Diam. 48" Cen. diam. 42"
WHEEL CENTERS: MAIN, CAST STEEL; OTHERS, CAST IRON.
Tires STEEL. Held by SHRINKAGE AND SHOULDER.
Tires, Flanged, Pos. ALL. Size 3" x 5½"
Tires, Plain, Pos. NONE. Size ---
Lateral play between driving boxes and wheel hubs - 3/16" TOTAL.
Driving Boxes CAST STEEL.
Journals, Diam. 8" Length 11"

EQUALIZING BEAMS OF WROUGHT STEEL.
Springs. Make B. L. W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING.
To swing 3½" each side of cen., Cen. pin liners NONE.
Journals, Diam. 5" Length 8½" Boxes CAST IRON.
Wheel hub liners NONE.
Wheels, Diam. 26" Tread ---- Kind CAST IRON SPOKE CENTER.
Tires STEEL. Cen. diam. 21" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE. Wheeled ----
To swing ---- each side of cen., Cen. pin liners ----
Journals, Diam. ---- Length ---- Boxes ----
Wheel hub liners ----
Wheels, Diam. ---- Tread ---- Kind ----
Tires ---- Cen. diam. ---- Size ----
Tires held by ----

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating {Engine, sch. NO. 6 ET. WESTG. COMBINED AUTO. AND
Parts {Eng. Tr'k, sch. ---- STRAIGHT AIR.
Foundation {Drivers, sch. AM-2-AMERICAN OUTSIDE EQUALIZED.
Parts {Eng. Tr'k, sch. ----
Air pump ONE 9½" Pos. LEFT SIDE.
Train connections FRONT AND BACK.
Train signal, sch. NONE.
AIR RESERVOIRS TO BE PLACED ON TOP OF RIGHT AND LEFT HAND RUNNING BOARDS, DISREGARDING I.C.C. REQUIREMENTS IN THIS RESPECT. AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1604.
Weight, with fuel and water, about 90,000 POUNDS.
TENDER TO BE WEIGHED: YES.
Tank 4500 Gallons. Bill 5471.
TANK "U" SHAPE, STRAIGHT TOP. FUEL CAPACITY 8 TONS.
TANK PLATES, OUTSIDE ¼" THICK, TOP AND BOTTOM 5/16" THICK.
Tool Boxes HARD WOOD, TOP.
SYPHON CONNECTION TO TANK ON LEFT SIDE.
Frame STEEL, 8" AND 10" CHANNELS, WITH BUMPERS OF WOOD AND STEEL PLATE.
Front Drawbar height 30¾"
Pilot NONE.
Back drawhead, center above rail 33½"
Coupler M. C. B. AUTOMATIC, WITH SLOTTED KNUCKLE.

Steps HAND HOLDS, ETC., TO CONFORM TO I. C. C. REQUIREMENTS.
TENDER TRUCKS TO HAVE AJAX BAR INSTEAD OF ARCH BAR.
Trucks ANDREWS CAST STEEL SIDE FRAMES WITH BOLSTERS OF CAST STEEL, TRUCK SIDE FRAMES AS B. L. W. CARD 3606 APPROVED.
Springs ELLIPTIC, MAKE: B. L. W.
Journals, Diam. 4¼" Length 8"
Wheels, Diam. 33" Tread 4¼" Kind CHILLED CAST IRON PLATE.
Tires NONE. Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE.

Brake Position ON ALL WHEELS.
Brake sch. NO. 6 ET. WESTG. AUTO. AND STRAIGHT AIR, WITH 12" x 12" TENDER BRAKE CYLINDERS.

List of tools, sch. 29. ONE PAIR WRECKING FROGS.
Photo sch. No. 2. Inspection B. L. W.
To be weighed YES. Material specns B. L. W.
Certificate of boiler test THREE B. L. W. FORM 1086.
Junior laws to 9-15-20. Shipment ON OWN WHEELS. (See ★ BELOW)

Brass shop finish, No. 1.
Machine shop finish D-165.

★ SPARE PARTS COVERED ON EXTRA ORDER No. 24780, DATED 10-28-20, TO BE SHIPPED WITH LOCOMOTIVE.

B. L. W.
Patents FEED WATER STRAINER, PAT. SEPT. 1, 1913 (CAST ON).

Property plates NONE.

Painting, style 291, OLIVE GREEN AND ALUMINUM.

Mark on TANK SIDES:- WAUSAU SOUTHERN LUMBER CO.

Road Nos. Pos. Road Nos. Name NONE.
F. No. PLATE. 2
F. SAND BOX.
CAB PANEL.
BACK OF TANK.

Actual Dimensions of Loco. Extreme height over all 14' 4"
Extreme Width: Cab boards 10' 0" Cylinders ~~or valve motion~~ 10' 0"
Length outside face front bumper of engine to face of tender wedge - 29' 4"
Length face of tender wedge to outside face back bumper of tender - 24' 7½"
Total length outside face front bumper of engine to outside face back bumper of tender - 53' 11½"

THE BALDWIN LOCOMOTIVE WORKS DUPLICATE 10 28 ¼ D 145 WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFICED.

Memorandum Spec'n 20062

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 149

FOR WEED LUMBER COMPANY

HW.

Gen'l Dr'g PHOTO. 7388

Engine Drawing No. 31

3.15.20

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 9' 6" Driving 9' 6" Total 24' 6"

Total wheelbase, eng. and tend. Actual 46'5" Limited to ---

RAILS 90 POUNDS

Curves 20 DEGREES GRADES 6%

Limits, Height 14'10" Width 10'0"

Weight (approximate) in working order, Total 123,000 POUNDS

On F. Trk 13,000 lbs., On Drivers 96,000 lbs., On B. Trk 14,000 lbs.

Tractive power 23,400 lbs. Ratio of adhesion 4.1

Work'g St'm Pres. 175 lbs., Service LOGGING

Fuel OIL

BOILER ROOF AND SIDES 7/16". BACK SHEET ½"

Boiler STEEL Thick 21/32" Rivet 80-2

Front Tube Sheet ½" Thick THROAT SHEET 11/16"

Boiler, Diam. 62" Plan WAGON TOP.

Allowable st'm pres. 200 lbs. **Tested to** 225 lbs. steam pres.

With Factor of Safety of 5. 300 lbs. water pres.

Longitud. seams (SEE SUP. 23)

DOME - ONE PIECE TYPE

Dome, diam. 30" Pos. FORWARD OF FIRE BOX.

Firebox STEEL Combustion Chamb. NONE

Firebox, length 72" Width 42" Depth F. 62¾" B. 55½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening (SEE SUP. 25) CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame DOUBLE Riveted

Water space stays 1" DIAM. WITH 3/16" HOLES 12" DEEP FROM O. S.

Radial stays (SUP. 26) Sling stays front (SEE SUP. 26)

Button heads below crown on EIGHT central rows

Crown bars NONE Placed --- above crown

Crown bolts --

Flues ---

Tubes 112 B.W.G. SEAMLESS STEEL (SEE SUP. 27)

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 240 Diam. 2" Length 12'6"

Heating Surface Flues, --- Combus. Chamb. --- Total 1560 sq. ft.

Tubes 1560 sq. ft. Fire Box 1016 sq. ft. Fire Brick Tubes ---

Grate area 21 sq. ft. Ratio Heating Surface to Grate 73.3

Superheating ---

Fire Brick IRON NONE

FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT ET PAN.

Grates Bar

Ash Pan, Deep FRONT ONLY

Throttle BALANCE Pos. DOME

Cyl. and STEEL

Superheater NONE

SMOKEBOX TO HAVE SHORT EXTENSION.

Smokebox Extension SHORT Diameter same and cap NONE

Spark ejector or hooper NONE

Netting and deflect. plate NONE

Exhaust nozzles DOUBLE-LOW

CLEANING PLATE WITH

Stack CAST IRON, STRAIGHT Diam. 16"

(SPEC'D) **Safety Valves** TWO COALE 3" OPEN

Safety valves BOTH ON SAME BASE Set to 175 POUNDS

Whistle ONE B. L. W. CHIME

Steam Gauge ONE IRON 84" MAKER: ASHCROFT

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE REFLEX **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock ½" Above top part of crown

Low water alarm WITHOUT Sight feed to dome

Blower Valve B. L. W.

Blow off Cock One GLOBE 2" Pos. IN THROAT

Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER.

Firebox, CORNERS, BACK ONES DIAGONAL

Crown, TWO EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT; ONE ABOVE FIRE DOOR

Front tube sheet, ONE Washout plug, ONE

Pump NONE

(SPEC'D) **Injectors** TWO HANCOCK, APPROVED TYPE No. 8

Injectors, Pos. B. and L. Steam pipes COPPER

Pipes, Check IRON Feed pipes, Front IRON

Check B.L. WITH STOP VALVE Feed pipes, Back IRON

Steam Heat NONE

Cab STEEL

Cab boards STEEL Roof T-IRON

Running boards STEEL Supports T-IRON

Hand rail IRON Ventilator BOILER

Back Bumper BAR STEEL Back plate 3/4"

Pilot NONE

Front Bumper CAST STEEL NONE

Steps, HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead

Coupler M.C.B. AUTO., WITH SLOTTED KNUCKLE

Headlight TWO R. CAST WITH

Headlight NONE

Generator NONE

Bell 32 POUNDS

Sand Box (SPEC'D) TWO Diam. 20" Bod. IRON PAINTED Sand IRON

Sand RELAY-CLOG AIR, ALSO HAND IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED

Boiler Jacket #16 SOFT STEEL Pts. IRON Bands IRON

Boiler Lagging ASBESTOS CEMENT.

THE BALDWIN LOCOMOTIVE WORKS

H. BEEHNER

SPECIFICATION FOR LOCOMOTIVES 10 28 ¼ D 149 JUNE 1920

FOR WEED LUMBER COMPANY

HW

329

328

Frames CAST STEEL, 4" WIDE

FRAME PEDESTAL CAPS OF FORGED STEEL

Cylinders, Diam. 17" Stroke 24"

Steam ports, Length 14" Width 1½" Bridges 1"

Exhaust ports, Length 16" Width 2½" Valve travel 5½"

Steam lap ¾" Exhaust lap 2" Exhaust clearance ---

Exhaust crank throw 11-11/16" Bore of cross valve NONE

(SPEC'D) S. P. Lubr. NATHAN TRIPLE BULL'S EYE, THREE PINTS CAPACITY

Cyl. heads CAST IRON Lubr. pipes OF COPPER UNDER JACKET

Cyl. casings IRON PTD. Jacket covers STEEL PAINTED

Steam chest casings IRON PTD. Covers STEEL PAINTED

Steam chest valves RICHARDSON BALANCED, WITH VACUUM VALVES

(SPEC'D) Valve gear, Type UNITED STATES, KING TYPE

PISTON RODS TO BE KEYED TO CROSSHEADS

Pistons HEADS CAST IRON WITH RINGS OF CAST IRON SPRUNG IN.

Guides LAIRD TYPE, FORGED STEEL Oil cups NEEDLE

Crossheads CAST STEEL WITH BEARINGS OF BRONZE

Wrist Pins STEEL Bushings (SEE SUP. 42)

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERT'S

Links, sliding blocks, pins, lifting links and eccentric rod taps to be well case hardened or to have hardened bushings

All threads on bolts to be U.S. standard. All bolts to be United States Standard

All trusshed movable parts of steel or of iron case hardened

Wearing Bearings B. L. W.

Driving wheel hub liners OF BRONZE, CAST ON HUB FACES OF BOXES

Drivers, O. S. Diam. 44" Cen. diam. 38" CENTERS CAST IRON

TIRE SECTION TO HAVE M.M. STANDARD TREAD AND FLANGE

Tires STEEL Held by SHRINKAGE ONLY

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"

Tires, Plain, Pos. MIDDLE Size 3" x 6½"

Lateral play between driving boxes and wheel hubs 3/16" TOTAL

Driving Boxes CAST STEEL, WITH CAST IRON OIL CELLARS

Journals, Diam. 9" Length 10"

Springs. Make B. L. W.

FRONT ENGINE TRUCK FRAME OF CAST STEEL

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING

To swing 2" each side of cen. Cen. pin liners NONE

Journals, Diam. 5" Length 9" Boxes CAST IRON

Wheel hub liners BRASS, ON HUB FACES OF BOXES

Wheels, Diam. 28" Tread ¼" Kind ROLLED STEEL

Tires NONE Cen. diam. --- Size ---

Tires held by --- WHEEL RIMS 2½" THICK

Back Engine Truck TWO Wheeled B.L.W. INSIDE BEARING

To swing 3" each side of cen. Cen. pin liners NONE

Journals, Diam. 5" Length 9" Boxes CAST IRON

Wheel hub liners BRASS, ON HUB FACES OF BOXES

Wheels, Diam. 28" Tread ¼" Kind ROLLED STEEL

Tires NONE Cen. diam. --- Size ---

Tires held by --- WHEEL RIMS 2½" THICK

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Engine, sch. A-1 AND SVA WESTINGHOUSE AUTO. AND STRAIGHT AIR

Parts Eng. Trk. sch. ---

Foundation Drivers, sch. M-1 AMERICAN U.S. EQUALIZED

Parts Eng. Trk. sch. ---

Pump TWO 9½" Pos. BOTH L.S.

Train connections FRONT AND BACK

Train signal, sch. NONE

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled, Drawing No. 1477

Weight, with fuel and water about 72,000 POUNDS. TENDER TO BE WEIGHED: YES

Tank OIL 1,300 Capacity in { 5097 / 5305

WATER 4,000

TANK "U" SHAPE, SLOPING BACK.

Tool Boxes HARD WOOD, TOP.

Frame STEEL, 5" AND 8" CHANNELS, WITH BUMPERS (SEE SUP. 60, 58)

FRAME BOLSTER TO BE TRUSSED TYPE.

Front Drawbar height 31½"

Pilot NONE Pushing device NONE

Back drawhead center above rail 34"

Coupler M.C.B. AUTO., WITH SLOTTED KNUCKLE

STEPS, HAND HOLDS, ETC. TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE, WITH CHANNEL SPRING PLANKS AND BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B. L. W.

Journals, Diam. 4½" Length 8"

Wheels, Diam. 30" Tread 4" Kind ROLLED STEEL

Tires NONE Cen. diam. --- Size ---

Tires held by --- WHEEL RIMS 2½" THICK

Safety chains SINGLE

Brake POSITION ON ALL WHEELS

Brake sch. FL-1012 AND SNB, WESTINGHOUSE AUTO. AND STRAIGHT AIR.

List of tools sup. 28 (SEE SUP. 50)

Photo sch. NONE Inspection B.L.W. (EXCEPT SEE SUP. 1st, 22)

To be weighed NO Material specs. B.L.W. (SEE SUP. 4th)

Certificate of tender test THREE COPIES OF B.L.W. FORM 1036

Junior laws to 5.6.20 Shipment ON OWN WHEELS (SEE SUP. 51, 62)

Brass shop finish, No. 1

Machine shop finish D-135

B. L. W.

Patents FEED WATER STRAINER, PAT'D. SEPT. 1, 1903. (CAST ON)

Property plates NONE

Painting, No. 291, OLIVE GREEN AND ALUMINUM

LETTERING ETC. SAME AS FOR 10 28 ½ D 145

Marking TANK SIDES: WEED LUMBER COMPANY

Road Nos. Pos.	Road Nos.	Name: NONE
F. NO. PLATE	8	
F. SAND BOX		
CAB PANEL		
BACK OF TANK		

Actual Dimensions of Loco. Extreme height over all 13'8½"

Extreme Width Cab boards 9'11" Cylinders or valve motion 10'0"

Length outside face front bumper of engine to face of tender wedge 30'5"

Length face of tender wedge to outside face back bumper of tender 24'6"

Total length outside face front bumper of engine to outside face back bumper of tender 54'11"

SPECIFICATION FOR LOCOMOTIVES 10 28 & D 149

FOR WEED LUMBER COMPANY

P

1 BOILER TO BE OPERATED IN THE STATE OF CALIFORNIA
BOILER TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (1918), AND MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO ONE-AND-ONE-HALF (1½) TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 3 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES

8 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP.	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THREADS PER INCH.	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING.	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS.	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.

9 EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.

10 A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURE ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I. E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURE ABOVE 175 LBS. AND FUSIBLE PLUG CARD 4219 FOR 175 LBS. AND LESS).

15 FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER, THE FEED WATER TO DISCHARGE BELOW THE LOWEST SAFE WATER LINE.

16 SAFETY VALVES MUST MEET THE REQUIREMENTS OF THE A. S. M. E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER AS PER B. L. W. MARKING CARD 6858.
SAFETY VALVES OVER 3" IN DIAMETER SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD.
ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG: ALSO WHERE POSSIBLE ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES, EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS, SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED 2" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ½". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

(Manufacturer's Serial Number)	CALIFORNIA (State in which boiler is to be used) No. 2 (Manufacturer's State Standard number) THE BALDWIN LOCOMOTIVE WORKS (Name of manufacturer) (LEAVE BLANK) (States number) (LEAVE BLANK) (Year put in service) 175 LBS. (maximum working pressure when built)

SPECIFICATION FOR LOCOMOTIVES 10 28 & D 149

FOR WEED LUMBER COMPANY

HW

331

330

21 LOCOMOTIVE TO BE OPERATED IN CALIFORNIA.
BOILER TO CONFORM TO REQUIREMENTS OF BOILER LAWS OF THE STATE OF CALIFORNIA, I.E. A.S.M.E. CODE. (SEE SUP. ETC.)

22 BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

23 LONGITUDINAL SEAMS, BUTT JOINTED WITH DOUBLE COVERING STRIPS SEXTUPLE RIVETED, 90% SEAMS.
CIRCUMFERENTIAL SEAMS, DOUBLE RIVETED LAP JOINTS.

24 ALL FIRE BOX SEAM RIVETS TO BE COUNTERSUNK ON THE FIRE SIDE.

25 FIRE DOOR OPENING TO BE OVAL 13" x 18".
FIRE DOOR ELLIPTICAL SHEETS TO BE PROTECTED FROM WEAR BY GUARD CAST ON FIRE DOOR FRAME.
FIRE DOOR TO BE SOUTHERN PACIFIC TYPE.
ROYALTY, IF ANY, PAYABLE BY THE WEED LUMBER CO.

26 STAYBOLTS: TWO FRONT ROWS RADIAL STAYS TO BE TATE EXPANSION, ABOUT 2½ IN NUMBER.
CROWN STAYS TO BE 15/16" DIAM. IN BODY, 1" DIAM. AT ENDS.
STAYBOLTS IN SIDES, THROAT AND BACK HEAD TO BE 1" DIAM.
HOLLOW STAYBOLTS BENEATH BRICK-WORK IN FIRE-BOX.

27 BOILER TUBES TO BE SPACED IN VERTICAL ROWS AND SET WITH COPPER FERRULES, AND SWAGED, ROLLED AND BEADED IN FIRE BOX, END, AND ROLLED IN FRONT TUBE SHEET.

28 FUEL OIL: FULL ANALYSIS OF FUEL OIL IS AS FOLLOWS:-
GRAVITY 19 B.T.U. 18990 PER POUND,
FLASH 172 SULPHUR .8%
FIRE TEST 218 DEG. F. VISCOSITY 21 DEG. ENGLAR AT 70 DEG. F.
COLD TEST BELOW 0 DEG. F.

29 OIL BURNING ARRANGEMENT AS SHOWN ON RY. CO'S PENCIL SKETCH HEREWITH. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

30 FIRE PAN TO BE FASTENED TO AND BELOW THE MUD RING, WITH THE BURNER INSTALLED BELOW THE MUD RING AND AT LEAST 5" ABOVE THE BOTTOM OF THE PAN, WITH THE END OF THE BURNER ON A LINE WITH THE BRICK WORK. ALL DRAFT TO BE PROVIDED FOR AT FRONT OF FIRE PAN ONLY.

31 WAIST SHEET FROM FRONT OF MUD RING TO FRAME CROSSTIE TO BE CUT OUT SUFFICIENTLY TO ACCOMMODATE OIL BURNER AND FOR DRAFT.

32 STEAM LINE BETWEEN ENGINE AND TENDER TO HAVE McLAUGHLIN JOINT ARRANGED AS SHOWN ON PENCIL SKETCH HEREWITH, OMITTING THE STEAM COIL IN OIL TANK.

33 SMOKE BOX TO BE ½" THICK AND TO BE MADE SEPARATE FOR EASY RENEWAL.

34 CAB ROOF TO BE LINED WITH WOOD AND TO HAVE VENTILATOR.
CAB SASH OF HARD WOOD WITH DOUBLE STRENGTH GLASS.
CAB TO HAVE CONVENIENT SEATS WITH CUSHION, AND TOOL BOX FOR ENGINEER AND FIREMAN.

35 OMIT PILOT AND PROVIDE FOOT BOARDS FRONT AND BACK.
FOOT BOARDS OF WOOD ACROSS FRONT, WITH WROT IRON SUPPORTS.

36 HEADLIGHT EQUIPMENT TO BE SCHROEDER ELECTRIC, WITH INCANDESCENT HEADLIGHTS.

FOR HEREAFTER: BACK ENGINE TRUCK BOLSTER TO BE MADE OF CAST STEEL. (R. S. McC. 4-8-21)

41 FRAMES TO HAVE DOUBLE FRONT ENDS SECURELY BOLTED AND KEYED TO MAIN FRAME.

42 MAIN AND SIDE ROD CUPS TO BE ARRANGED FOR HARD GREASE, AND TO BE FORGED SOLID ON RODS.

43 ECCENTRIC CRANKS TO BE FORGED STEEL.

44 LINKS, SLIDING BLOCK AND ALL WEARING SURFACES TO BE CASE-HARDENED.
ALL PIN BEARINGS TO HAVE CASE HARDENED PINS AND BUSHINGS.

45 DETROIT AUTO. FLANGE OILER WITH FOUR FEEDS TO BE APPLIED FOR FRONT AND BACK DRIVERS.

46 DRIVING BOXES TO HAVE BRONZE WEARING PLATES CAST ON THE SHOE AND WEDGE FACES.

47 BRAKE EQUIPMENT TO INCLUDE G-6 AUTOMATIC BRAKE VALVE AND S-3-A STRAIGHT AIR VALVE, WITH DRIVER BRAKE RELEASE.
DRIVER BRAKE CUT OUT TO BE PLACED IN CAB WITHIN REACH OF ENGINEER.

48 STRAIGHT AIR DRIVER BRAKES TO HAVE SEPARATE GAUGE.

49 AIR PUMPS TO BE REGULATED BY 1" GOVERNOR, SO ARRANGED THAT ONE OR BOTH PUMPS CAN BE OPERATED BY SAME GOVERNOR.

50 TOOLS TO INCLUDE ALL NECESSARY WRENCHES AND SPANNERS, ONE HARD AND ONE SOFT HAMMER, MONKEY WRENCH, A COLD CHISEL, THREE OIL CANS, TWO JACK SCREWS, AND TWO CAMEL BACK FROGS.

51 SIX EXTRA BAFFLE PLATES FOR FIRE DOOR, ORDERED ON EXTRA ORDER NO. 18304 DATED 7.14.20 TO BE SHIPPED WITH LOCO. EXTRAS COVERED BY EXTRA ORDER 19509 DATED 5.27.20 TO BE SHIPPED WITH THIS LOCOMOTIVE. (SEE SUP. 62)

TENDER

56 TANK STEEL: TOP, BOTTOM AND INSIDE TO BE ¼" THICK, OUTSIDE TO BE 3/16" THICK.

57 TANK TO BE PROVIDED WITH TANK VALVES AND STRAINER AND CLEANING HOLES.

58 BUMPERS FRONT AND BACK OF TENDER TO BE CAST STEEL.

59 FOOT BOARD OF WOOD ACROSS BACK, WITH WROT IRON SUPPORTS.

60 LENGTH OF TENDER FRAME AND DETAILS OF TRUCKS TO BE SAME AS FOR 10 28 & D 145, IF POSSIBLE ARRANGING FOR INCREASED WATER CAPACITY BY INCREASING THE HEIGHT OF TANK.

61 STEAM LINE BETWEEN ENGINE AND TENDER TO HAVE McLAUGHLIN JOINT, ARRANGED AS SHOWN IN PENCIL SKETCH HEREWITH, OMITTING THE STEAM COIL IN OIL TANK.

62 EXTRAS COVERED ON EXTRA ORDER 13293 DATED 4.26.20 TO BE SHIPPED WITH THIS LOCO. (SEE SUP. 51)

THE BALDWIN LOCOMOTIVE WORKS {Dup. 6 32 D 1081, with same extras except where otherwise specified.

Memorandum Spec'n 20087

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1144

FOR Westinghouse Electric & Manufacturing Co.

HW

Gen. as Photo. 3248

Engine Drawing No. 72

4,5,20

Gauge of Road 4' 8½" Play ⅜"

Wheelbase, Rigid 8' 6" Driving 8' 6" Total 8' 6"

Total wheelbase, eng. and tend. {Actual 39' 9½" / Limited to ---

Curves 150 ft. radius

Limits, Height --- Width ---

Weight (approximate) in working order, Total 119,000 pounds.

On F. tr'k --- lbs., Drivers 119,000 lbs., B. tr'k --- lbs.

Tractive power 28,800 lbs., Ratio of adhesion 4.1

Work'g St'm Pres. 180 lbs., Service Switching

Fuel Soft Coal

Boiler Steel Thick 11/16" Bill 9038

Front Tube Sheet ½" Thick

Boiler, Diam. 64" Plan Straight Top

Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.

With Factor of Safety of 5.48 270 lbs. water pres.

Longitud. seams Butt jointed, double covering strips.

Dome, diam. 29" Pos. Central

Firebox Steel Combustion chamb. None

Firebox, length 82¾" Width 41⅛" Depth F. 62¼" B 59¾"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" diam. Crown and sides in one piece

Water space, Front 4" Sides 3½" Back 3½"

Water space frame Single Riveted

Water space stays ⅝" diam. with 3/16" holes 12½" deep from O. S.

Radial stays 1" diam. Sling stays front {Two rows B.L.W. Expansion Stays

Button heads below crown sh. Ten central rows

Crown bars None Placed --- above crown

Crown bolts ---

Flues None

Tubes #12 B. W. G. Charcoal Iron

Tube ends Staged for copper ferrules, fire box ends.

Number 284 Diam. 2" Length 10'3"

Heating Surface Flues --- Combus. Chamb. --- Total 1527

Tubes 1405 Fire Box 122 Fire Brick Tubes ---

Grate area 23.53 Ratio to Heating Surface 64.6

Superheater ---

Fire Brick Arch, on Studs

Grates Rocking Bars and Drop Plate

Ash Pan, Dampers Front and Back

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater None

Smokebox extension With Cleaning hole and cap L. S. Only

Spark ~~ejector~~ hopper With

Netting and deflect. plates With

Exhaust nozzles Double, High

Stack Straight Dia. 18"

Safety Valves Two Consolidated 2½" Open (Not Spec'd)

Safety valves Both with relief lever, Set to 180 pounds

Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Maker: Ashcroft

Steam gauge stand Iron **Clock** None

Water Gauge One B.L.W. Ironclad **Cab Lamps** to burn oil

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve to have separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One Crane Pos: L. S.

Cleaning Plugs One plug above fire door.

Firebox, Corners diagonal front and S. S.

Crown, Two each side and three back

Waist, One under front

Front tube sheet, Two visible plugs One

Pump None

Injectors (Spec'd) Two Sellers, Class "N" No. 6½

Injectors, Pos. Right and left Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B.L.W., with stop valve Pos. Right and left

Steam Heat None

Cab Steel Ventilator in cab roof.

Cab boards Steel Nosing T-Iron

Running boards Steel Nosing T-Iron

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 28"

Pilot None

Front Bumper Cast Steel Bumper shoes Cast in Bumper

Bumper plate None

Steps across front, with hand rail.

Steps, handholds etc. to conform to I.C.C. requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. automatic

Signal fixtures None

Headlight Two round case 18" Reflector To burn Kerosene (See X.O. 4664-1924)

Headlight, Nos. pin sides with Hood sides with

Lamp shelf None Nosing ---

Bell 92 pounds

Sand Box Two Diam. 28" Gollmar air bell ringer

Sander Leach air trap A-1, in each box to sand front and rear. (Not Spec'd)

Dome casing Iron Painted Body Iron Painted Plate Iron

Boiler Jacket #22 Soft Steel Pto. Bands Iron Style 9

Boiler Lagging Plastic Magnesia from B.L.W. Stock

H. Beehker

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1144 July 1920

FOR Westinghouse Electric & Manufacturing Co.

HW

333

332

Furnish blue prints, (See Sup. 37)

Frames Cast Steel

Cylinders, Diam. 19" Stroke 24"

Steam ports, Length 16" Width 12" Bridge 1"

Exhaust ports, Length 18" Width 2½" Width 1⅝"

Valve travel 5" Lap ¾" Exhaust clearance ---

(Spec'd) Clearance 5" Piston valve None

Detroit triple No. 22 Bull's eye

Cylinder heads Cast Iron Lubr. pipes of iron under jacket

Cylinder casing Iron Painted Jacket Steel Painted

Steam chest cover Iron Painted Casing Steel Painted

Piston valves Richardson balanced, with vacuum valves

(Not Spec'd) Packing United States.

Pistons heads of cast iron with rings of cast iron sprung in

Guides alligator type, steel Bearings Needle

Crossheads Cast Steel, with bearings of cast steel, tinned

Wrist Pins Steel Lubrication for grease, forged on.

Parallel rods to have solid ends.

Valve Motion Stephenson.

Eccentrics to be split

Wearing Bearings B. L. W.

Driving boxes, Main (See Sup. 33)

Drivers, M. C. B. Diam. 45" Engine truck 30" centres cast steel.

Tires Steel Shrinkage and shoulder

Tires, Flange, Pos. Front and back Size 3" x 5½"

Tires, Plain, Pos. Middle Size 3" x 6½"

Material for lay between driving boxes and wheel fits 3" total

Driving Boxes Cast Steel

Journals, Dia. 8" Length 8½"

Springs, Make B. L. W.

Front Engine Truck None Wheels ---

To swing --- each side of cent. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cent. diam. --- Size ---

Tires held by ---

Back Engine Truck None Wheels ---

To swing --- each side of cent. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cent. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels

Operating { Engine, sch. No. 6 ET Westg. Combined auto. and

Parts { Eng. Trk. sch. --- straight air.

Foundation { Drivers, sch. WM-2 BC American O.S. Equalized

Parts { Eng. Trk. sch. ---

Air pump One 9½" Pos. Left Side

Train connections Front and back

Train signal, sch. None

Tender Eight Wood, Diam. 435

Weight, 80,000 pounds.

Tender to be weighed: Yes

Tank 4,000 Gallons. Bill 4150

Tank "U" shape, sloping back. Fuel capacity 7 tons

Top Boards of hard wood, top.

Frame Steel, 10" channels, with bumper of wood and plate at front and steel plate at rear.

Front Drawbar height 28"

Pins None Pin holes at rear

Back drawbar height 33½"

Coupler M. C. B. auto. with Westinghouse Friction Draft Gear

Steps and handholds, etc. to conform to I. C. C. requirements.

Steps across rear with hand rail.

Steps and hand rails on sloping back of tank.

Trucks Arch bar type, with cast steel bolsters.

Springs Elliptic, B. L. W. Make

Journals, Diam. 4½" Length 8"

Wheels, Diam. 30" Tread ½" Kind Rolled Steel

Tires None Cent. diam. --- Size ---

Tires held by --- Wheel rims 2" thick

Safety chains Single

Brake Equipment On all wheels

Brake gear No. 6 ET Westinghouse automatic and straight air, with 10" x 12" tender brake cylinder.

Steps on back of tender to be same as noted in Mr. E. C. Pierce's letter of April 3rd, 1920, copy herewith.

List of tools sup. 29

Photo sch. None Inspection (See sup. rec 27.36)

To be weighed No Material specs. B.L.W. except for boiler (Surf.)

Certificate of boiler test Three copies of B.L.W. form 1036

Junior laws to 5-22-20 Shipment On own wheels

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Feed Water Strainer Patd. Sept. 1, 1903 (Cast on)

Patents

Property plates None

Painting, style 291, Olive Green and Aluminum

Mark on Tank sides: W. E. & M. Co.

Road Nos. Pos. Road Nos. Name None

F. No. Plate 7

F. Sand Box

Cab Sides

Actual Dimensions of Loco. Extreme height over all 13'9¾"

Extreme Width: Cab boards 9'11" ; Cylinders or valve motion 9'3"

Length outside face front bumper of engine to face of tender wedge 26'2⅜"

Length face of tender wedge to outside face back bumper of tender 24'7⅝"

Total length outside face front bumper of engine to outside face back bumper of tender 50'10¼"

SPECIFICATION FOR LOCOMOTIVES 6 32 D 1144

FOR WESTINGHOUSE ELECTRIC & MANUFACTURING CO.

RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF PENNSYLVANIA MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYBOLT DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE TRAC. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

15 AN OPENING IN THE BOILER FOR A THREADED PIPE CONNECTION 1" IN DIAMETER OR OVER SHALL HAVE NOT LESS THAN THE MINIMUM NUMBER OF THREADS IN SUCH OPENING AS SHOWN IN THE FOLLOWING TABLES:

SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
MINIMUM NO. OF THREADS REQUIRED IN OPENING	4	5	7
MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

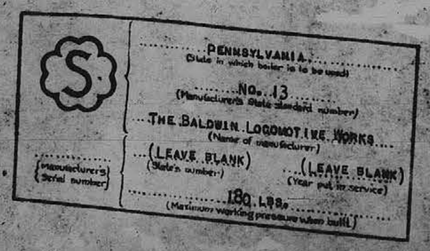
IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN ⅜", (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

16 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

17 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

18 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND ⅛" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

19 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.



SPECIFICATION FOR LOCOMOTIVES 6 32 D 1144

FOR WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

HW

335
334

26 LOCOMOTIVE TO OPERATE IN THE STATE OF PENNSYLVANIA.

27 BOILER TO CONFORM TO A. S. M. E. CODE.
BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

28 MATERIALS TO BE INSPECTED BY THE B. L. W. CONSTRUCTION OF LOCO. AT THESE WORKS TO BE INSPECTED BY MR. COOPER.

29 INSIDE AND OUTSIDE SHEETS TO BE WELDED TO MUD RING ALL AROUND.

30 ASH PAN TO BE SAME AS NOTED IN E.C. PIERCE'S LETTER OF APRIL 3RD 1920 (COPY HEREWITH). ASH PAN AS B. L. W. TRACING 42345 APPROVED.

31 INJECTOR OVERFLOW TO BE PIPED SO WATER WILL RUN INTO BOTH SECTIONS OF ASH PAN.

32 CHAFING CASTING BETWEEN ENGINE AND TENDER TO HAVE LARGE RADIUS AND DEEP FACE, DESIGNED TO SUIT CURVES.
BUFFER CASTING BETWEEN ENGINE AND TENDER TO BE SAME AS FURNISHED IN 1917, ON EXTRA ORDER NO. 4644 FOR LOCOMOTIVE No. 5, CLASS 6 32 D 1001, WESTINGHOUSE REF. W-1164.

33 DRIVING BOXES TO BE BABBITTED ON FACES NEXT TO HUBS OF WHEELS. BOXES TO BE DOVETAILED FOR BABBITT FACES.
(No HUB LINERS REQUIRED IN WHEEL CENTERS).

34 AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.

35 AIR DRUMS TO BE ENAMELLED AND TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

36 PURCHASER TO BE ADVISED TWO DAYS IN ADVANCE OF THE TIME ITS MASTER MECHANIC, MR. RENNER IS TO BE AT EDDYSTONE, TO SUPERINTEND THE FITTINGS OF THE BOILER HEAD.

37 FURNISH TO RAILWAY COMPANY, ONE (1) COMPLETE SET OF BLUE PRINTS.

THE BALDWIN LOCOMOTIVE WORKS {DUP. 10 22 ½ D 47, WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20079

SPECIFICATION FOR LOCOMOTIVES 10 22 ½ D 54

FOR WIND RIVER LUMBER COMPANY

Gen. as PHOTO. 3839

Engine Drawing No. 17

3-26-20

Gauge of Road 4' 8½" Play 3/8"

Wheelbase, Rigid 9' 6" Driving 9' 6" Total 21'11"

Total wheelbase, eng. and tend. {Actual ---
{Limited to ---

Curves 25 DEGREES GRADE 5%

RAILS 35 TO 40 POUNDS PER YARD

Limits, Height (SEE SUP. 24) Width (SEE SUP. 25)

Weight (approximate) in working order, Total 84,000 POUNDS

On F. tr'k 12,000 lbs., Drivers 60,000 lbs., B. tr'k 12,000 lbs.

Tractive power ~~14,000~~ 13365 lbs., Ratio of adhesion ~~3.9~~ 3.86 TANK EMPTY

Work'g St'm Pres. 165 lbs., Service LOGGING

Fuel WOOD

Boiler STEEL Thick ½" Bill 9006

Front Tube Sheet ½" Thick

Boiler, Diam. 46" Plan STRAIGHT TOP.

Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.

With Factor of Safety of 5.46 270 lbs. water pres.

Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

Dome, diam. 25" Pos. CENTRAL

Firebox STEEL Combustion chamber NONE

Firebox, length 57⅞" Width 31⅛" Depth Fr. 57½" B. 51⅜"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening 16" DIAM.

Water space, Front 4" Sides 3" Back 3"

Water space frame SINGLE Riveted

Water space stays ⅞" DIAM. WITH 3/16" HOLES 14" DEEP FROM O. S.

Radial stays 1" DIAM. Sling stays front {TWO ROWS B. L. W. EXPANSION STAYS

Button heads below crown on FOUR Center gas

Crown bars NONE Placed --- Above crown

Crown bolts ---

Flues ---

Tubes #12 W.G. CHARCOAL IRON OR STEEL

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 125 Diam. 2" Length 9'0"

Heating Surface Flues --- Combus. Chamb. --- Total 654⁰

Tubes 583⁰ Fire Box 71⁰ Fire Brick Tubes ---

Grate area 12.3 Ratio to Heating Surface 1 : 53

Superheater ---

Fire Brick ARCH, NONE

Grates PLAIN BARS AND DEAD PLATE.

Ash Pan, Dampers FRONT AND BOTH SIDES.

ASH PAN TO HAVE REMOVABLE NETTING UNDER DAMPERS, SUITABLE FOR EITHER COAL OR WOOD FUEL.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L. S. ONLY

Spark ~~ejector or~~ hopper WITH

Netting and deflect. plates NONE

Exhaust nozzles DOUBLE LOW

CLEANING PIPE-WITH

Stack RUSHTON IMPROVED Dia. 14"

Safety Valves TWO CONSOLIDATED 2" OPEN

Safety valves BOTH with relief lever, Set to 165 POUNDS

Whistle ONE B. L. W. PLAIN

Steam Gauge ONE IRON 7" MAKER: ASHCROFT

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B. L. W. IRONCLAD **Cab Lamps** TO BURN OIL

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE B. L. W. POS:- FRONT

Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER.

Firebox, CORNERS AND BACK

Crown, TWO EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT

Front tube sheet, ONE ~~10~~ Visible plug ONE

Pump NONE

Injectors TWO MONITOR (NOT SPEC'D) No. 6

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B. L. W. WITH STOP VALVE Pos. R. AND L.

Steam Heat NONE

Cab WOOD

Cab boards WOOD Nosing NONE

Running boards NONE Nosing ---

Hand rail IRON Located on CAB

Back Bumper OAK

Pilot NONE

Front Bumper OAK Pushing shoes FRONT AND BACK

Bumper plate (SEE SUP. 29)

Steps ACROSS FRONT AND REAR, WITH HAND RAILS.

STEPS, HAND RAILS, ETC. TO CONFORM TO I. C. C. REQUIREMENTS.

E & B Drawhead, Center above rail (SEE SUP. 30)

Coupler (SEE SUP. 30)

Signal fixtures NONE

Headlight TWO ROUND CASE 16" Reflector To burn KEROSENE

Headlight, Nos. on sides WITH Light shell WITH

Lamp shell NONE Visors ---

Bell 85 POUNDS

Sand Box TWO Diam. 18" Body IRON PAINTED Frames IRON

Sander (NOT SPEC'D) LEACH AIR TRAP A-1, AND HAND TO SAND FRONT AND BACK.

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

W. E. Moore

SPECIFICATION FOR LOCOMOTIVES 10 22 ½ D 54 MAY 1920

FOR WIND RIVER LUMBER COMPANY

337
336

Frames CAST STEEL

Cylinders, Diam. 14" Stroke 18"

St'm ports, Length 12" Width 1" Bridges ⅞"

Exh. ports, Length 12" Width 2" Valve lead 1/16"

Valve travel 1½" Steam lap ⅞" Exhaust clearance ---

Eccentric throw ¼" By-pass valve NONE

S. P. Lubr. (NOT SPEC'D) MICHIGAN TRIPLE GULL'S EYE

Cyl'r heads CAST IRON Lubr. PIPES OF IRON UNDER JACKET

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED

St'm chest castings IRON PAINTED Covers STEEL PAINTED

St'm chest valves (NOT SPEC'D) RICHARDSON BALANCED, WITH VACUUM VALVES

Mot. pkg. UNITED STATES, KING TYPE.

Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN

Guides STEEL Oil cups NEEDLE

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL Rod cups {COMPRESSION GREASE CUPS. FORGED ON STRAPS.

MAIN AND SIDE RODS TO HAVE STRAP ENDS.

Valve Motion STEPHENSON.

(Links, sliding blocks, pins, lifting links and eccentric rod jaws to be Twell case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE

Drivers, O. S. Diam. 37⅝ Cen. diam. 32" CENTRES CAST IRON

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 2½" x 5½"

Tires, Plain, Pos. MIDDLE Size 2½" x 6½"

Lateral play between driving boxes and wheel hubs 3/16" TOTAL

Driving Boxes CAST IRON

Journals, Diam. 5½" Length 7"

Springs. Make B. L. W.

Front Engine Truck TWO Wheeled SWING BOLSTER

To swing 3½" each side of cen. Cen. pin liners NONE

Journals, Diam. 4½" Length 7½" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 28" Tread 4½" Kind CHILLED CAST IRON SPOKE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck TWO Wheeled SWING BOLSTER SIDE BEARING

To swing 3½" each side of cen. Cen. pin liners NONE

Journals, Diam. 4½" Length 7½" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 28" Tread 4½" Kind CHILLED CAST IRON SPOKE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING WHEELS (NO TENDER)

Operating {Engine, sch. No. 6 ET TESTG. COMBINED AUTO. AND

Parts {Eng. Trk. sch. --- STRAIGHT AIR.

Foundation {Drivers, sch. No. 1 AMERICAN O. S. EQUALIZED

Parts {Eng. Trk., sch. ---

Air pump ONE 9½" Pos. L. S.

Train connections NONE

Train signal, sch. NONE

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender NONE

TANK No. 8 STEEL

Tank 1000 Gallons, Bill 3352

TANK SHAPE RECTANGULAR ON SIDES OF BOILER.

FRONT TANK CORNERS TO BE CUT OFF 8" DEEP AND 60" LONG GIVING GOOD VIEW FOR ENGINE MEN.

TANK FUNNEL TO BE PLACED BETWEEN REAR AND INTERMEDIATE DRIVERS.

TANK EQUALIZING PIPE TO BE 5" DIAMETER.

List of tools, sch. 27 ONE PAIR WRECKING FROGS

Photo sch. NONE Inspection B. L. W. EXCEPT FOR BOILER (SEE SUP. 22

To be weighed No Marking of parts B. L. W. EXCEPT (SUP. 14)

Certificate of Interchange THREE COPIES OF B. L. W. F RW 1030

Junior flues to 5. 13. 20 Shipment ON OWN WHEELS (SUP. 36)

Brass shop finish, No 1

Machine shop finish D-165

B. L. W. NONE

Patents {

Property plates B. L. W. FOR ENGINE

Painting, style 222, OLIVE GREEN AND ALUMINUM

Marked TANK SIDES: WIND RIVER LUMBER CO.

Post Pos. Pos.	Plate Nos.	Name NONE
F. No. PLATE	2	
DOME AND CAB SIDES		

Actual Dimensions of Loco. Extreme height over all 13'0"

Extreme Width {Over cab boards 8'4"
{Over cylinders or valve motion 9'4"

Length over {Face of front buffer beam 29'4"
outside {face of back bumper or engine

SPECIFICATION FOR LOCOMOTIVES 10 22 ½ D 54

FOR WIND RIVER LUMBER COMPANY.

RTL

1 BOILERS TO BE BUILT TO CONFORM TO THE BOILER CODE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, (1918) OR TO THE REQUIREMENTS OF THE STATE OF WASHINGTON MUST BE INSPECTED DURING CONSTRUCTION AND UPON COMPLETION BY AN AUTHORIZED INSPECTOR WHO SHALL NOT BE INTERESTED EITHER DIRECTLY OR INDIRECTLY WITH THE MANUFACTURERS.

2 A DATA REPORT, ON FORMS FURNISHED BY THE ABOVE MENTIONED STATE SHALL BE FORWARDED TO THE PROPER OFFICIAL BEFORE THE BOILER LEAVES THE BUILDER'S WORKS.

3 A HYDROSTATIC TEST SHALL BE APPLIED EQUAL TO 1½ TIMES THE WORKING PRESSURE.

4 THE MATERIALS ENTERING INTO THE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:-

BOILER AND FIRE BOX STEEL MATERIAL FOR ONE-PIECE DOME	A.S.M.E. SPEC. PAGE 11
BOILER RIVET STEEL	A.S.M.E. SPEC. PAGE 15
BOILER RIVET IRON	A.S.M.E. SPEC. PAGE 31
BOILER BRACE IRON	A.S.M.E. SPEC. PAGE 37
BOILER STAYBOLT IRON	A.S.M.E. SPEC. PAGE 34
BOILER TUBES	A.S.M.E. SPEC. PAGE 40

5 FRONT TUBE SHEET SHALL BE OF FIRE BOX STEEL.
ALL BOILER AND FIRE BOX STEEL AND MATERIAL FOR ONE PIECE DOME SHALL BE MARKED BY THE MANUFACTURER WITH THE HEAT NUMBER, NAME OF MANUFACTURER, GRADE AND LOWEST TENSILE STRENGTH IN THE MANNER AND LOCATION DESCRIBED ON B.L.W. MARKING CARD 6859. THIS MARKING CARD SHOULD BE ORDERED ON THE CARD SHEET AND ON THE STORE ROOM SHEET FOR BOILER STEEL AND FOR MATERIAL FOR ONE PIECE DOME. SMOKE BOX STEEL MAY CONFORM TO B.L.W. SPECIFICATION.

6 THE MINIMUM FACTOR OF SAFETY SHALL BE FIVE. (1918)
LONGITUDINAL SEAMS SHALL BE OF BUTT AND DOUBLE STRAP CONSTRUCTION.

7 IN ADDITION TO B.L.W. PRACTICE, THE MAXIMUM PITCH OF STAYBOLTS FOR 5/16" PLATE, SHOULD NOT BE MORE THAN GIVEN IN TABLE:-

STAYBOLT DIAM.	PRESSURE	5/16" PLATE PITCH	3/8" PLATE PITCH
7/8"	160	4 1/8"	4 3/8"
7/8"	180	3 15/16"	4 1/8"
7/8"	190	3 13/16"	4"
7/8"	200	3 11/16"	3 15/16"
1"	225	3 1/2"	4 1/4"

8 WELDED BRACES SHALL NOT BE SUBJECTED TO A FIBRE STRESS IN EXCESS OF 6,000 LBS. PER SQ. IN. FOR METHOD OF CALCULATING THESE STRESSES, SEE DRAG. 34108.

9 STRESS IN STAYBOLTS SHALL NOT EXCEED 7,500 LBS. PER SQ. IN.

10 THE MINIMUM THICKNESS OF TUBE SHEETS SHALL BE AS FOLLOWS:-

OUTSIDE DIAM. OF TUBE SHEET	MINIMUM THICKNESS
42" OR LESS	3/8"
OVER 42" TO 54" INCLUSIVE	7/16"
OVER 54" TO 72" INCLUSIVE	1/2"
OVER 72"	9/16"

WHEN A TUBE SHEET IS NOT CIRCULAR IN FORM (I. E., FIRE BOX TUBE SHEET) THE LEAST DIMENSION OF SUCH SHEET SHALL DETERMINE ITS THICKNESS.

11 DOME:- ONE PIECE DOMES MAY BE USED FOR ALL PRESSURES, BUT SHALL NOT BE LOCATED OVER THE FIRE BOX ON BOILERS ABOVE 48" BARREL DIAMETER. B.L.W. THREE PIECE DOMES MAY BE USED FOR PRESSURES UP TO AND INCLUDING 180 LBS. PROVIDED THE VERTICAL SEAM IS FIRE WELDED. ABOVE 180 LBS., THE VERTICAL SEAM MUST BE OF THE DOUBLE BUTT CONSTRUCTION.

12 THE OUTSIDE ENDS OF SOLID STAYBOLTS, 8 IN. AND LESS IN LENGTH, SHALL BE DRILLED WITH A HOLE AT LEAST 3/16" DIA., TO A DEPTH EXTENDING AT LEAST ½" BEYOND THE INSIDE OF THE PLATES.

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SIZE OF PIPE CONNECTION OR CORRESPONDING TAPER TAP	1" & 1¼"	1½" & 2"	2½" TO 4"
NO. OF THDS. PER INCH	11½	11½	8
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MINIMUM THICKNESS OF MATERIAL REQUIRED TO GIVE ABOVE NO. OF THREADS	3/8"	7/16"	7/8"

IF THICKNESS OF BOILER MATERIAL IS NOT SUFFICIENT TO GIVE THE ABOVE NUMBER OF THREADS, A LINER OR FLANGE MUST BE APPLIED.
EACH BOILER MUST BE PROVIDED WITH A CONNECTION ¼ PIPE SIZE FOR ATTACHING INSPECTOR'S TEST GAUGE.
A FUSIBLE PLUG MUST BE APPLIED. THE PLUG MUST BE FILLED WITH PURE TIN AND THE LEAST DIAMETER OF THE FUSIBLE METAL MUST BE NOT LESS THAN ½" EXCEPT FOR WORKING PRESSURES ABOVE 175 LBS., IN WHICH CASE THE LEAST DIAMETER SHALL NOT BE LESS THAN 3/8". (I.E., USE FUSIBLE PLUG CARD 4144 FOR PRESSURES ABOVE 175 LBS. AND FUSIBLE PLUG CARD 1219 FOR 175 LBS. AND LESS).
FEED WATER SHALL NOT DISCHARGE INTO A BOILER IN CLOSE PROXIMITY TO RIVETED JOINTS IN SHELL OR FURNACE SHEETS. EACH BOILER SHALL HAVE A FEED PIPE FITTED WITH A CHECK VALVE, AND ALSO A STOP VALVE OR STOP COCK BETWEEN THE CHECK VALVE AND THE BOILER.

14 SAFETY VALVES MUST BE ORDERED TO MEET THE REQUIREMENTS OF THE A.S.M.E. BOILER CODE AND MUST BE PLAINLY STAMPED BY THE MANUFACTURER PER B.L.W. MARKING CARD 6858. THIS MARKING CARD SHOULD BE SPECIFIED ON STORE ROOM SHEET. SAFETY VALVES OVER 3" IN DIAM. SHALL HAVE FLANGED INLETS. THESE FLANGES SHALL CONFORM TO THE AMERICAN STANDARD. ALL SAFETY VALVES MUST BE PROVIDED WITH RELIEF LEVERS.

15 THERE SHALL BE NOT LESS THAN SIX BRASS WASHOUT PLUGS NOT SMALLER THAN 1½" PIPE TAP LOCATED AS FOLLOWS:-
ONE IN FRONT TUBE SHEET BELOW THE TUBES.
ONE IN BACK HEAD AT OR ABOUT THE LINE OF THE CROWN SHEET.
FOUR IN THE LOWER PART OF THE WATER LEG; ALSO WHERE POSSIBLE, ONE NEAR THE THROAT SHEET.

16 SHOP PRACTICE:- RIVET HOLES EXCEPT FOR ATTACHING STAY FEET AND T-IRON TO HEADS SHALL BE DRILLED FULL SIZE WITH PLATES, BUTT STRAPS, AND HEADS BOLTED UP IN PLACE; OR THEY MAY BE PUNCHED OUT NOT TO EXCEED ¼" LESS THAN FULL SIZE FOR PLATES OVER 5/16" IN THICKNESS, AND 3/8" LESS THAN FULL SIZE FOR PLATES 5/16" AND UNDER, AND THEN DRILLED OR REAMED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED UP IN POSITION.
THE TUBE HOLES MAY BE DRILLED FULL SIZE, OR THEY MAY BE PUNCHED NOT TO EXCEED ½" LESS THAN FULL SIZE AND THEN DRILLED, REAMED OR FINISHED FULL SIZE WITH ROTATING CUTTER.

17 UPON COMPLETION, EACH BOILER SHALL BE STAMPED IN THE PRESENCE OF THE AUTHORIZED INSPECTOR, WITH THE WORDS: AS ARRANGED BELOW. THE HEIGHT OF THE LETTERS AND FIGURES SHALL NOT BE LESS THAN ¼". THE LOCATION OF THE STAMP SHALL BE ON THE BACK HEAD ABOVE A PLUG HOLE.

S.

WASHINGTON
(State in which boiler is to be used)
NO. 4
(Manufacturer's State standard number)
THE BALDWIN LOCOMOTIVE WORKS
(Name of manufacturer)
(LEAVE BLANK) (Extra number) (LEAVE BLANK) (Year put in service)
180 POUNDS.
(Maximum working pressure when built)
(Manufacturer's Serial number)

21 LOCOMOTIVE TO BE OPERATED IN THE STATE OF WASHINGTON.

22 BOILER TO CONFORM WITH THE A.S.M.E. CODE, (AND TO BE STAMPED No. 1.)(SEE SUP 1 vc)
BOILER TO BE INSPECTED BY THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE COMPANY.

23 LOCOMOTIVE TO BE BUILT SO THAT IT CAN READILY BE CHANGED TO A COAL BURNER.

24 HEIGHT OF ENGINE LIMITED, SO IT CAN PASS UNDER N. P. TRESTLE WHICH IS 14'10" FROM RAIL TO UNDER SIDE OF STRINGER.

25 WIDTH OF ENGINE CAN BE SAME AS FOR 10 22 ½ D 47.

26 FIRE DOOR TO BE PLACED HIGH ENOUGH TO ELIMINATE UNNECESSARY STOOPING WHEN FIRING WITH WOOD.

27 ASH PAN TO CONFORM TO I.C.C. REQUIREMENTS.

28 FUEL BOX ON REAR EXTENSION OF ENGINE FRAME, BACK OF CAB, WOOD BACK AROUND TOP OF FUEL BOX, SAME AS FOR 10 22½ D 47, FUEL CAPACITY, ONE CORD OF WOOD.

29 FRONT BUMPER PLATE TO BE SQUARE EXTENDING BACK TO CYLINDERS AND SUPPORTED BY KNEES, SO MATERIAL MAY BE CARRIED ON IT. (NOT GOOSE NECK STYLE OF PLATE.)

30 COUPLINGS: THREE POCKET CAST STEEL DRAWHEAD AS CO'S PENCIL SKETCH HEREWITH, WITH MIDDLE POCKET, 33" CENTRE ABOVE TOP OF RAIL.

31 SAND PIPES TO BE PLACED CLOSE TO DRIVERS, SO SAND WILL HIT RAIL WHEN LOCOMOTIVE IS ON A CURVE.

32 CO. ACCEPTES 14" CYLINDER MADE BY MISTAKE FOR 10 22½ D 54 ONLY. SET SAFETY VALVES AT 165 POUNDS WORKING PRESSURE ONLY. (SEE SUP. 37)

33 PROVIDE SUFFICIENT CLEARANCE BETWEEN BRAKE SHOE AND CONNECTING RODS.

34 FLANGE OILERS, SOUTHERN PACIFIC STYLE, TO BE APPLIED TO FRONT OF FRONT DRIVERS AND REAR OF REAR DRIVERS.

35 AIR BRAKES TO BE APPLIED TO ENGINE ONLY.

36 LOCOMOTIVE TO BE ERECTED SO IT CAN BE SHIPPED ON OWN WHEELS TO CARSON, SKAMANIA CO., WASHINGTON, AND THEN TO BE KNOCKED DOWN FOR TRANSPORTATION TO LOGGING OPERATION.

37 FOR HEREAFTER:- RAISE QUESTION ABOUT MAKING CYLINDER 13½" DIAMETER AND WORKING PRESSURE 175 POUNDS AS ORIGINALLY SPECIFIED. (SEE SUP. 32)

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-6550

Memorandum Spec'n 20097

SPECIFICATION FOR LOCOMOTIVES 10 3+ D 1139 and 1140 Gen. as Photo. 3795 {Except omit auxiliary dome and apply dynamo.

FOR Wisconsin and Michigan Railroad Co. Engine Drawing No. 83

EP/
P

1-22-20 (Spec'd)

Gauge of Road 4' 8½" Play ⅜"
Wheelbase, Rigid 13' 6" Driving 13' 6" Total 24' 3"
Total wheelbase, eng. and tend. {Actual 55' 3½" / Limited to ---

Curves 15 degrees Grades 1%
Rails 70 pounds
Limits, Height --- Width ---
Weight (approximate) in working order, Total 150,500 pounds
On F. tr'k 33,500 lbs., Drivers 117,000 lbs., B. tr'k --- lbs.
Weight limited.
Tractive power 25,670 lbs., Ratio of adhesion 4.55
Work'g St'm Pres. 180 lbs., Service Passenger and Freight
Fuel Coal

Boiler Steel Thick ⅜ & 11/16 Bill 9060
Front Tube Sheet ½" Thick
Boiler, Diam. 66" Plan Extended wagon top
{Allowable st'm pres. 180 lbs. / With Factor of Safety of 4.99} Tested to {200 lbs. steam pres. / 240 lbs. water pres.}
Longitud. seams Butt jointed, double covering strips, sextuple riveted
Main Dome, One-piece type. Auxiliary dome, None
6 **Dome,** diam. 28" Pos. Forward of fire box

Firebox Steel Combustion chamb. None
Firebox, length 114-3/16" Width 42⅜" Depth F. 67" B. 65"
Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"
1 Firedoor opening 16" diam.
Water space, Front 4" Sides 3½" Back 3½"
Water space frame Double Riveted
2 Water space stays ⅞" diam. with 3/16" holes 1½" deep from O. S.
Radial stays 1" diam. Sling stays front {Two Rods B. L. W. Expansion Stays}
Button heads below crown on Eight central rows
Crown bars None Placed --- above crown
Crown bolts ---

Flues ---
Tubes No. 12 B.W.G. Charcoal iron or steel (B.L.W. Option)
Tube ends Swaged for copper ferrules, fire-box ends.
Number 330 Diam. 2" Length 14' 8"

Heating Surface Flues --- Combus. Chamb. --- Total 2692
Tubes 2520 Fire Box 172 Fire Brick Tubes
Grate area 33.6 Ratio to Heating Surface 1: 80
Superheater ---

Fire Brick Arch, on studs.

Grates Rocking bars and drop plate
Ash Pan, Dampers Front and Back
Ash pan to be Hopper Type.

Throttle Balance Pos. Dome
3 Dry pipe Steel

Superheater None

3 **Smokebox** extenstion With Cleaning hole and cap None
14 Spark ejector or hopper None
Netting and deflect. plates With (See Sup. 14)

Exhaust nozzles Single, high

Stack Straight Dia. 18"

Safety Valves Two Ashton 3" Open
Safety valves None with relief lever, Set to 180 pounds
Whistle One B. L. W. Plain

Steam Gauge One Iron 7" Makers Ashcroft
Steam gauge stand Iron Clock Co. None

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric
Gauge Cocks Three Back Surface valve None
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve Without separate dry pipe to dome
Blower Valve B. L. W.

5 **Blow off Cock** One Everlasting Pos: Front
Cleaning Plugs
Firebox, Corners diagonal
Crown, Two each side and three back
Waist, Two under, one front and one back
Front tube sheet, One Fusible plug One

Pump None

Injectors Two Sellers (Spec'd) No. 10½
Injectors, Pos. Right and Left Steam pipes Copper
Pipes, Check Iron Feed Iron Overflow Iron
Check Sellers, with stop valve Pos. Right and Left

Steam Heat With

Cab Steel

Cab boards Wood Nosing None
Running boards Wood Nosing None
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 33½"
Wedge between engine and tender.

Pilot Wood
Front Bumper Oak Bumper plate With
Steps Hand holds, etc. to conform to I. C. C. requirements

Front Drawhead, Center above rail 33½"
Coupler M. C. B. Auto.

Signal fixtures Iron on bumper
Headlight equipment to be Pyle National Type "K-2" Electric with incandescent head. lights.
Headlight One Round Cast 16" Reflector,
Headlight, Nos. on sides With H'dl't step With
Lamp shelf None Fixing ---

Bell 92 pounds Columbian Pneumatic Bell Ringer.
Sand Box One Diam. 31" Body Iron painted Pipes Iron
Sander (Not Spec'd) Leach Air, Trap A-10, to sand front and back.

Dome casing Iron painted

Boiler Jacket #18 Soft Steel Ptd. Bands Iron Style 9
Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

E. Elliot June 1920
SPECIFICATION FOR LOCOMOTIVES 10 3+ D 1139 and 1140

FOR Wisconsin and Michigan R. R. Co.

P

3241
340

Frames Cast Steel

Cylinders, Diam. 20" Stroke 26"
St'm ports, Length 23.17 Width 1½" Bridges ---
Exh. ports, Length --- Width --- Valve lead ¼"
Valve travel 5½" Stm lap ⅞" Exhaust clearance ---
Eccentric crank throw 1" By-pass valve None
(Spec'd) S. F. Lubr. Nathan Type Bulls Eye, Three pints. capacity
Cyl'r heads Cast Iron Lubr. pipes of iron under jacket.
Cyl'r casings Iron Painted Head covers Steel painted
St'm chest casings --- Covers ---
St'm chest valves 1" diam., Piston type
(Spec'd) Met. pkg. {Piston Rods / Valve Stems} United States, King Type.
Piston rods to be keyed to crossheads.
Pistons Heads Cast iron with rings of cast iron, sprung in.
Guides Steel Oil cups Needle
Crossheads Cast steel with bearings of cast iron, tinned
Wrist Pins Steel Rod cups for grease
Parallel rods to have solid ends.

Valve Motion Walschaerts
(Links, slidin blocks, pins, lifting links and eccentric rod jaws to be well case hadened or to have hardened bushings.

All threads in bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners (See Sup. 8)
Drivers, O. S. Diam. 62" Cen. diam. 56"
Wheel centers, Main, Cast Steel; Others, Cast Iron
Tires Steel Held by Shrinkage and shoulder
Tires, Flanged, Pos. All Size 3" x 5½"
Tires, Plain, Pos. --- Size ---
Lateral play between driving boxes and wheel hubs = 3/16" total
Driving Boxes Steeled cast iron, with grease cellars.
Journals, Diam. {Main 9" Length 11" / Others 8"}

Springs. Make B. L. W.

Front Engine Truck Four Wheeled Swing bolster, center bearing
To swing 3" each side of cen., Cen. pin liners None
Journals, Diam. 6" Length 10" Boxes Cast Iron
Wheel hub liners Babbitt on face of box next to hub of wheel
Wheels, Diam. 30" Tread --- Kind Rolled Steel
Tires None Cen. diam. --- Size ---
Tires held by --- Wheel rims 2½" thick x 5½" wide

Back Engine Truck None Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

9 **Brake,** position On all driving and tender wheels
Operating Engine, sch. No. 6-ET Westg. Combined Auto. and
Parts Eng. Tr'k, sch. --- Straight Air
Foundation Drivers, sch. WM-2 American O. S. Equalized
Parts Eng. Tr'k, sch. ---
10 Air pump One 11" Pos. Left Side
Train connections Front and Back
Train signal, sch. "L"

Tender Eight Wheeled, Drawing No. 1567
Weight, with fuel and water, about 124,000 pounds
Tender to be weighed: Yes
Tank 6,000 Gallons. Bill 5369
Tank "U" shape, straight top Fuel capacity, 10 tons

Tool Boxes Steel, Top

Frame Steel, 12" channels with bumpers of wood and channel wedge between engine and tender.
Front Drawbar height 32½"
Pilot None
Back drawhead, center above rail 33½"
Coupler M. C. B. Auto.

Steps, hand holds, etc. to conform to I. C. C. requirements.
Steps At front and rear with two grab irons each
Steps and grab irons to be arranged as Ry. Co's pencil sketch.
Trucks Arch bar type, with bolsters of cast steel.
Bearings at sides of both trucks.
Springs Elliptic, Make B. L. W.
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 1¼" Kind Chilled cast iron plate
Tires None Cen. diam. --- Size ---
Tires held by ---
Safety chains Single

Brake Position On all wheels
Brake sch. No. 6-ET Westg. Auto. and Straight Air, with 12" x 12" tender brake cylinder.

List of tools, sch. #29 Two traversing jacks
Photo sch. No. 2 Inspection B. L. W.
To be weighed Yes Material specns B. L. W.
Certificate of boiler test Three copies B. L. W. form 1036
Junior laws to 7-1-20 Shipment On own wheels (See Sup. 12)

Brass shop finish No. 1
Machine shop finish D-165

Property plates B. L. W. for engine and tender.

Painting, style 291, Olive Green and Aluminum

Mark on sides of cab W. & M. R. R.

Road Nos. Pos.	Road Nos.	Name None
F. No. Plate	527	
Sand Box	528	
Tank Sides		

Actual Dimensions of Loco. Width over Cab Handles 10' 6½"
Extreme height over all 14' 11½"
Extreme Width: Cab boards 10' 3" ; Cylinders ~~engine motion~~ 9' 8½"
Length outside face front bumper of engine to face of tender wedge = 34' 9"
Length face of tender wedge to outside face back bumper of tender = 26' 2½"
Total length outside face front bumper of engine to outside face back bumper of tender = 60' 11½"

SPECIFICATION FOR LOCOMOTIVES 10 34 D 1139 AND 1140
FOR WISCONSIN & MICHIGAN R. R. Co.
P

342
341

1 FIRE DOOR TO BE FRANKLIN PNEUMATIC.

2 FLEXIBLE STAYS TO BE (SPECIAL) TATE, ABOUT 500, IN BREAKING ZONE.

3 STEAM PIPES TO HAVE OUTSIDE CONNECTIONS TO VALVE CHAMBERS.

4 SMOKE BOX TO HAVE W. W. SELF-CLEANING FRONT END ARRANGEMENT.

5 BLOW-OFF COCK FROM SCULLY IRON & STEEL CO.

6 PROVIDE A 1" CONNECTION IN STEAM DOME FOR ATTACHING A STEAM HOSE FOR THAWING WATER IN TANK, AND FOR SYPHON.

7 CYLINDERS TO HAVE SHORT CYLINDER COCKS.

8 MAIN DRIVING WHEELS TO HAVE WEARING LINERS OF BRONZE PRESSED INTO FACE OF WHEELS.

9 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS, AND TO BE LOCATED UNDER FRONT RUNNING BOARD.

10 AIR PUMP TO BE APPLIED ON SIDE OF BOILER IN A POSITION WHICH WILL NOT INTERFERE WITH RENEWAL OF STAYBOLTS.

11 CONNECTION TO BE PROVIDED FROM AIR PUMP EXHAUST NEAR FRONT OF ENGINE SO A $\frac{1}{4}$" PIPE CAN BE RUN TO TIRE FLANGES TO PREVENT CUTTING ON CURVES.

12 THE FOLLOWING SPARE PARTS ORDERED THROUGH THE EXTRA WORK DEPARTMENT ON EXTRA ORDER No. 1864 DATED 8-3-20, TO BE SHIPPED WITH LOCOMOTIVES (NO CHARGE).- ONE DRIVING SPRING, ONE ENGINE TRUCK SPRING, AND TWO EXTRA GRATE BARS.

15 FOR HEREAFTER:- ENGINE TRUCK CROSSTIES TO BE MADE HEAVIER.
ASH PAN TO BE MADE OF HEAVIER PLATES AND TO HAVE CAST IRON HOPPER CASTINGS AND SLIDES.
CAB TO HAVE CLEAR VISION WINDOWS IN FRONT DOORS.
TANK FUNNEL TO BE LARGER; ABOUT 18" x 36".
PILOT TO BE STRONGLY BRACED FOR LATER APPLICATION OF SNOW FLANGERS.
PROVIDE ELECTRIC CLASSIFICATION LAMPS ON SMOKE BOX AND DECK LIGHT ON REAR OF CAB.
R. R. Co. MADE THESE CHANGES ON ENGINE AFTER DELIVERY.
(R. S. McC. 4-25-22)

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7287, Dup. 8 32 D 798, except where otherwise specified.

Memorandum Spec'n 21040

SPECIFICATION FOR LOCOMOTIVES 8 32 D 807

FOR Yosemite Valley R. R. Co.

P

Gen. as Photo 5537 {Except to have short smoke box, one sand box, electric headlight at front, cast steel engine truck wheels, cab of wood and wooden tender frame.

Engine Drawing No. 79

11-26-21 (Spec'n)

Gauge of Road 4' 8½" Play ¾" (See sup. 34)

Wheelbase, Rigid 14' 2" Driving 14' 2" Total 22' 9"

Total wheelbase, eng. and tend. {Actual 51' 2" / Limited to ---

Curves 18 degrees Grades 2%

Rails 70 pounds.

Limits, Height --- Width ---

Weight (approximate) in working order, Total 137000 pounds

On F. tr'k 20000 lbs., Drivers 117000 lbs., B. tr'k --- lbs.

Weight limited (See sup. 1)

Tractive power 28600 lbs. Ratio of adhesion 4.2

Work'g St'm Pres. 190 lbs. Service Passenger and Freight

10 **Fuel** Oil, with gravity same as for 8 32 D 798

Boiler Steel Thick 1 1/16" Bill 9526

Front Tube Sheet ½" Thick

Boiler, Diam. 61" Plan Extended Wagon Top

Allowable st'm pres. 200 lbs. Tested to 220 lbs. steam pres.

With Factor of Safety of 4.73 267 lbs. water pres.

Longitud. seams Butt jointed, double covering strips, sextuple riveted.

3 **Dome,** diam. 29" Pos. Forward of fire box

5 **Firebox** Steel Combustion chamb. None

Firebox, length 93-1 1/16" Width 41½" Depth F. 70" B. 68"

4 Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

6 Firedoor opening One Oval 13½" x 18"

Water space, Front 4" Sides 3½" Back 3½"

Water space frame Double Riveted

Water space stays ⅞" diam. with 3/16" holes 1½" from outside.

Radial stays 1" diam. Sling stays front {Two rows B. L. W. / Expansion Stays

~~Button~~ Heads below crown on ——→ central rows (See sup. 8)

Crown bars None Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G. Steel

Tubes No. 12 B. W. G. Charcoal Iron or Steel (B.L.W. Option)

Tube ends Swaged for copper ferrules, fire box ends.

9 Number {24 / 153 Diam. {5½" / 2" Length 12' 7"

Heating {Flues 422 sq. ft. Combus. Chamb. --- Total 1571 sq. ft.

Surface {Tubes 1001 sq. ft. Fire Box 148 sq. ft. Fire Brick Tubes ---

Grate area 26.8 sq. ft. Ratio to Heating Surface 1: 58.6

Superheater 342 sq. ft.

Fire Brick Arch, None

10 Fire box lined with fire brick, for oil burning.

Fire brick pavement in pan.

10 **Grates** None

11 **Ash Pan,** Dampers Front and Back

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater Schmidt type (See sup. 13c)

16 **Smokebox** extension None 15 Cleaning hole and cap None

Spark injector or hopper None

~~Superheater~~ Netting and deflect. plates With

22 Exhaust nozzles Single, Low (See sup. 17)

Cleaning pipe, (See sup. 18)

19 **Stack** Straight Dia. 16"

11-26-21 (Spec'n)

Safety Valves Two Crosby 3" Encased

Safety valves None with relief lever, Set to 190 pounds.

Whistle One 1½" Chime

21 **Steam Gauge** One Iron 7" Maker: Ashcroft

Steam gauge stand Iron **Clock** None

Water Gauge One Wiltsongo No. 4XX **Cab Lamps** Electric (Sup.

Gauge Cocks Three back Surface valve None

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve To have separate dry pipe to dome

22 **Blower Valve** B. L. W.

Blow off Cock One Everlasting Pos: (See sup. 23)

24 **Cleaning Plugs**

Firebox, Corners diagonal and one each side

Crown, Three each side and three back

Waist, (See sup. 24)

Front tube sheet, None Fusible plug One

Pump None

Injectors to have lever movement

Injectors Two Ohio Type "A" (Spec'd) No. 9

Injectors, Pos. Right and Left Steam pipes Copper

Pipes, Check Iron Feed Iron Overflow Iron

Check B. L. W. Pos. R. and L.

Steam Heat (See sup 25)

Cab Wood

Cab boards Wood Nosing None

Running boards Wood Nosing None

Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 33¼"

Pilot Wood

Front Bumper Oak Bumper plate With

Steps Hand holds etc. to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"

Coupler Tower M. C. B. Auto. with Tower pocket attachment for pilot beam.

Signal fixtures (See sup. 26c)

27 **Headlight** One round case 18" Reflector,

Headlight, Nos. on sides (See sup. 28) H'd'l't step With

Lamp shelf None Nosing ---

Bell 92 pounds

Sand Box One Diam. 31" Body Iron painted Pipes Iron

Sander (Spec'd) Leach Air, Trap A-10, to sand front of front drivers and back of rear drivers.

Dome casing Steel painted, pressed steel top and bottom rings.

Boiler Jacket #22 Polished Steel Bands Iron Style 9

Boiler Lagging Magnesia Sectional

THE BALDWIN LOCOMOTIVE WORKS

H. Howitt

SPECIFICATION FOR LOCOMOTIVES 8 32 D 807 Feb. 1922

FOR Yosemite Valley R. R. Co.

P

3411

343

Frames Cast Steel

Cylinders, Diam. 19" Stroke 28"

St'm ports, Length 23.16" Width 1⅞" Bridges ---

Exh. ports, Length --- Width --- Valve lead 3/16"

Valve travel 5½" Steam lap ⅞" Exhaust clearance ---

Eccentric crank throw 13⅜" By-pass valve None

S. F. Lubr. (Spec'd) Detroit Five-feed No. 12, Bull's Eye

Cyl'r heads Cast Iron Lubr. pipes of iron under jacket.

Cyl'r casings Iron painted Head covers Steel painted

St'm chest casings --- Covers ---

St'm chest valves 10" diam., Piston type

Met. pkg. (Spec'd) {Piston rods / Valve stems} United States, King type

Pistons Heads of cast iron (See sup. 29)

Guides Steel Oil cups Needle

Crossheads Alligator type, Cast Steel (See sup. 30)

Wrist Pins Steel Rod cups (See sup. 31)

Parallel rods to have solid ends.

Valve Motion Walschaerts

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners (See sup. 33-36)

Drivers, O. S. Diam. 57" Cen. diam. 50" Centers Cast Steel

Tires Steel (Sup. 32) Held by Shrinkage and shoulder

Tires, Flanged, Pos. Front and Back Size 3½" x 5½"

Tires, Plain, Pos. Middle Size 3½" x 6½"

Lateral play between driving boxes and wheel hubs, including lateral play in box pedestal fits = (Sup. 35)

Driving Boxes Cast Steel

Journals, Diam. 8½" Length 11"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, Center bearing

To swing 4" each side of cen., Cen. pin liners None

Journals, Diam. 6" Length 12" Boxes Cast Iron

Wheel hub liners Brass, on wheels

Lateral play between front truck boxes and wheel hubs, including lateral play in box pedestal fits (Sup. 39)

Wheels, Diam. 30" Tread 4 5/16" Kind Davis Cast Steel

Tires None Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck None Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Lateral play between back truck boxes and wheel hubs, including lateral play in box pedestal fits --- Total

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels

Operating Parts {Engine, sch. No. 6-ET Westg. Combined Auto. and Straight air / Eng. Tr'k, sch. ---

Foundation Parts {Drivers, sch. Wi-2 American O. S. Equalized / Eng. Tr'k, sch. ---

Air pump Two 9½" Pos. Both Left Side

Train connections Front and Back

Train signal, sch. "L"

Air reservoirs to have hydrostatic test of 210 pounds.

6 **Tender** Eight Wheeled, Drawing No. 1700 {Tender to be weighed: Yes

Weight, with fuel and water, about 100,000 pounds.

10 Oil 2240 5737

6 **Tank** Water 4500 Gallons, Bill 5738

Tank "U" shape, straight top.

7 Tool Boxes Hard wood, top of water tank back of oil tank.

Frame White Oak with bumpers of White Oak.

Front Drawbar height 32"

Pilot None

Back drawhead, center above rail 33½"

Coupler Tower M. C. B. Auto. with drawbar yoke attachment and with tandem spring draft gear.

Steps hand holds, etc. to conform to I. C. C. requirements.

Trucks Arch bar type, with bolsters of Cast Steel

Springs Elliptic, B. L. W. make

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread 4¼" Kind Griffin, Chilled cast iron

Tires None Cen. diam. --- Size ---

Tires held by ---

Safety chains Single

Brake Position On all wheels

Brake sch. No. 6-ET Westg. Auto. and Straight air, with 12" and 12" tender brake cylinder. Hand brake in addition to air brake.

43 List of tools, sch. 160 Wrecking Frogs (See sup. 43)

Photo sch. No. 2 Inspection B. L. W.

To be weighed Yes Material spec'ns B. L. W.

Certificate of boiler test (See sup. 2)

Junior laws to 12-23-21 Shipment On own wheels

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents: None

Property plates None

Painting, style 291, Olive Green and Aluminum

Lettering etc. to be in Aluminum leaf.

Lettering etc. to be same as for 8 32 D 798.

Mark on Cab Panels, Yosemite Valley

44 Road Nos. Pos. Road Nos. Name None

44 F. No. Plate 29

45 Sand box

45 Tank Sides

Back of Tank

Actual Dimensions of Loco. Extreme height over all 14' 10¾"

Extreme Width: Cab boards 10' 1" ; Cylinders or valve motion = 9' 11"

Length outside face front bumper of engine to face of tender wedge = 33' 1½"

Length face of tender wedge to outside face back bumper of tender = 23' 7½"

Total length outside face front bumper of engine to outside face back bumper of tender = 56' 9"

SPECIFICATION FOR LOCOMOTIVES 8 32 D 807

FOR YOSEMITE VALLEY RAILROAD COMPANY

P

1 MAXIMUM WEIGHT ON DRIVERS MUST NOT EXCEED 121,000 POUNDS.

2 BOILER TEST CERTIFICATE, THREE COPIES B. L. W. FORM 1036 AND TWO COPIES B. L. W. FORM 491.

3 MAIN DOME, ONE-PIECE TYPE.
AUXILIARY DOME, NONE.

4 FIRE BOX CROWN AND SIDES IN ONE SHEET.

5 ALL RIVETS IN FIRE BOX SEAMS TO BE 7/8" AND TO BE COUNTERSUNK ON FIRE SIDE.

6 FIRE DOOR OPENING FORMED BY RIVETING THE INSIDE AND OUTSIDE SHEETS TOGETHER ON THE OUTSIDE.

7 FIRE DOOR TO BE HEINTZELMAN BAFFLE DOOR OF THE ADJUSTABLE DRAFT TYPE, SO AIR CAN BE ADMITTED TO THE FIREBOX THROUGH THE DOOR.

8 CROWN STAYS AS B. L. W. TRACING 26873 IN TEN CENTRAL ROWS. RADIAL STAY BOLTS TO BE RIVETED OVER ON BOTH ENDS. NO BUTTON HEADS IN FIRE BOX.

9 FLUE SPACES TO BE NOT LESS THAN 1 1/16". NO FLUE HOLES TO BE LESS THAN 1½" FROM TOP OR SIDE FLANGE OF FLUE SHEET.

10 OIL BURNING ARRANGEMENT TO INCLUDE VON BODEN-INGLES 3" OIL BURNER WITH REGULATING VALVE WHERE OIL PIPE LEADS TO BURNER, APPLIED AS CLOSE TO BURNER AS POSSIBLE. CONTROL LEVER LOCATED IN CAB SO IT CAN BE OPERATED BY FIREMAN WHILE LOOKING OUT OF WINDOW. ROYALTY, IF ANY, ON OIL BURNING ARRANGEMENT, PAYABLE BY THE B. L. W.

11 FIRE PAN TO BE B. L. W. STANDARD TO SUIT ENGINE.

12 OIL AND STEAM CONNECTIONS BETWEEN ENGINE AND TENDER TO BE MADE WITH McLAUGHLIN FLEXIBLE JOINTS.

13 SUPERHEATER AS THE SUPERHEATER CO'S. SPECN. NO. O-17265, DATED DECEMBER 7, 1921 (COPY ATTACHED). SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS. ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. W.

14 PATENT PLATES (HEREWITH) FROM THE SUPERHEATER CO. COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

15 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

16 SMOKE BOX TO BE OF STEEL ½" THICK.

17 EXHAUST NOZZLE TIPS TO BE 4 7/8", 4 3/8" AND 4 1/2" DIAMETER, WITH THE 4 7/8" TIP APPLIED.

18 CLEANING PIPE TO BE ADJUSTABLE.

19 STACK TO BE SAME AS FOR 8 32 D 798.

21 STEAM GAUGE AND WATER GLASS TO HAVE ELECTRIC LIGHT, AND ONE LIGHT LOCATED NEAR THE ENGINEER WHERE IT CAN BE USED BY HIM WITHOUT LEAVING HIS SEAT. EACH GAUGE TO HAVE A LIGHT.

22 BLOWER PIPE TO COME FLUSH WITH TOP OF NOZZLE POT.

23 BLOW-OFF COCK TO BE LOCATED IN CENTER OF THROAT SHEET JUST ABOVE MUD RING.

24 ONE CLEANING PLUG ABOUT 4" ABOVE FIRE DOOR. TWO CLEANING PLUGS UNDER WAIST, ONE ABOUT 12" BACK OF FRONT FLUE SHEET, AND ONE 24" AHEAD OF THROAT SHEET LOCATED SO IT WILL JUST MISS THE AXLE.

25 STEAM HEATING APPLIANCE COMPLETE AS MADE BY THE VAPOR CAR HEATING CO., WITH STOP VALVE NO. 206, AS SHOWN IN THEIR CATALOGUE NO. 22. THIS STOP VALVE NO. 206 TO BE APPLIED IN FOUNTAIN HEAD. STEAM HEAT PIPING TO RUN TO FRONT OF ENGINE AND TO REAR OF TENDER, WITH McLAUGHLIN FLEXIBLE JOINT BETWEEN ENGINE AND TENDER.

26 ENGINE TO HAVE BRACKETS FOR CLASSIFICATION LAMPS AND FLAGS. ALSO FLAG POCKETS ON PILOT.

27 LOCO. TO BE EQUIPPED WITH ADAMS & WESTLAKE STANDARD R. R. ELECTRIC CLASSIFICATION LIGHTS, AND TAIL-LIGHTS, TO MEET GOVERNMENT'S REQUIREMENT.

28 HEADLIGHT AND EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHT HAVING 250 WATT LAMPS. HEADLIGHT SIDE NUMBERS TO BE IN 4" FIGURES. HEADLIGHT GENERATOR TO BE PLACED IN FRONT OF CAB AND SECURELY FASTENED TO THE BOILER.

29 PISTON HEADS TO BE SOLID, AND FITTED WITH THREE PACKING RINGS 3/8" WIDE BY 3/8" AND TO HAVE DOWEL OF TOBIN BRONZE, TO HOLD RINGS IN PLACE, MIDDLE RING ON BOTTOM, AND THE OTHER TWO 3" FROM CENTER EACH SIDE OF CENTER.

30 CROSSHEADS TO HAVE ADJUSTABLE GIBS TOP AND BOTTOM, AND SIDE PLATES. CROSSHEAD GIBS TO BE CAST IRON, WITH BABBITT RECESSES THAT EXTEND ACROSS THE SURFACE OF THE GIB AND TAKE ONE-HALF OF THE BEARING SURFACE OF THE GIB, ALTERNATING IRON AND BABBITT.

31 MAIN ROD BACK END AND SIDE RODS TO HAVE COMPRESSION CUPS FOR HARD GREASE.

32 DRIVING TIRES FROM STANDARD STEEL WORKS.

33 DRIVING WHEELS TO HAVE HUB LINERS OF BRASS (SEE SUP. 36)

34 DRIVING WHEELS TO BE SET 53 1/4" BETWEEN INSIDE FACES OF TIRES, FOR FRONT AND BACK WHEELS AND 52 3/4 FOR MIDDLE (PLAIN) WHEELS. (NOW. 9.16.25)

35 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 7/32" TOTAL.

36 DRIVING BOXES TO HAVE HARD BABBITT FACE NEXT TO THE HUB OF DRIVING WHEEL (SEE SUP. 33)

37 FRANKLIN GREASE CELLARS TO BE APPLIED. MANNER OF GROOVING THE DRIVING BOXES FOR APPLICATION OF GREASE CELLARS AS SKETCH (HEREWITH).

38 ALL DRIVING SPRINGS TO HAVE STEEL ROLLER BEARINGS ON SADDLES.

39 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 5/16" TOTAL.

345 346 346 347 348

SPECIFICATION FOR LOCOMOTIVE: 8 32 D 807

FOR: YOSEMITE VALLEY R. R. CO.

Specification for Type A Double Loop Superheater No. O-17265, DECEMBER 7, 1921.

BOILER TUBES	153 in number 2" o. d. 12 ft 7 in over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A 28-18.	
BOILER FLUES	24 in number 5½" o. d #9 B.W.G. Roof cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A 28-18. Card	2L-11552D
BOILER FLUE SETTING	1/8 in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, headed and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card	1136
TUBE SHEET LAYOUT	Card	3L-50872
UNITS	24 units 1½" o. d #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide Card	10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints Card	1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A Card	1064-M
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card	A. H. M. 4 x 6 11051-A
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card	1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units Card	SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card	1067
PYROMETER	Model No. Pyrometer Card	NONE
PYROMETER ARRANGEMENT	Generally in accordance with Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration Card	
S. H. ARRANGEMENT	In accordance with Card	4L-40860
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 2L-11528-G	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYCL. PIPE CONNECTION	Card 1L-11437	S. H. PIPE BAND	Card 1988
DAMPER CYL. PIPING DIAGRAM	Card 2L-11442	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card 1068	RETURN BENDS	Card 11022
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O. S.)	Card 1148	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT BEARING I.S.	Card 1275-D	DEFLECTING PLATE STUDS	Card 10809
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE CLAMP	Card 10809-A
PATENT PLATE	Card 3L-3367		
DAMPER RIGGING	CARD 11384		

41 AIR PUMPS PLACED SO THEY WILL CLEAR STAYBOLTS. BOTH PUMPS TO WORK INDEPENDENTLY OF EACH OTHER. AIR PUMP EXHAUST TO BE TAPPED INTO BOTH CYLINDER EXHAUST CHAMBERS, AND TO HAVE TWO ¾" LUNKENHEIMER GLOBE VALVES EXTENDING IN FRONT OF SADDLE, SO THEY CAN BE REACHED FROM THE OUTSIDE TO DRAIN THE WATER OFF.

42 MAIN RESERVOIR TO BE WESTINGHOUSE ENAMELED, 40,000 CUBIC INCHES CAPACITY, LOCATED ON RUNNING BOARD, OR AWAY FROM HEAT OF ENGINE.

43 TWO JOHNSON WRECKING FROGS, TYPE "B" FOR 70 POUNDS RAILS.

44 FRONT NUMBER PLATE WITH BRASS FIGURES.

45 ROAD NUMBER ON SAND BOX TO BE IN 6" FIGURES. ROAD NUMBERS ON SIDES AND BACK OF TANK TO BE IN 16" FIGURES.

TENDER

61 TENDER DETAIL CONSTRUCTION TO BE SAME AS ON 8 32 D 798.

62 WATER TANK TO BE 8' 9" WIDE BY 21' 0" LONG BY 4' 8" DEEP, WITH ROUNDING ENDS IN FRONT ROLLED TO 12" RADIUS. BACK CORNERS ROLLED TO 10" RADIUS.

63 TENDER TO HAVE ONE COAT OF ~~CLARKS~~ (A/K TIME) IRON CEMENT APPLIED TO ALL PARTS OF INSIDE OF WATER TANK BEFORE IT IS RIVETED TOGETHER.

64 THE MAN HOLE OF WATER TANK TO BE 18" x 24" OPENING CROSSWISE OF TENDER WITH SUITABLE COVER WITH HAND HOLD TO LIFT IT OFF.

65 THE TENDER TO HAVE TWO WATER VALVE CONNECTIONS IN WATER TANK, ONE ON EACH SIDE.

66 ONE WATER VALVE COCK TO BE PROVIDED IN LEFT HAND SIDE OF WATER TANK, AND WHERE IT CAN BE EASILY REACHED FROM THE GANGWAY.

67 OIL TANK TO HAVE ½" RIVETS, 1½" PITCH.

68 MANHOLE TO OIL TANK TO BE 18" x 24", OPENING CROSSWISE OF TANK. THE MANHOLE TO HAVE SUITABLE COVER SO IT CAN BE BOLTED TIGHT WITH RUBBER GASKET TO PREVENT ANY OIL FROM LEAKING OUT UNDER 10 POUNDS PRESSURE. THE OIL MANHOLE COVER TO BE FASTENED WITH HINGED JOINT ON BACK SIDE SO COVER WILL TURN BACK, AND ONE BOLT ON EACH SIDE AND ONE BOLT IN FRONT MADE WITH SWIVEL JOINT SO BOLTS WILL TURN DOWN WHEN LOOSENED AND HAVE BUTTERFLY NUT ON TOP TO SCREW COVER DOWN. THE COVER TO HAVE SLOTTED HOLES IN FRONT AND ON SIDE TO ALLOW BOLTS TO TURN DOWN. A BRACKET TO BE FASTENED TO TOP OF OIL TANK TO PREVENT COVER OF OIL MANHOLE FROM DROPPING DOWN BELOW A LEVEL OF TOP OF MAN HOLE. THE COVER TO TURN BACK.

69 A SUITABLE GAUGE TO BE PLACED IN FRONT OF OIL MANHOLE SO THE OIL CAN BE MEASURED, AND SAME SHALL NOT ALLOW THE OIL TO LEAK OUT OF TOP.

70 TENDER TO HAVE IRON LADDER ON REAR OF TANK.

71 TENDER TO HAVE PROPER BRACKETS FOR TAIL LIGHTS AND FLAGS (SUP. 27)

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-6304

Memorandum Specn 20021

SPECIFICATION FOR LOCOMOTIVES 10 22 D 9½

FOR ALASKAN ENGINEERING COMMISSION

H# 3-27-20

Gen. as Photo. 6533 (Except to have wood cab and Walschaert's valve motion

Engine Drawing No. 18

Gauge of Road 3'0" Play 2"
Wheelbase, Rigid 10'11" Driving 10'11" Total 19'9"
Total wheelbase eng. and tend (Actual 18' 11" Limited to ---

Curves ---

Limits, Height --- Width ---
Weight (approximate) in working order, Total 75,500 pounds
On F. tr'k 15,500 lbs. Drivers 60,000 lbs. B. tr'k --- lbs.

Tractive power 14000 lbs. Ratio of adhesion 4.28
Work'g St'm Pres. 185 lbs., Service Switching
Fuel Coal

Boiler Steel Thick 9/16" Bill 9010
Front Tube Sheet ½" Thick
Boiler, Diam. 48" Plan Extended Wagon Top
(Allowable st'm pres. 185 lbs. **Tested to** 205 lbs. steam pres.
(With Factor of Safety of 5.08 247 lbs. water pres.
Longitud. seams Butt jointed, double covering strips

Dome, diam. 25" Pos. Forward of Fire Box

Firebox Steel Combustion chamb. None
Firebox, length 84" Width 23" Depth F. 5 7/8" B. 4 3/32"
Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"
Firedoor opening 16" Diam.
Water space, Front 3½" Sides 2½" Back 2½"
Water space frame Single Riveted
Water space stays ⅞" diam. with 3/16" holes 1¼" deep rom C. S.

Radial stays 1" diam. Sling stays front Two rows B. L. W. Expansion Stays
Button heads below crown on Six central rows
Crown bars None Placed --- above crown
Crown bolts ---

Flues ---
Tubes #12 W. G. Charcoal Iron or Steel (B. L. W. Option)
Tube ends Staged for copper ferrules, fire box ends.
Number 144 Diam. 2" Length 10'8"

Heating (Flues --- Combus. Chamb. --- Total 891.0
Surface (Tubes 798.0 Fire Box 93.0 Fire Brick Tubes ---
Grate area 13.4 Ratio to Heating Surface 1: 66.5
Superheater ---

Fire Brick Arch on studs

Grates Rocking bars with drop plate
Ash Pan, Dampers Front and Back

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

Smokebox extension With Cleaning hole and cap L. S. Only
Spark ~~arrester~~ hopper With
Netting and deflect. plates With

Exhaust nozzles Double High

Stack Straight Dia. 14"

Safety Valves Two Consle 2½" Open (Not Spec.)
Safety valves None with relief valve Set to 185 pounds
Whistle One B. L. W. ¾ Plain

Steam Gauge One Iron 7" Makers: Ashcroft (Not Spec.)
Steam gauge stand Iron **Cleck** None

Water Gauge One B. L. W., Ironclad **Cab Lamps** To burn oil
Gauge Cocks Three Back Surface valve None
Lowest gauge cock 3" above highest part of crown
Lubricator steam valve Without separate dry pipe to dome
Blower Valve B. L. W. ¾

Blow off Cock One B. L. W. ¾ Pos: L. S.
Cleaning Plugs
Firebox, Corners, back ones diagonal, and ~~s~~. S.
Crown, Two each side and two back
Waist, One under front
Front tube sheet One Fusible plug One

Pump None
Loco. for operation in Tanana Valley, Alaska.
Loco. to be suitable for operation in temperatures of 70 degrees below zero, Fahrenheit.

Injectors Two Monitor (Not Spec.) No. 7
Injectors, Pos. R. and L. Steam pipes Copper
Pipes, Check Iron Feed Iron Overflow Iron
Check B. L. W. Pos. R. and L.

Steam Heat With, in cab.

Cab Wood

Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 26"

Pilot Wood Pushing shoes None
Front Bumper Oak Bumper plate With
Steps and hand holds to conform to I. C. C. requirements.

Front Drawhead, Center above rail 26½"
Coupler M. C. B. Auto.

Signal fixtures Iron on bumper

Headlight One Hound Case 18" Reflector, To burn Kerosene
Headlight, Nos. on sides With Hdl't step With
Lamp shelf None Nosing ---

Bell 85 pounds
Sand Box One Diam. 28" Body Iron Painted Pipes Iron
Sanders Leach Air, trap A-10, to sand front and back.
Dome casing Iron Painted

Boiler Jacket #22 Soft Steel P. T. Bands Iron Style 9 and 14
Boiler Lagging Magnesia Sectional
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

A. Bolton

SPECIFICATION FOR LOCOMOTIVES 10 22 D June 9½ 1920.

FOR ALASKAN ENGINEERING COMMISSION

H#

349
357

Frames Cast Steel

Cylinders, Diam. 14" Stroke 20"
St'm ports, Length 13" Width 1½" Bridges 1"
Exh. ports, Length 13" Width 2½" Valve lead ⅛"
Valve travel 4½" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 10 3/32" By-pass valve None
S. F. Lubr. Nathan Three-feed bulls eye (Not Spec.)
Cyl'r heads Cast Iron Lubr. pipes of iron under jacket
Cyl'r casings Iron Pt'd. Head covers Steel Painted
St'm chest casings Iron Painted Covers Steel painted
St'm chest valves Richardson balanced, with vacuum valves
Met. pkg. Piston rod / valve stems United States, King Type (Not Spec.)

Pistons Heads of cast iron with rings of cast iron sprung in
Guides Steel Oil cups Needle
Crossheads Cast Steel, with bearings of brass
Wrist Pins Steel Rod cups Plunger
Parallel rods to have straps, keys and brasses

Valve Motion Walschaerts
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings

All threads on bolts except staybolts to be United States Standard
All finished movable nuts of steel or of iron case hardened

Wearing Bearings B. L. W.
Driving wheel hub liners None
Drivers, O. S. Diam. 44" Cen. diam. 38" centers cast iron

Tires Steel Held by Shrinkage and Shoulder
Tires, Flanged, Pos. Front and Back Size 3" x 5"
Tires, Plain, Pos. Middle Size 3" x 6"
Lateral play between driving boxes and wheel hubs 1/8" total
Driving Boxes Cast Iron
Journals, Diam. 6½" Length 8"

Springs. Make B. L. W.

Front Engine Truck Four Wheeled Swing bolster, center bearing
To swing 3½" each side of cen. Cen. pin liners None
Journals, Diam. 4" Length 6½" Boxes Cast Iron
Wheel hub liners None
Wheels, Diam. 22" Tread 3-11/16" Rim Chilled Cast Iron Plate
Tires None Cen. diam. --- Size ---
Tires held by ---

Back Engine Truck None Wheeled ---
To swing --- each side of cen. Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels
Operating Engine, sch. No. 6 ET Estg. combined auto. and
Parts Eng. Trk. sch. --- straight air.
Foundation Drivers, sch. M-1 American O. S. Equalized
Parts Eng. Trk. sch. ---
Air pump One 9½" Pos. L. S.
Train connections Front and Back
Train signal, sch. None
Air reservoirs to have hydrostatic test of 210 pounds

Tender Eight Wheeled, Drawing No. 1555
Weight, with fuel and water, about 56,000 pounds
Tender to be weighed: Yes
Tank 2,500 Gallons, Bill 4833
Tank "U" shape, straight top. Fuel capacity 5 tons.

Tool Boxes Hard wood, top.

Frame Steel, 6" and 8" channels, with bumpers of wood and steel plate
Front Drawbar height 25½"
Pilot None Pushing shoes at rear
Back drawhead, center above rail 26½"
Coupler M. C. B. Auto.

Steps, hand holds etc. to conform to I. C. C. requirements.
Steps across rear with hand rail.

Trucks Arch bar tyre, with cast steel bolsters.

Springs Elliptic, B. L. W.
Journals, Diam. 3½" Length 7"
Wheels, Diam. 28" Tread 3-11/16" Rim Chilled Cast Iron Plate
Tires None Cen. diam. --- Size ---
Tires held by ---
Safety chains Single

Brake Position On all wheels
Brake sch. No. 6 ET Estg. Auto. and straight air, with
8" x 12" tender cylinder.
*Careful records of all tests of materials to be kept by The B. L. W. and seven certified copies of test reports to be furnished in accordance with Hildreth & Co's letter of April 14, 1920.
List of tools, sch. 26
Photo scr. ~~Mfrs~~ None Inspection (See X below) and above)
To be weighed Yes Material specns B. L. W.
Certificate of boiler test Three copies of B. L. W. form 1036
Junior laws to 6-9-20 Shipment Best Foreign Style

Brass shop finish, No 1
Machine shop finish D-165
*Inspection by Hildreth & Co. 15 Broad Street, New York, N. Y. in accordance with their letter of Apl. 14, 1920 (copy attached)

B. L. W.
Patents None

Property plates None

Painting, style ---Olive Green, No striping

Mark on None

Front number plate a star
Road Nos. Pos. Road Nos. Name None
None

Actual Dimensions of Loco. Extreme height over all 12' 8½"
Extreme Width: Cab boards 8' 7"; Cylinders ~~or valve chests~~ 7' 6"
Length outside face front bumper of engine to face of tender wedge 28' 1½"
Length face of tender wedge to outside face back bumper of tender 21' 5½"
Total length outside face front bumper of engine to outside face back bumper of tender 49' 7"

350
357

COPY

CLASS: 10 22 D 94 FOR:- ALASKAN ENGINEERING COMMISSION.

HILDRETH & COMPANY
CONSULTING ENGINEERS
15 BROAD STREET,
NEW YORK

APRIL 14, 1920.

BALDWIN LOCOMOTIVE WORKS:
PHILA., PA.

ATTENTION: F. WOOLLVEN, MANAGER OF ORDERS.

IN REFERENCE TO YOUR LETTER OF APRIL 8TH, PLEASE BE ADVISED THAT WE WILL NOT INSPECT ANY OF THE MATERIAL ENTERING INTO THIS LOCOMOTIVE AT THE POINTS OF MANUFACTURE. HOWEVER, IT WILL BE NECESSARY IN ORDER TO GIVE THE ALASKAN ENGINEERING COMMISSION FULL DATA WITH OUR REPORT THAT WE BE PROVIDED BY YOU WITH SEVEN COPIES OF CERTIFIED TEST REPORTS COVERING THE MATERIAL ENTERING INTO THE LOCOMOTIVE IN QUESTION. WE WILL ARRANGE TO HAVE OUR INSPECTOR VISIT YOUR PLANT IN ORDER TO MAKE THE PRESSURE TESTS ON THE CYLINDERS THE HYDRAULIC TESTS ON THE BOILER AND FINAL OPERATING TEST AND STEAM TEST BEFORE THE LOCOMOTIVE IS DISMANTLED FOR SHIPMENT.

WE ARE ALSO TO SEE THAT THE PACKING IS PROPERLY TAKEN CARE OF AND WE MUST MARK ALL BOXES WITH OUR ACCEPTANCE MARK BEFORE SHIPMENT. YOU WILL UNDERSTAND, HOWEVER, THAT WE WILL NOT INTERFERE IN ANY WAY WITH YOUR REGULAR METHOD OF PACKING FOR EXPORT.

AT THE TIME OF THE FINAL STEAM AND OPERATING TESTS, OUR INSPECTOR WILL MAKE A CAREFUL GENERAL INSPECTION TO SEE THAT THE ENGINE IS IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATION AND THE ORDER.

THE INSPECTION OF THIS LOCOMOTIVE WILL BE HANDLED FROM THIS OFFICE AND WE REQUEST THAT YOU ADDRESS ALL COMMUNICATIONS AND MAKE ALL CALLS FOR AN INSPECTOR TO THIS OFFICE.

YOURS VERY TRULY,

HILDRETH & COMPANY
PER H. O. LEISTER.

THE BALDWIN LOCOMOTIVE WORKS Supr. 10 24 ½ D 79 WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20077

SPECIFICATION FOR LOCOMOTIVES 10 24 ½ D 141

FOR ANGLO-NEWFOUNDLAND DEVELOPMENT CO. LTD.

HR. NEWFOUNDLAND

Gen. as PHOTO. 2624

Engine Drawing No. 16

3.25.20 (Not Specs.)

Gauge of Road 3' 6" Play 3/8"

Wheelbase, Rigid 10' 0" Driving 10' 0" Total 25' 0"

Total wheelbase, eng. and tend. {Actual ---- {Limited to ----

Curves MAIN LINE, 10 DEGREES, IN YARDS, 18 DEGREES.

WEIGHT OF RAIL 50 LBS. PER YARD, LAID ON SOFT GROUND.

Limits, Height ---- Width ----

Weight (approximate) in working order, Total 103,000 POUNDS.

On F. tr'k 12,000 lbs., Drivers 78,000 lbs., B. tr'k 13,000 lbs.

Tractive power 15,300 lbs., Ratio of adhesion 4.2

Work'g St'm Pres. 160 lbs., Service FREIGHT

Fuel SOFT COAL

Boiler STEEL Thick ½" Bill 8975

Front Tube Sheet ½" Thick

Boiler, Diam. 48" Plan STRAIGHT TOP

{Allowable st'm pres. 160 lbs. **Tested to** {180 lbs. steam pres.

{With Factor of Safety of 5.7 {214 lbs. water pres.

Longitud. seams BUTT JOINTED DOUBLE COVERING STRIPS.

Dome, diam. 22" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 65 11/16" Width 29 7/8" Depth F. 46 3/8" B. 45 1/4"

Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"

Firedoor opening 16" DIAM.

Water space, Front 3½" Sides 2½" Back 2½"

Water space frame SINGLE Riveted CORNERS 3" RADIUS

Water space stays ⅜" DIAM. WITH 3/16" HOLES 12" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front {TWO ROWS B.L.W. EXPANSION STAYS

Button heads below crown on SIX central rows

Crown bars NONE Placed ---- above crown

Crown bolts ----

Flues ----

Tubes #12 W. G. IRON OR STEEL

Tube ends SWAGED FOR COPPER FERRULES FIRE BOX ENDS.

Number 133 Diam. 2" Length 11' 0"

Ends not to be welded. 11-5-21.

Heating Surface {Flues ---- Combus. Chamb. ---- Total 830 sq. ft.

{Tubes 760 sq. ft. Fire Box 70 sq. ft. Fire Brick Tubes ----

Grate area 13.6 sq. ft. Ratio to Heating Surface 1: 61

Superheater ----

Fire Brick ARCH ON STUDS

Grates ROCKING BARS AND DROP PLATE

Ash Pan, Dampers R. AND L.

ASH PAN TO HAVE WIRE NETTING HINGED UNDER DAMPER OPENING.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L.S. ONLY

Spark ejector-hopper WITH

Netting and deflect. plates WITH

Exhaust nozzles DOUBLE HIGH

Stack STRAIGHT Dia. 13 3/8"

Safety Valves TWO CONSOLIDATED 2½" Cross

Safety valves NONE with relief lever, Set to 160 POUNDS

Whistle ONE B. L. W. PLAIN

Steam Gauge One IRON 7" MAKER: ASHCROFT (Not Spec.)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 2½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE B. L. W. POS: LEFT SIDE

Cleaning Plugs

Firebox, CORNERS DIAGONAL R. S. AND BACK

Crown, ONE EACH SIDE AND THREE BACK

Waist, ONE UNDER FRONT

Front tube sheet, ONE Fusible plug ONE

Pump NONE

ONE 2½" SYPHON, ON L.S. UNDER CAB BOARD, WITH SUITABLE CONNECTION TO WATER TANK, WITH ONE 20 FT. LENGTH OF 2½" SUCTION HOSE WITH STRAINER.

OVERFLOW PIPES FROM INJECTORS TO BE FITTED SO THEY CAN BE OPENED INTO ASH PAN WHEN REQUIRED.

Injectors TWO MONITOR (Not Spec.) No. 6

Injectors, Pos. R. AND L. Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B.L.W. COMBINED WITH STOP VALVE Pos. R. AND L.

Steam Heat NONE

Cab WOOD

FUEL BOX ON REAR EXTENSION OF FRAME, CAPACITY 6000 POUNDS.

Cab boards WOOD Nosing NONE

Running boards WOOD Nosing NONE

Hand rail IRON Located on TANK

Back Bumper OAK

PRIEST FLANGER AT FRONT END OPERATED BY AIR.

Pilot WOOD, FRONT AND BACK Pushing shoes NONE

Front Bumper OAK Bumper plate WITH

Steps ON PILOT

F & B Drawhead, Center above rail 31"

Coupler TOWER M.C.B. AUTO. FRONT AND BACK.

Signal fixtures IRON ON BUMPER

HEADLIGHT EQUIPMENT TO BE SCHROEDER ELECTRIC WITH INCANDESCENT HEADLIGHTS.

Headlight TWO ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH H'd'l't step WITH

Lamp shelf NONE Nosing NONE

Bell 85 POUNDS

Sand Box TWO Diam. 24" Body IRON PAINTED Pipes IRON

Sander LEACH AIR TRAP A-1 (Not Spec.)

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

H. Scheib

SPECIFICATION FOR LOCOMOTIVES 10 24 ½ July 1920.

FOR ANGLO-NEWFOUNDLAND DEVELOPMENT CO. LTD.

HW.

356 358

Frames CAST STEEL

Tender NONE

Cylinders, Diam. 15" Stroke 22"

St'm ports, Length 13" Width 1½" Bridges 1"

Exh. ports, Length 13" Width 2½" Valve lead 1/16"

Valve travel 5" Steam lap ⅞" Exhaust clearance ---

Eccentric ~~crank~~ throw 4⅝" By-pass valve NONE

S. F. Lubr. DETROIT TRIPLE No. 21 BULL'S EYE (Not Spec.)

Cyl'r heads CAST IRON Lubr. PIPES OF COPPER UNDER JACKET

Cyl'r casings IRON PTD. Head covers STEEL PAINTED

St'm chest castings IRON PTD. Covers STEEL PAINTED

St'm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES.

Met. pkg. U. S. (Not Spec.)

Tank 1300 Gallons, Bill 3051

SADDLE TANK OVER BOILER.

Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN.

Guides STEEL Oil cups NEEDLE

Crossheads CAST STEEL WITH BEARINGS OF BRASS.

Wrist Pins STEEL Rod cups NEEDLE, FORGED ON.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

ROCK SHAFT AND REVERSE SHAFT OF CAST STEEL.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE

Drivers, O. S. Diam. 44" Centers 38" CENTERS CAST IRON.

TIRE FLANGES TO BE 1" x 1"

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5"

Tires, Plain, Pos. MIDDLE Size 3" x 6"

Lateral play between driving boxes and wheel hubs ⅛" TOTAL

Driving Boxes STEELED CAST IRON

Journals, Diam. 5½" Length 8"

List of tools, sch. 26

Photo sch. NONE Inspection B.L.W.

To be weighed YES Material specns B.L.W.

Certificate of boiler test DUPLICATE

Junior laws to 3-1-10 Shipment KNOCKED DOWN AND BOXED

Brass shop finish, No. 1

Machine shop finish D-165

Springs. Make B. L. W.

B. L. W. Patents NONE

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTRE BEARING

To swing 3" each side of cen. Cen. pin liners NONE

Journals, Diam. 5" Length 8" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 26" Tread 4" Kind CHILLED CAST IRON SPOKE

Tires NONE Cen. diam. --- Size ---

Tires held by --- WHEEL FLANGES 1½" x 1⅝"

Property plates NONE

Back Engine Truck TWO Wheeled RUSHTON RADIAL

To swing 3½" each side of cen. Cen. pin liners NONE

Journals, Diam. 5" Length 8" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 26" Tread 4" Kind CHILLED CAST IRON SPOKE

Tires NONE Cen. diam. --- Size ---

Tires held by --- WHEEL FLANGES 1½" x 1⅝"

Brake, position ON ALL DRIVING WHEELS (NO TENDER)

Operating {Engine, sch. NO. 5 ET WESTG. COMBINED AUTO AND STRAIGHT AIR

Parts {Eng. Trk. sch. ---

Foundation {Drivers, sch. M-1 AMERICAN O.S. EQUALIZED

Parts {Eng. Trk. sch. - --

Air pump ONE 9½" Pos. L. S.

Train connections FRONT AND BACK

Train signal, sch. NONE

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Painting, sch. 219, OLIVE GREEN AND ALUMINUM

LETTERING ETC. TO BE SAME AS FOR 10 24 ½ D 79

Mark on TANK SIDES: A. N. D. Co. Ltd.

Road Nos. Pos. Road Nos. Name NONE

F. No. PLATE 10

F. SAND BOX

BACK OF FUEL BOX

Actual Dimensions of Loco. Extreme height over all 12' 1"

Extreme Width {Over cab boards 9' 4"

{Over cylinders or valve motion 7' 0"

Length outside face of front bumper to outside face of back bumper of engine 30' 10"

THE BALDWIN LOCOMOTIVE WORKS DUP. 10 28 D 144, WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 20059

SPECIFICATION FOR LOCOMOTIVES 10 28 D 149

FOR ANGLO - NEWFOUNDLAND DEVELOPMENT CO., LTD.

NEWFOUNDLAND.

Gen. as PHOTO. 1330

Engine Drawing No. 11

3.6.20

Gauge of Road 3' 6" Play 5/8"

Wheelbase, Rigid 11' 0" Driving 11' 0" Total 20' 5"

Total wheelbase, eng. and tend. {Actual 47' 9" / Limited to ---

RAILS 50 LBS. PER YARD, LAID ON SOFT GROUND.

Curves 10 DEGREES ON MAIN LINE, 18 DEGREES IN YARDS.

Limits, Height --- Width 9' 4"

Weight (approximate) in working order, Total 91,000 POUNDS.

On F. tr'k 17,000 lbs., Drivers 74,000 lbs., B. tr'k --- lbs.

WEIGHT ON DRIVERS LIMITED, SAME AS FOR 10 28 D 144.

Tractive power 19450 lbs., Ratio of adhesion 3.8

Work'g St'm Pres. 180 lbs., Service FREIGHT

Fuel SOFT COAL

Boiler STEEL Thick 13/16" Bill 8955

Front Tube Sheet 1/2" Thick

Boiler, Diam. 56" Plan STRAIGHT TOP

Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.

With Factor of Safety of 5.61 **Tested to** 240 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

Dome, diam. 29" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 89 5/8" Width 29" Depth F. 55 7/8" B. 48 3/4"

Firebox, Tube 1/2" Crown 1/2" Sides 3/8" Back 3/8"

Firedoor opening 16" DIAM.

Water space, Front 4" Sides 3" Back 3"

Water space frame SINGLE Riveted

Water space stays 7/8" DIAM. WITH 3/16" HOLES 1 1/2" DEEP FROM O. S.

Radial stays 1" DIAM. Sling stays front {TWO ROWS B. L. W. EXPANSION STAYS.

Button heads below crown on SIX central rows

Crown bars NONE Placed --- above crown

Crown bolts ---

Flues ---

Tubes #12 W.G. CHARCOAL IRON OR STEEL

Tube ends SWAGED FOR COPPER FERRULES FIRE BOX ENDS.

Number 184 Diam. 2" Length 12' 0"

(TUBES NOT TO BE WELDED)

Heating Surface Flues --- Combus. Chamb. --- Total 1254.5 sq. ft.

Tubes 1148.0 sq. ft. Fire Box 106.5 sq. ft. Fire Brick Tubes, ---

Grate area 18 sq. ft. Ratio to Heating Surface 1: 70

Superheater ---

Fire Brick ARCH ON STUDS.

Grates ROCKING BARS AND DROP PLATE.

Ash Pan, Dampers FRONT AND BACK

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L. S. ONLY

Spark ejector ~~hopper~~ WITH, TO DELIVER TO RIGHT SIDE.

Netting and deflect. plates WITH

Exhaust nozzles DOUBLE-HIGH

Stack ~~Cast Iron~~, STRAIGHT Dia. {13" AT BOTTOM / 15" AT TOP.

Safety Valves (Not Spec) TWO CONSOLIDATED 2 1/2" ENCASED

Safety valves NONE with relief lever, Set to 180 POUNDS.

Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE IRON 7" MAKER: ASHCROFT (Not Spec)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B. L. W. (IRONCLAD) **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE (SEE SUP. 6) POS: FRONT

Cleaning Plugs

Firebox, CORNERS, BACK ONES DIAGONAL

Crown, TWO EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT

Front tube sheet, ONE Fusible plug ONE

Pump NONE

Injectors (Spec) TWO SELLERS, CLASS "N" No. 7 1/2

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B. L. W. COMBINED WITH STOP VALVE Pos. RIGHT AND LEFT

Steam Heat NONE

Cab Wood. CRYSTAL PLATE GLASS CAB WINDOWS.

Cab boards WOOD Nosing NONE

Running boards WOOD Nosing NONE

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 28 1/2"

Pilot WOOD Pushing shoes NONE

Front Bumper OAK Bumper plate WITH

Steps NONE

Front Drawhead, Center above rail 31"

Coupler TOWER M. C. B. AUTOMATIC

Signal fixtures IRON ON BUMPER

Headlight ONE ROUND CASE 16" Reflector,

Headlight, Nos. on sides WITH H'dl't step WITH

Lamp shelf NONE Nosing ---

Bell 85 POUNDS

Sand Box TWO Diam. 28" Body IRON PAINTED Pipes IRON

Sander (Not Spec) LEACH AIR, TRAP A-1

Dome casing IRON PAINTED

Boiler Jacket #22 SOFT STEEL PTD. Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL

THE BALDWIN LOCOMOTIVE WORKS

J DANIEL

SPECIFICATION FOR LOCOMOTIVES 10 28 D 149 MAY 1920

358

360

FOR ANGLO - NEWFOUNDLAND DEVELOPMENT CO., LTD.

Frames CAST STEEL

Cylinders, Diam. 17" Stroke 22"

Stm ports, Length 16" Width 1 1/2" Bridges 1"

Exh. ports, Length 16" Width 2 1/2" Valve lead 1/8"

Valve travel 4 3/4" Steam lap 2" Exhaust clearance ---

Eccentric ~~throw~~ throw 5 1/2" By-pass valve NONE

(Spec) S. F. Lubr. DETROIT TRIPLE No. 22 BULL'S EYE.

Cyl'r heads CAST IRON LUBR. PIPES OF COPPER UNDER JACKET.

Cyl'r casings IRON PTD. Head covers STEEL PAINTED

Stm chest casings IRON PTD. Covers STEEL PAINTED

Stm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES

(Not Spec) Met. pkg. PISTON RODS / VALVE STEMS UNITED STATES

Pistons CAST IRON RINGS SPRUNG INTO SOLID HEAD

Guides LAIRD TYPE, STEEL Oil cups NEEDLE

Crossheads CAST STEEL WITH BEARINGS OF BRASS

Wrist Pins STEEL Rod cups NEEDLE, FORGED ON

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

PARTED ECCENTRICS HELD TOGETHER BY BOLT AND KEY.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners BRASS

Drivers, O. S. Diam. 50" Cen. dia. 44" CENTRES CAST STEEL.

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5"

Tires, Plain, Pos. MIDDLE Size 3" x 6"

Lateral play between driving boxes and wheel hubs 1/8" TOTAL

Driving Boxes CAST STEEL

Journals, Diam. 7" Length 8"

Springs. Make B. L. W.

Front Engine Truck FOUR Wheeled SWING BOLSTER CENTRE BEARING

To swing 1 1/2" each side of cen. Cen. pin liners NONE

Journals, Diam. 4 1/2" Length 7 1/2" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 26" Tread 3 3/4" Kind CHILLED CAST IRON SPOKE

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck NONE Wheeled ---

To swing --- each side of cen. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Parts: Engine, sch. No. 6 ET WEST'G COMBINED AUTO AND STRAIGHT AIR. Eng. Trk. sch. ---

Foundation Parts: Drivers, sch. M-1 AMERICAN O. S. EQUALIZED Eng. Trk. sch. ---

Air pump ONE 9 1/2" Pos. LEFT SIDE

Train connections FRONT AND BACK

Train signal, sch. NONE

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 LBS.

Tender EIGHT WHEELED, Drawing No. 338

Weight, with fuel and water about 56,000 POUNDS

TENDER TO BE WEIGHED: YES

Tank 2,800 Gallons, Bill 4428

TANK "U" SHAPE, STRAIGHT TOP. TANK COCK AND HOSE - WITH

TANK TO HAVE SLOPING BACK IN COAL SPACE. FUEL CAPACITY 5 TONS

Tool Boxes OF STEEL, TOP. TWO DRAIN PIPES 3" DIAM IN TANK.

SYPHON CONNECTION TO TOP OF TANK AT FRONT, LEFT SIDE.

Frame STEEL, 8" CHANNELS WITH BUMPERS OF CHANNEL.

TENDER FLOOR OF STEEL.

Front Drawbar height 26"

Pilot NONE Pushing shoes NONE

Back drawhead ~~above~~ above rail 31"

Coupler TOWER M. C. B. AUTOMATIC

Steps FRONT ONLY

Trucks ARCH BAR TYPE, WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, B. L. W.

Journals, Diam. 3 1/2" Length 7"

Wheels, Diam. 30" Tread 3 1/2" Kind CHILLED CAST IRON PLATE.

Tires NONE Cen. diam. --- Size ---

Tires held by ---

Safety chains SINGLE

Brake Position ON OWN WHEELS

Brake sch. No. 6 ET WESTG. AUTO AND STRAIGHT AIR, WITH 8"x12" TENDER CYLINDER

List of tools, sch. 29

Photo sch. NONE Inspection B. L. W.

To be weighed NO Material specns B. L. W.

Certificate of boiler test DUPLICATE

Junior laws to 3.1.20 Shipment ~~DOUBLE DECK~~ KNOCKED DOWN AND BOXED. ~~BEST FOREIGN STYLE~~

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents: FEED PIPE STRAINER, PAT'D SEPT. 1, 1903 (CAST ON)

Property plates NONE

Painting, style 291, OLIVE GREEN AND ALUMINUM.

LETTERING ETC. TO BE SAME AS FOR 10 28 D 144

Mark on TANK SIDES: A. N. D. CO., LTD.

Road Nos. Pos. Road Nos. Name NONE

F. No. PLATE 9

SAND BOX

BACK OF TANK

Actual Dimensions of Loco. Extreme height over all 12' 11 1/2"

Extreme Width: Cab boards 8' 9" Cylinders ~~---~~ 7' 6 3/4"

Length outside face front bumper of engine to face of tender wedge 30' 11 3/4"

Length face of tender wedge to outside face back bumper of tender 22' 9"

Total length outside face front bumper of engine to outside face back bumper of tender 52' 10 3/4"

SPECIFICATION FOR LOCOMOTIVES 10 28 D 149

FOR ANGLO - NEWFOUNDLAND DEVELOPMENT CO., LTD.

HW

359

361

1 DUMP GRATE SHAFT TO EXTEND THROUGH BOTH SIDES OF FRAME, WITH CAM ON BOTH SIDES TO SUPPORT GRATE.

2 ASH PAN TO HAVE WIRE NETTING HINGED UNDER DAMPER OPENING.

3 STACK TO BE 3'1" HIGH FROM TOP OF SMOKE BOX.
STACK TO HAVE COPPER TOP FINISH AS PLATE 38, FIG. 1 IN 190? CATALOGUE.

4 FITTINGS SUCH AS SAFETY VALVES, STEAM GAUGES, INJECTORS ETC. TO BE SAME AS FOR 10 24 ½ D 95 AND 10 28 D 144.

5 DRIP COCK TO BE APPLIED IN ELBOW OF BLOWER PIPE.

6 BLOW OFF COCK TO BE A BRASS STRAIGHT-WAY GATE VALVE TO WORK FROM RUNNING BOARD, THE OPERATING RODS AND LEVERS TO BE IN A STRAIGHT LINE SO AS NOT TO BREAK STEM.

7 STEAM VALVE IN WAIST OF BOILER FOR SPARK EJECTOR.

8 ONE 2½" SYPHON ON LEFT SIDE UNDER CAB BOARD, SAME AS FOR 10 24 ½ D 95, WITH 20' 0" OF 2½" SUCTION HOSE, WITH STRAINER AND WITH 15'0" OF DELIVERY HOSE.

9 INJECTOR FEED PIPE FROM TENDER TO BE 2" WITH 2½" HOSE.

10 NATHAN FIRE EXTINGUISHER SAME AS FOR 10 24 ½ D 95, WITH 50'0" OF HOSE.

11 DROP SEAT ON ENGINEER'S SIDE.
CAB KNEES TO BE HEAVY ON ACCOUNT OF SNOW ON CAB ROOF.

12 DECK PLATE OF CAST STEEL.

13 ~~RAY~~ SNOW FLANGER TO BE APPLIED TO FRONT TRUCK.
FLANGER TO BE OPERATED BY AIR.
~~SNOW FLANGER TO HAVE LIFTING GEAR ON TOP SAME AS FOR MY Co's LOCO. No. 3, BUILT IN 1910, B.L.W. CLASS 10 28 ½ D 26.~~

14 HEADLIGHT EQUIPMENT TO BE SCHROEDER ELECTRIC WITH INCANDESCENT HEADLIGHT.

15 FRAME, FRONT RAIL TO BE HEAVY ON ACCOUNT OF SNOW BUCKING.

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. O-679

Memorandum Spec'n 20137

SPECIFICATION FOR LOCOMOTIVES 12 28 ½ D 14 to 19

FOR REID NEWFOUNDLAND COMPANY,

NEWFOUNDLAND.

P

Gen. Ex Photo. 5268 {EXCEPT TO HAVE BELL AND TO OMIT AUXILIARY DOME.

Engine Drawing No. 3

9-7-20

Gauge of Road 3' 6" Play 8"
Wheelbase, Rigid 10' 0" Driving 10' 0" Total 27' 3"
Total wheelbase, eng. and tend. {Actual 50' 8" {Limited to ---
GRADES, 2%
Curves 14 DEGREES. RAILS 50 POUNDS PER YARD.
WEIGHT LIMITED (See Sup. 1)
Limits, Height --- Width 9' 4"
Weight (approximate) in working order, Total 113000 POUNDS
On F. tr'k 21000 lbs., Drivers 78000 lbs., B. tr'k 14000 lbs.
WEIGHT OF ENGINE EMPTY ABOUT 101000 POUNDS.
Tractive power 19250 lbs., Ratio of adhesion 4.05
Work'g St'm Pres. 170 lbs., Service PASSENGER
Fuel SOFT COAL

9306 HEREAFTER

Boiler STEEL Thick ⅜" Bill 9291
Front Tube Sheet ½" Thick BOILER BELPAIRE TYPE.
Boiler, Diam. 56" Plan STRAIGHT TOP.
Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.
With Factor of Safety of 5.04 **Tested to** 267 lbs. water pres.
Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

Dome, diam. 29" Pos. FORWARD OF FIRE BOX
FIRE BOX, BELPAIRE TYPE.
Firebox STEEL Combustion chamb. NONE
Firebox, length 66-3/16" Width 60⅛" Depth F. 56" B. 47½"
Firebox, Tube ½" Crown ⅜" Sides 5/16" Back 5/16"
Firedoor opening OVAL 13" x 18"
Water space, Front 3½" Sides 3" Back 3"
Water space frame DOUBLE Riveted
Water space stays ⅞" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O.S. {TWO RODS B. L. W.
VERTICAL Radial stays 1" DIAM. Sling stays front {EXPANSION STAYS
Button heads below crown on SIX central rows
Crown bars NONE Placed --- above crown
Crown bolts ---

Flues No. 9 B. W. G. STEEL
Tubes No. 12 B. W. G. CHARCOAL IRON
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number {18 {111 Diam {5⅛" {2" Length 16' 0"

Heating Surface Flues 358⁰ Combus. Chamb. --- Total 1463⁰
Tubes 1000⁰ Fire Box 93⁰ Fire Brick Tubes 12⁰
Grate area 27.6⁰ Ratio to Heating Surface 1: 53
Superheater 343⁰

Fire Brick Arch, SECURITY ARCH FROM AMERICAN ARCH CO., ON THREE TUBES, 3" O. S. DIAM., No. 7 B. W. G. THICK.

Grates ROCKING BARS AND DROP PLATE
Ash Pan, Dampers NONE

THROTTLE TO HAVE AUXILIARY DRIFTING VALVE.
Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater SCHMIDT TYPE (See Sup. 6 YC)

Setsolobox extension WITH Cleaning hole and cap L.S.ONLY
Spark-ejector-ev hopper WITH
Netting and deflect. plates WITH

Exhaust nozzles SINGLE, HIGH

Stack STRAIGHT Dia. 15"
STACK TO HAVE COPPER TOP

Safety Valves TWO COALE 2½" OPEN.
Safety valves NONE with relief lever, Set to 170 POUNDS
Whistle ONE B. L. W. PLAIN

Steam Gauge ONE BRASS 7" MAKER: CROSBY
Steam gauge stand BRASS **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC
Gauge Cocks THREE BACK {IN WATER COLUMN: (Not Spec'd) Surface valve NONE
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve TO HAVE separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock ONE (See Sup. 9) Pos: FRONT
Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER
Firebox, CORNERS, DIAGONAL.
Crown, TWO EACH SIDE AND TWO BACK
Waist, ONE UNDER FRONT.
Front tube sheet, ONE Fusible plug ONE
PRESSED STEEL COLLARS RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE

(Spec'd) **Injectors** TWO SELLERS, CLASS "N" No. 8½
Injectors, Pos. R. AND L., ON BACK HEAD Steam pipes COPPER
Pipes, Check (See Sup. 10) Feed COPPER Overflow IRON
Check SELLERS Pos. BACKHEAD OF BOILER.

Steam Heat GOULD SYSTEM, WITH GOULD 1" x 1½" IMPROVED BALANCED VALVE STEAM PRESSURE REGULATOR.

Cab STEEL, LINED WITH WOOD.
CRYSTAL PLATE GLASS CAB WINDOWS.
CAB BOARDS TO BE COVERED WITH WOOD 1½" THICK.
Cab boards STEEL Nosing T-IRON
Running boards STEEL Nosing T-IRON
Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 27"

11 **Pilot** WOOD
Front Bumper YELLOW PINE Bumper plate WITH
Steps NONE ON PILOT, AT EACH SIDE. (Jun. 6/23/24)

Front Drawhead, Center above rail 27"
Coupler M. C. B. AUTOMATIC, WITH RAILWAY Co's. STANDARD SHANKS AND DRAW CASTINGS.

Signal fixtures IRON ON BUMPER

12 **Headlight** ONE ROUND CASE 18" Reflector,
Headlight, Nos. on sides WITH Hdl't also WITH
Lamp shelf NONE Nosing ---

Bell 85 POUNDS
Sand Box ONE Diam. 28" Body IRON PAINTED Pipes IRON
(Not Spec'd) **Sander** LEACH AIR, TRAP A-1, TO SAND FRONT.

Dome casing IRON PAINTED.

Boiler Jacket 18 SOFT STEEL PTD. Bands IRON Style 9 AND 10
Boiler Lagging MAGNESIA SECTIONAL
BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

A. Scheid Feb'ry 1920

SPECIFICATION FOR LOCOMOTIVES 12 28 ½ D 14 to 19 361

FOR REID NEWFOUNDLAND Co.

P

FURNISH PRINTS (See Sup. 2) 363

13 **Frames** CAST STEEL

Cylinders, Diam. 17" Stroke 24"
St'm ports, Length 19.63" Width 1-5/16" Bridges ---
Exh. ports, Length --- Width --- Valve head 3/16"
Valve travel 4½" Steam lap 13/16" Exhaust clearance ---
Eccentric crank throw 12-5/16" By-pass valve NONE
(Not Spec) S. P. Lubr. DETROIT FIVE FEED No. 42 BULL'S EYE.
Cyl'r heads CAST IRON LUBR. PIPES OF COPPER O.S. OF JACKET.
Cyl'r casings IRON PAINTED Head covers STEEL PAINTED
St'm chest casings --- Covers ---
St'm chest valves 8" DIAM. PISTON TYPE x0 4517-33.
(Not Spec) Met. pkg. VALVE STEMS UNITED STATES, KING TYPE

14 **Pistons** HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.
Guides STEEL Oil cups NEEDLE
15 **Crossheads** CAST STEEL, (See Sup 15) WITH SCRAPERS OF CAST IRON, PLUNGER.
16 **Wrist Pins** STEEL Rod cups PLUNGER

Valve Motion WALSCHAERTS
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners BRASS
Drivers, O. S. Diam. 52" Cen. diam. 46" CENTERS CAST STEEL

Tires STEEL Held by SHRINKAGE AND SHOULDER
Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5"
Tires, Plain, Pos. MIDDLE Size 3" x 6"
Lateral play between driving boxes and wheel hubs = ⅛" TOTAL
Driving Boxes CAST STEEL
Journals, Diam {MAIN 7½" {OTHERS 7" Length 8"

Springs. Make B. L. W.

Front Engine Truck FOUR Wheeled SWING BOLSTER, CENTER BEARING.
To swing 2" each side of cen., Cen. pin liners NONE.
Journals, Diam. 4½" Length 6" Boxes CAST IRON
Wheel hub liners BRASS
Wheels, Diam. 30" Tread --- Kind CAST STEEL SPOKE CENTER
Tires STEEL Cen. diam. 25" Size 2½" x 5"
Tires held by SHRINKAGE AND SHOULDER

Back Engine Truck TWO Wheeled HODGES O.S. BEARING TYPE
To swing 2½" each side of cen., Cen. pin liners NONE
Journals, Diam. 5" Length 9" Boxes CAST STEEL
Wheel hub liners BRASS
Wheels, Diam. 30" Tread --- Kind CAST STEEL SPOKE CENTER
Tires STEEL Cen. diam. 25" Size 2½" x 5"
Tires held by SHRINKAGE AND SHOULDER

Brake, position ON ALL DRIVING AND TENDER WHEELS
Operating Parts: Engine, sch. No. 6-ET Westg. COMBINED AUTOMATIC AND STRAIGHT AIR
17 Foundation Parts: Drivers, sch. WM-1, AMERICAN O. S. EQUALIZED
Eng. Tr'k, sch. ---
Air pump ONE 9½" Pos. LEFT SIDE
Train connections FRONT AND BACK
Train signal, sch. "L"
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT Wheeled. Drawing No. 1639 {TENDER TO BE WEIGHED: YES
Weight, water and water, about 84000 POUNDS {WEIGHT EMPTY ABOUT 36000 POUNDS.
Tank 3600 Gallons. Bill 5562
TANK "U" SHAPE, STRAIGHT TOP, WITH SLOPING FUEL SPACE.
FUEL CAPACITY 9 TONS. TANK COCK AND HOSE, WITH
Tool Boxes STEEL, TOP
TENDER FLOOR OF STEEL
Frame STEEL, 8" AND 10" CHANNELS, WITH BUMPERS OF STEEL PLATE

Front Drawbar height 26⅞"
Pilot NONE
Back drawhead, center above rail 27"
Coupler M.C.B. AUTOMATIC, WITH RAILWAY COMPANY'S STANDARD SHANKS AND DRAW CASTINGS.

Steps FRONT ONLY.

Trucks ARCH BAR TYPE, WITH BOLSTERS OF CAST STEEL

Springs ELLIPTIC, MAKE B. L. W.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 30" Tread 3½" Kind CHILLED CAST IRON PLATE
Tires NONE Cen. diam. --- Size ---
Tires held by ---
Safety chains SINGLE

Brake Position ON ALL WHEELS
Brake sch. No. 6-ET WESTINGHOUSE AUTO. AND STRAIGHT AIR, WITH 10" x 12" TENDER BRAKE CYLINDER.

List of tools, sch. 32 TWO TRAVERSING JACKS.
Photo sch. No. 2 Inspection B. L. W.
To be weighed YES Material specns B. L. W.
Certificate of boiler test DUPLICATE
Junior taws to 12-16-20 Shipment {BOXED ON CARS, {BEST FOREIGN STYLE (SUP. 18)

Brass shop finish, No. 3.
Machine shop finish D-158, EXCEPT CYLINDER HEAD COVERS TO BE PAINTED.

B. L. W. Patents REAR TRUCK, No. 1060499, APRIL 20, 1913 (BRASS PLATE)

Property plates NONE

Painting, style 248, DARK GREEN AND GOLD.
STRIPING, LETTERING AND NUMBERS TO BE PENNA R. R. STYLE.

19 Mark on TANK SIDES, REID NEWFOUNDLAND COMPANY LTD.

19 Road Nos. Pos. Road Nos. Name NONE
F. No. PLATE 190 TO 195
SAND BOX
CAB PANEL,
BACK OF TANK

Actual Dimensions of Loco. Extreme height over all 12' 6½"
Extreme Width: Cab boards 9' 3" ; Cylinders ~~or valve motion~~ 8' 0"
Length outside face front bumper of engine to face of tender wedge = 31' 8⅝"
Length face of tender wedge to outside face back bumper of tender = 22' 6½"
Total length outside face front bumper of engine to outside face back bumper of tender = 57' 3½"

SPECIFICATION FOR LOCOMOTIVES 12 28 ½ D 14 TO 19

FOR REID NEWFOUNDLAND CO.

P

1 WEIGHT LIMITED: WEIGHT PER AXLE NOT TO EXCEED 26000 POUNDS. WEIGHT ON DRIVING WHEELS NOT TO EXCEED 78000 POUNDS.

2 FURNISH TO COMPANY TWO COMPLETE SETS OF BLUE PRINTS.

3 BOILER TO BE BUILT FOR 200 POUNDS PRESSURE, SAFETY VALVES TO BE SET TO 170 POUNDS, AND MACHINERY TO BE SUITABLE FOR 190 POUNDS.

4 MAIN DOME, ONE-PIECE TYPE.
AUXILIARY DOME, NONE.

5 TUBES AND FLUES TO BE WELDED TO FIRE BOX TUBE SHEET.

6 SUPERHEATER AS THE SUPERHEATER CO'S. SPECN. NO. O-15214, DATED NOV. 12, 1920. (COPY ATTACHED)
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBER.
ROYALTY PAYABLE BY THE B. L. W.

7 PATENT PLATES (HEREWITH) COVERING THE SUPERHEATER TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

8 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

9 BLOW-OFF COCK TO BE ~~BOADO OR~~ HOMESTEAD, OPERATED FROM RUNNING BOARD.

10 INJECTOR CHECK PIPE:- BRASS ELBOW BETWEEN INJECTOR AND CHECK WITH A COPPER PIPE FROM CHECK RUNNING INSIDE BOILER.

11 FRONT BUMPER TO PROVIDE CLEARANCE FOR PRIEST ENGINE TRUCK ICE FLANGER, WHICH WILL BE APPLIED BY RY. CO. AFTER DELIVERY OF ENGINES.

12 HEADLIGHT EQUIPMENT TO BE SUNBEAM INCANDESCENT ELECTRIC, TYPE RE-3, HEADLIGHT TO BE LOCATED ON TOP OF SMOKE BOX.
OMIT VENTILATOR ON TOP OF HEADLIGHT.

13 FRAME FRONT RAIL TO BE HEAVY ON ACCOUNT OF SNOW BUCKING.

14 PISTON RODS TO BE KEYED TO CROSSHEAD.

15 CROSSHEADS TO HAVE DETAILS OF CONSTRUCTION SIMILAR TO 6 38 D 100, WITH SIDE PLATES OF CAST IRON, AND GIBS OF WROT IRON BABBITTED.
APP: R.S.McC. 8.11.26.

16 PARALLEL RODS TO HAVE SOLID ENDS.

17 BRAKE SHOES OF CAST IRON, NOT CHILLED.

18 SPARE PARTS COVERED BY EXTRA ORDER NO. 22408, DATED 9-22-20 TO BE SHIPPED WITH LOCOS.

19 MARK ON TANK SIDES ON CENTER LINE OF TANK IN 6" LETTERS, EXCEPT THE "TO" IN LAST WORD TO BE IN 3" LETTERS.
ROAD NUMBER TO BE IN 6" FIGURES ON CAB PANELS, AND IN 2" FIGURES ON REAR OF TANK ON CENTER LINE 2" BELOW THE TOP ROW OF RIVETS.

363
365

LOCOMOTIVES FOR 12 28 ½ D 14 TO 19

FOR REID NEWFOUNDLAND COMPANY, NEWFOUNDLAND.

Specification for Type A Double Loop Superheater. SPECN. NO. O-15214, DATED NOV. 12TH, 1920.

BOILER TUBES	111 in number 2 o. d 16 ft 0 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	18 in number 5½ o. d #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 ..... Card 1106-E
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections ..... Card 1136
TUBE SHEET LAYOUT	..... Card 3L-50715
UNITS	18 units 14 o. d 9 B.W.G. Pipes to be in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide ..... Card 10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on ..... Card 1052
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12-A ..... Card 1091-L
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls ..... Card 11031-A
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place ..... Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with ..... Card SEE ARRGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 3L-11436
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer ..... Card 1067
S. H. ARRANGEMENT	To be in accordance with ..... Card 3L-40727
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 2L-11451-V	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 10714	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 2L-11442	S. H. PIPE BAND	Card 1383
DAMPER CYLINDER PIPE CONN.	Card 1L-11437	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1068-M	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O.S.)	Card 11106-B	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I.S.)	Card 11107-F	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINK	Card 1090	DEFLECTING PLATE STUDS	Card 10803
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10803-A
PYROMETER	NONE	DAMPER RIGGING	Card 11304-B

THE BALDWIN LOCOMOTIVE WORKS — As Spec'n. C-7871, duplicate of 8 20 C 44 & 45 except where otherwise specified

Memorandum Spec'n 22115

SPECIFICATION FOR LOCOMOTIVES 8 20 C 47 and 48

FOR (Was) UNITED RAILWAYS OF YUCATAN, YUCATAN.

Gen. as Photo. 5964 (except to have electric headlight, short smokebox and Laird type guides.)

Engine Drawing No. 14 18

11-20-22

Gauge of Road 3' 0" Play 3/8"
Wheelbase, Rigid 8' 0" Driving 8' 0" Total 19' 9"
Total wheelbase, eng. and tend. Actual 41' 5 1/4" Limited to ---

Curves --- Rails 35 pounds

Limits, Height --- Width ---
Weight (approximate) in working order, Total 57000 pounds
On F. tr'k 23000 lbs., Drivers 34000 lbs., B. tr'k --- lbs.
Weight of engine empty, about 49500 pounds
Tractive power 9000 lbs., Ratio of adhesion 3.78
Work'g St'm Pres. 160 lbs., Service Passenger
(Spec) Fuel Oil, with specific gravity of 12 degrees Baumé.

Boiler Steel Thick 7/16" & 1/2" Bill 9741
Front Tube Sheet 1/2" Thick
Boiler, Diam. 44" Plan Extended Wagon Top
Allowable st'm pres. 160 lbs. Tested to 180 lbs. steam pres.
With Factor of Safety of 5.13 214 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips
Main Dome, One-piece type. Auxiliary dome, None
Dome, diam. 25" Pos. Forward of fire-box

Firebox Steel Combustion chamb. None
Firebox, length 56-15/16" Width 24 1/2" Depth F. 50" B. 49"
Firebox, Tube 1/2" Crown 3/8" Sides 3/8" Back 5/16"
Firedoor opening 16" diam. Crown and sides in one sheet
Water space, Front 3 1/2" Sides 2 1/2" Back 2 1/2"
Water space frame Single Riveted
Water space stays 7/8" diam. with 3/16" holes 4" deep from O. S.
Radial stays 1" diam. Sling stays front Two rows B. L. W. Expansion Stays
Button Heads below crown on Four central rows, to suit oil fuel
Crown bars None Placed --- above crown
Crown bolts ---

Flues ---
Tubes No. 12 B. W. G. Charcoal Iron
Tube ends Swaged for copper ferrules fire box ends
Number 124 Diam. 2" Length 9' 4 1/2"
Tubes to be electric welded to fire-box tube sheet

Heating Surface Flues --- Combus. Chamb. --- Total 670 sq. ft.
Tubes 603 sq. ft. Fire Box 67 sq. ft. Fire Brick Tubes ---
Grate area 9.7 sq. ft. Ratio to Heating Surface 1: 69
Superheater ---

Fire Brick Arch, None
(Spec) Fire-box lined with fire brick, for oil burning
Fire-brick pavement in pan
Grates None
Ash Pan, Dampers Front only

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None

Smokebox extenstion None Cleaning hole and cap None
Spark ejector or hopper None
Netting and deflect. plates None

Exhaust nozzles Double, Low
Cleaning pipe, With
Stack Cast Iron, Straight Dia. 13"

Safety Valves Two Coale 1 1/2" Open
Safety valves None with relief lever, Set to 160 pounds
Whistle One B. L. W. Plain

Steam Gauge One Brass 7" Maker: Ashcroft
Steam gauge stand Brass **Clock** None

Water Gauge One Klinger **Cab Lamps** Electric
Gauge Cocks Three back (Sup. 6) Surface valve None
Lowest gauge cock 5" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One Everlasting Pos: Left side
Cleaning Plugs One filling plug in top of boiler
Firebox, Corners and right side
Crown, Two each side and two back
Waist, (See Sup. 7) Two fusible plugs, extra
Front tube sheet, One Fusible plug Two, Pos. F. and B. of crown
Pressed steel collars riveted to jacket around cleaning holes

Pump One Brass Pos: Right side
Top chamber, Brass Bottom chamber, Iron
Feed cock, Right side Feed pipes, copper
Checks, Brass Case Check pipes, Copper

(Spec) **Injectors** Two Sellers, Class "N" No. 6 1/2
Injectors, Pos. Right and Left Steam pipes Copper
Pipes, Check Copper Feed Copper Overflow Iron
Check ~~Mueller Brass~~ B. L. W. Pos. Right and Left

Steam Heat None

Cab Wood

Cab boards to be covered with wood
Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 29 1/2"

Pilot Wood
Front Bumper (Wood) Yellow Pine Bumper plate with
Steps Hand holds, etc. to conform to I. C. C. requirements

Front Drawhead, Center above rail 26"
Coupler Janney Automatic, to fold back

Signal fixtures Iron on bumper

Headlight One round case 12" Reflector,
Headlight, Nos. on sides None H'd'l't step None
Lamp shelf None Nosing ---

Bell 85 pounds
Sand Box One Diam. 23" Body Iron painted Pipes Iron
(Spec) Sander Leach Air, Trap A-10 to sand front and back of main wheels.

Dome casing Steel painted, with pressed steel top and bottom rings

Boiler Jacket #18 Soft Steel, Ptd. Bands Steel Style 9 and 14
Boiler Lagging Magnesia Sectional
Back head of boiler to be lagged and jacketed

THE BALDWIN LOCOMOTIVE WORKS

H.V. McNeil Apr. 1923.

SPECIFICATION FOR LOCOMOTIVES 8 20 C 47 and 48

FOR United Railways of Yucatan

Furnish Tracings (See Sup. 2)

Frames Cast Steel

Cylinders, Diam. 13" Stroke 18"
St'm ports, Length 12" Width 1" Bridges 7/8" Valve lead 1/16"
Exh. ports, Length 12" Width 2" Valve travel 4" Steam lap 7/8" Exhaust clearance ---
Eccentric crank throw 4 1/4" By-pass valve None
(Spec) S. F. Lubr. Michigan Triple Bull's Eye
Cyl'r heads (Sup. 9) Lubr. pipes of copper O. S. of jacket
Cyl'r casings Iron painted Head covers Steel, finished
St'm chest casings Iron painted Covers Steel, finished
St'm chest valves Richardson balanced, with vacuum valves.
(Spec) Met. pkg. United States, King type
Piston rods to be keyed to crossheads
Pistons Heads of cast iron, rings of cast iron sprung in.
Guides Laird type, Steel Oil cups Needle
Crossheads Cast Steel, with bearings of brass
Wrist Pins Steel Rod cups Needle
Parallel rods to have solid ends.

Valve Motion Stephenson
(Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.
Parted eccentrics held together by solid forged key

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.
Five gallons Locoline Engine Oil, Specn. "P"
Five gallons Locoline Valve Oil, Specn. "R"
Wearing Bearings B. L. W.
Driving wheel hub liners None
Drivers, O. S. Diam. 46" Cen. diam. 40" centers Cast Iron
Tire flanges to be 1" x 1"
Tires Steel Held by Shrinkage and Shoulder
Tires, Flanged, Pos. All Size 3" x 5"
Tires, Plain, Pos. None Size ---
Lateral play between driving boxes and wheel hubs = (See Sup. 10)
Driving Boxes Cast Iron
Journals, Diam. 6" Length 7"

Springs. Make B. L. W.

Front Engine Truck Four Wheeled Swing bolster, center bearing
To swing 22" each side of cen., Cen. pin liners None
Journals, Diam. 3 1/2" Length 6" Boxes Cast Iron
Wheel hub liners None
Wheels, Diam. 24" Tread --- Kind Cast Iron plate center
Tires Steel Cen. diam. 19 Size 2 1/2" x 5"
Tires held by Shrinkage and Shoulder; flanges 1" x 1"
Engine truck to have heart shaped links
Back Engine Truck None Wheels ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size
Tires held by ---

Brake, position On tender and train only
Operating Engine, sch. (Sup. 12) Westinghouse Auto. Air
Parts Eng. Trk. sch. ---
Foundation Drivers, sch. --- None
Parts Eng. Trk. sch. ---
Air pump One 9 1/2" Pos. Left side
Train connections Front and back
Train signal, sch. None
Air reservoir 16" diam. x 72" long under cab board on left side only. Reservoir to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1772 Weight empty about 26500 lbs.
Weight, with fuel and water, about 56,500 Tender to be weighed
Tank Oil 1200 6087 Designed: Yes
Water 2500 Gallons, Bill 6011
Tank "U" shape, straight top, with removable oil tank
Water tank to have drain pipes at rear
Tool Boxes Steel, Top
Tender floor of steel.
Frame Steel, 6" and 8" channels, with bumpers of steel plate.

Front Drawbar height 26 1/4"
Pilot None
Back drawhead, center above rail 26"
Coupler Janney Automatic, to fold back

Steps Hand holds, etc., to conform to I. C. C. requirements

Trucks Arch bar type, with bolsters of cast steel

Springs Elliptic, B. L. W. make
Journals, Diam. 3 1/2" Length 7"
Wheels, Diam. 26" Tread --- Kind Cast Iron plate center
Tires Steel Cen. diam. 21" Size 2 1/2" x 5"
Tires held by Shrinkage and Shoulder
Safety chains Single

Brake Position On all wheels
Brake sch. 8812 Westinghouse Automatic Air

List of tools, sch. 163 Two traversing jacks with ratchet heads
Photo sch. No. 2 Inspection B. L. W.
To be weighed Yes Material specns B. L. W.
Certificate of boiler test Three copies B. L. W. form 1036
Junior laws to 1-22-23 Shipment (See Sup. 1)

Brass shop finish, No. 3, except bump check to be painted
Machine shop finish D-158

Patents B. L. W. None

Property plates B. L. W. for engine and tender

Painting, style 291, Olive Green and Aluminum

Marking to be same as for 8 20 C 44 and 45
Mark-on tank sides, FERROCARRILES CONSTITUCIONALISTAS EN YUCATAN

	Road Nos. Pos	Road Nos.	Name None
F. No. plate		67	
Sand box		68	
Cab sides			
Back of tank			

Actual Dimensions of Loco. Extreme height over all 11' 6"
Extreme Width: Cab boards 8' 3"; Cylinders ~~engine number~~ 6' 6"
Length outside face front bumper of engine to face of tender wedge 24' 1"
Length face of tender wedge to outside face back bumper of tender 21' 2"
Total length outside face front bumper of engine to outside face back bumper of tender 45' 3"

SPECIFICATION FOR LOCOMOTIVES 8 20 C 47 AND 48
FOR UNITED RAILWAYS OF YUCATAN

368 366

1 LOCOMOTIVES TO BE SHIPPED COMPLETELY ERECTED WITHOUT BOXING. SMOKE STACK, BELL AND HEADLIGHT TO BE REMOVED AND BOXED. GLASS, GAUGES AND OTHER DAMAGEABLE PARTS TO BE PROTECTED.

2 PENNSYLVANIA RY. CO. TRACINGS OF THE FIRE-PAN, BRICK WORK, FIRE-DOOR AND OIL BURNER ARRANGEMENT.

3 OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH BURNER PLACED IN FRONT END OF FIRE-BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

4 OIL AND STEAM CONNECTIONS BETWEEN ENGINE AND TENDER TO BE BARCO FLEXIBLE METALLIC CONDUITS.

5 THROTTLE LEVER RIGGING AND THROTTLE LEVER STUFFING BOX IN ACCORDANCE WITH SOUTHERN PACIFIC COMMON STANDARD PRINTS, AS FOLLOWS:
1686-A, 1680-B, 1680-C, 1681-A, 1681-B

6 GAUGE COCKS TO BE O'MALLEY-BEARE.

7 ONE SHALLOW MUD DRUM IN BELLY OF BOILER NEAR FRONT, WITH PLUG IN COVER.

8 HEADLIGHT AND EQUIPMENT TO BE SUNBEAM ELECTRIC, TYPE RE-3, WITH INCANDESCENT HEADLIGHT.
HEADLIGHT TO HAVE WELDED CASE.
TWO EXTRA HEADLIGHT BULBS TO BE FURNISHED WITH EACH ENGINE.

9 CYLINDER HEADS, FRONT, CAST IRON.
CYLINDER HEADS, BACK, CAST STEEL.

10 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 3/32" TOTAL.

11 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 3/16" TOTAL.

12 BRAKE OPERATING PARTS TO BE WESTINGHOUSE SCH. A-1, EXCEPT TO OMIT THE FOLLOWING:

1 TRIPLE VALVE	
1 3/4" COCK (FOR TRIPLE VALVE)	PIECE 2233
1 AUXILIARY RESERVOIR	
2 DRIVING BRAKE CYLINDERS	
1 DRAIN COCK	PIECE 7716
1 NIPPLE (FOR TRIPLE VALVE)	PIECE 7743
1 3/4" CENTRIFUGAL DIRT COLLECTOR	PIECE 36452

FOR HEREAFTER: MARK ON SIDES OF TANK:-
FERROCARRILES UNIDOS DE YUCATAN

—TENDER—

9½ OIL TANK TO HAVE A CAPACITY TABLE SHOWING GALLONS PER INCHES OF DEPTH, ALSO WARNING NOTICE IN SPANISH FORBIDDING THE USE OF OPEN LAMPS OR TORCHES AROUND OR NEAR THE OIL TANK, AS B. L. W. CUBA STANDARD
BOTH THE CAPACITY TABLE AND THE WARNING NOTICE TO BE LOCATED ON FRONT OF OIL TANK IN PLAIN VIEW OF ENGINEER AND FIREMAN.

THE BALDWIN LOCOMOTIVE WORKS As Spec'n C-6351

Memorandum Spec'n 20036

SPECIFICATION FOR LOCOMOTIVES 4 8 C 96

FOR Transcontinental de Petroleo, Cia

HW Mexico.

Gen. as Photo. 5423

Engine Drawing No. 32

2.17.20

Gauge of Road 3' 0" Play 3/8"

Wheelbase, Rigid 3' 10" Driving 3' 10" Total 3' 10"

Total wheelbase, eng. and tend. {Actual ---, Limited to ---

Curves ---

Limits, Height 10' 0" Width 7' 0"

Weight (approximate) in working order, Total 17,000 pounds.

On F. tr'k --- lbs., Drivers 17,000 lbs., B. tr'k --- lbs.

Weight of engine empty about 13,700 pounds.

Tractive power 3,540 lbs., Ratio of adhesion 4.8

Work'g St'm Pres. 170 lbs., Service Industrial

Fuel Oil, with gravity of 18 to 22 degrees Baume

Boiler Steel Thick 5/16" Bill 8894

Front Tube Sheet 3/8" Thick

Boiler, Diam. 24" Plan Straight Top.

Allowable st'm pres. 170 lbs. **Tested to** 190 lbs. steam pres.

With Factor of Safety of 6.3 227 lbs. water pres.

Longitud. seams Lap joints, double riveted.

Dome, diam. 15 1/2" Pos. Central

Firebox Steel Combustion chamb. None

Firebox, length 26 13/16" Width 19 3/8" Depth F. 27" B. 27"

Firebox, Tube 3/8" Crown 5/16" Sides 5/16" Back 5/16"

Firedoor opening 12" diam. Crown and sides in one sheet

Water space, Front 2" and 2 1/2" Sides 2" Back 2"

Water space frame Single Riveted

Water space stays 3/8" diam. with 3/16" holes 1 1/2" deep from O.S.

Radial stays 5/8" diam. Sling stays front None

Button heads below crown on None central rows

Crown bars None Placed --- above crown

Crown bolts None

Flues ---

Tubes #13 W.G. Charcoal Iron or Steel (B.L.W. Option)

Tube ends Swaged for copper ferrules, fire box ends.

Number 43 Diam. 1 1/2" Length 6' 4"

Tubes to be welded to fire box tube sheet.

Heating Surface Flues --- Combus. Chamb. --- Total 122.3

Tubes 106.0 Fire Box 16.3 Fire Brick Tubes ---

Grate area 3.7 Ratio to Heating Surface 1: 33.1

Superheater ---

Fire Brick Arch None

Fire box lined with fire brick, for oil burning

Fire brick pavement in pan

Grates None

Ash Pan, Dampers Front only.

Throttle Balance Pos. Dome

Dry pipe Steel

Superheater None

Smokebox extension None Cleaning hole and cap None

Spark ejector or hopper None

Netting and deflect. plate None

Exhaust nozzles Single - Low

Cleaning pipe - With

Stack Straight Dia. 7"

Safety Valves Two Coale 1 1/2" Open (Not Spec)

Safety valves None with relief lever, Set to 170 pounds.

Whistle One B.L.W. Plain

Steam Gauge One Brass 6" MAKER: Ashcroft (Not Spec)

Steam gauge stand Brass **Clock** None

Water Gauge One B.L.W. Ironclad **Cab Lamps** To burn oil

Gauge Cocks Three Back Surface valve None

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One Everlasting POS: Back

Cleaning Plugs One filling plug in top o boiler

Firebox. Corners, back ones diagonal

Crown. None

Waist. One under front

Front tube sheet. None Fusible plug One

Pressed steel collars rbveted to jacket around cleaning holes

Pump None

Injectors (Not Spec) Two Metropolitan, Class "H" No. 3

Injectors, Pos. Right and Left Steam pipes Copper

Pipes, Check Copper Feed Copper Overflow Iron

Check B. L. W. Pos. Right and Left

Steam Heat None

Cab Wood Crystal Plate glass cab windows.

Cab boards Steel Nosing T-Iron

Running boards None Nosing None

Hand rail Iron Located on Cab

Back Bumper Oak

Pilot None Pushing shoes None

Front Bumper Oak Bumper plate None

Steps Across front and rear with handrails.

E & B. Drawhead, Center above rail 30"

Coupler M.C.B. Auto. of the narrow gauge type i.e. three quarter size at front and back.

Signal fixtures None

Headlights to be similar to Adams & Westlake No. 1853

Headlight Two Round Case 6" Reflector, To burn Kerosene

Headlight, Nos. on sides None H'd'l't step None

Lamp shelf None Nosing ---

Bell 28 pounds

Sand Box One Diam. 15" Body Iron painted Pipes Iron

Sander hand, to sand front and back.

Dome casing Iron painted.

Boiler Jacket #18 soft steel P.B.C. Bands Iron Style 9 and 14

Boiler Lagging Magnesia Sectional

Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

H. Bahnes

SPECIFICATION FOR LOCOMOTIVES 4 8 C 96 March 1920.

FOR Transcontinental de Petroleo, Cia

HW.

366

350

Frames Cast Steel

Cylinders, Diam. 7" Stroke 12"

St'm ports, Length 1 1/2" Width 3" Bridges 3"

Exh. ports, Length 1 1/2" Width 14" Valve lead 1/16"

Valve travel 2 3/8" Steam lap 1/2" Exhaust clearance ---

Eccentric crank throw 2 1/4" By-pass valve None

S. F. Lubr. Nathan Double Bulls Eye, one pint capacity. (Not Spec)

Cyl'r heads Cast Iron Lubr. pipes of copper O.S. of jacket

Cyl'r casings Iron painted Head covers Steel painted.

St'm chest casings Iron painted Covers Steel painted.

St'm chest valves Plan "D"

Met. pkg. Piston rods & valve stems Braided Packing

Piston Rods to be keyed to crossheads.

Pistons Heads of cast iron with rings of cast iron sprung in

Guides Steel Oil cups Needle

Crossheads Cast steel with bearings of brass.

Wrist Pins Steel Rod cups Needle, forged on.

Parallel rods to have solid ends.

Valve Motion Stephenson

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

Parted eccentrics held together with solid forged keys.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Tender None

Tank Oil 150 5226

Water 300 Gallons, Bill 5215

Saddle tank over top of boiler.

Oil tank in left side of cab.

Oil burning arrangement - W.N. Best equipment with burner in front end of fire box.

Royalty, if any, payable by the B. L. W.

* Spare parts ordered on Extra Order No. 15945 dated 3.16.20 to be shipped with loco.

Wearing Bearings B. L. W.

Driving wheel hub liners None

Drivers, O. S. Diam. 24" Cen. diam. 20" centers Cast Iron.

Tires Steel Held by Shrinkage and shoulder.

Tires, Flanged, Pos. All Size 2" x 5"

Tires, Plain, Pos. None Size ---

Lateral play between driving boxes and wheel hubs - 1/16" total

Driving Boxes Cast Iron.

Journals, Diam. 3 1/2" Length 6"

Springs. Make B. L. W.

Front Engine Truck None Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck None Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving wheels (no tender)

Operating Engine, sch. U.O. B.L.W. Steam

Parts Eng. Tr'k, sch. ---

Foundation Drivers, sch. U.O. B.L.W.

Parts Eng. Tr'k. sch. ---

Air pump --- Pos. ---

Train connections ---

Train signal, sch. ---

Separate lubricator for steam brake valve.

List of tools, sch. 28 Two ratchet jacks

Photo sch. None Inspection B. L. W.

To be weighed Tks Material spec'ns B. L. W.

Certificate of boiler test three copies of B.L.W. form 1036

Junior laws to 2.25.20 Shipment Boxed, in one piece. (See * above)

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents None

Property plates None

Locomotive to be painted with at least two coats of standard black locomotive paint and to be properly varnished.

Painting, style 222, Black and Aluminum.

Mark on tank sides, C. T. P.

Road Nos. Pos. Road Nos. Name None

F. No. Plate 4

Cab Sides

Actual Dimensions of Loco. Extreme height over all - 7' 10 1/2"

Extreme Width Over cab boards - 5' 10"

Over cylinders or valve motion - 5' 8"

Length outside face of front bumper to outside face of back bumper of engine - 14' 2"

THE BALDWIN LOCOMOTIVE WORKS As Spec'n C-6352

Memorandum Spec'n 20037

SPECIFICATION FOR LOCOMOTIVES 4 16 C 152

WNS

FOR TRANSCONTINENTAL DE PETROLEO, CIA

HW MEXICO.

Gen. as PHOTO. 6224

Engine Drawing No. 23

2.17.20 (Not Spec)

Gauge of Road 3' 0" Play 3/8"

Wheelbase, Rigid 5' 0" Driving 5' 0" Total 5' 0"

Total wheelbase, eng. and tend. {Actual ---
{Limited to ---

Curves ---

Limits, Height 10' 0" Width 7' 0"

Weight (approximate) in working order, Total 36,000 POUNDS.
On F. tr'k --- lbs., Drivers 36,000 lbs. B. tr'k --- lbs.
WEIGHT OF ENGINE EMPTY ABOUT 26,000 POUNDS.

Tractive power 9,650 lbs., Ratio of adhesion 3.73

Work'g St'm Pres. 170 lbs., Service INDUSTRIAL.

Fuel OIL, WITH GRAVITY OF 18 TO 22 DEGREES BAUME.

Boiler STEEL Thick 3/8" Bill 8893

Front Tube Sheet 1/2" Thick

Boiler, Diam. 36" Plan STRAIGHT TOP

Allowable st'm pres. 170 lbs. **Tested to** 190 lbs. steam pres.
With Factor of Safety of 5.5 227 lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

Dome, diam. 19" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 42 1/16" Width 30" Depth F. 38 1/2" B. 36 3/4"

Firebox, Tube 1/2" Crown 5/16" Sides 5/16" Back 5/16"

Firedoor opening 14" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 2" AND 2 1/2" Sides 2" Back 2"

Water space frame SINGLE Riveted

Water space stays 3/8" DIAM. WITH 3/16" HOLES 1 1/4" DEEP FROM O.S.

Radial stays 1" DIAM. Sling stays front NONE

Button heads below crown on NONE central rows

Crown bars NONE Placed --- above crown

Crown bolts ----

Flues ---

Tubes #11 (Tousestock) for 4 16 C 152 only. W.C. CHARCOAL IRON OR STEEL (B.L.W. OPTION)

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 76 Diam. 2" Length 8' 4 1/2"

TUBES TO BE WELDED TO FIRE BOX TUBE SHEET.

Heating Surface Flues --- Combus. Chamb. --- Total 373.3 sq.ft.
Tubes 333.3 sq.ft. Fire Box 40 sq.ft. Fire Brick Tubes ---

Grate area 8.7 sq.ft. Ratio to Heating Surface 1: 42.8

Superheater ---

Fire Brick ARCH NONE

FIRE BOX LINED WITH FIRE BRICK FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

Grates NONE

Ash Pan, Dampers FRONT ONLY.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension NONE Cleaning hole and cap NONE

Spark ejector or hopper NONE

Netting and deflect. plates NONE

Exhaust nozzles DOUBLE - LOW

CLEANING PIPE - WITH

Stack STRAIGHT Dia. 9"

Safety Valves TWO COALE 1 1/2" OPEN. (Not Spec)

Safety valves NONE with relief lever. Set to 170 POUNDS.

Whistle ONE B.L.W. PLAIN.

Steam Gauge ONE BRASS 6" MAKER: ASHCROFT (Not Spec)

Steam gauge stand BRASS **Clock** NONE

Water Gauge ONE B. L. W. IRONCLAD **Cab Lamps** TO BURN OIL

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve WITHOUT separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock ONE EVERLASTING POS: R. S.

Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER.

Firebox, CORNERS DIAGONAL.

Crown, ONE EACH SIDE AND TWO BACK.

Waist, NONE

Front tube sheet, ONE Fusible plug ONE

PRESSED STEEL COLLARS RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE

Injectors (Not Spec) TWO METROPOLITAN, CLASS "H" No. 3

Injectors, Pos. R. AND L. Steam pipes COPPER.

Pipes, Check COPPER Feed COPPER Overflow IRON

Check B. L. W. Pos. R. AND L.

Steam Heat NONE

Cab WOOD CRYSTAL PLATE GLASS CAB WINDOWS.

Cab boards WOOD Nosing NONE

Running boards WOOD Nosing NONE

Hand rail IRON Located on TANK

Back Bumper OAK

Pilot NONE Pushing shoes NONE

Front Bumper OAK Bumper plate NONE

Steps ACROSS FRONT AND BACK WITH HAND RAILS.

F. & B. Drawhead, Center above rail 30"

Coupler M.C.B. AUTO. OF THE NARROW GAUGE TYPE, FRONT AND BACK.

Signal fixtures NONE

SIX HEADLIGHT CHIMNEYS AND TWELVE WICKS.

Headlight TWO ROUND CAST 10" Reflector, To burn KEROSENE

Headlight, Nos. on sides NONE H'dl't step NONE

Lamp shelf NONE Nosing ---

Bell 20 POUNDS, AHEAD OF SMOKE STACK.

Sand Box TWO Diam. 15" Body IRON PAINTED Pipes IRON

Sander HAND, IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED

Boiler Jacket #18 SOFT STEEL PTD. Sands IRON Style 9 AND 14

Boiler Lagging MAGNESIA SECTIONAL.

BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

L. G. Sandy March 1920.

SPECIFICATION FOR LOCOMOTIVES 4 16 C 152

370

FOR TRANSCONTINENTAL DE PETROLEO, CIA

HW

372

Frames CAST STEEL

Cylinders, Diam. 11" Stroke 16"

St'm ports, Length 7 1/2" Width 3" Bridges 3"

Exh. ports, Length 7 1/2" Width 1 1/2" Valve lead 1/16"

Valve travel 3" Steam lap 9/16" Exhaust clearance ---

Eccentric crank throw 2 1/2" By-pass valve NONE

S. P. Lubr. (Not Spec) NATHAN DOUBLE BULLS EYE, ONE PINT CAPACITY.

Cyl'r heads CAST IRON LUBR. PIPES OF COPPER O.S. OF JACKET

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED

St'm chest casings IRON PAINTED Covers STEEL PAINTED

St'm chest valves PLAIN "D"

Pkg. (PISTON RODS / VALVE STEMS) BRAIDED PACKING.

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST IRON WITH RINGS OF CAST IRON SPRUNG IN.

Guides STEEL Oil cups NEEDLE ON CROSSHEAD

Crossheads CAST STEEL WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL Rod cups PLUNGER, FORGED ON.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion STEPHENSON

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

PARTED ECCENTRICS HELD TOGETHER WITH SOLID FORGED KEYS.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners NONE

Drivers, O. S. Diam. 29" Cen. diam. 25" CENTERS CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER.

Tires, Flanged, Pos. ALL Size 2" x 5"

Tires, Plain, Pos. NONE Size ------

Lateral play between driving boxes and wheel hubs - 1/16" TOTAL.

Driving Boxes CAST IRON.

Journals, Diam. 5" Length 6"

Springs. Make B. L. W.

Front Engine Truck NONE Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Back Engine Truck NONE Wheeled ---

To swing --- each side of cen., Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position ON ALL DRIVING WHEELS (NO TENDER)

Operating Engine, sch. U-0 B. L. W. STEAM

Parts Eng. Tr'k. sch. ---

Foundation Drivers, sch. U-0 B. L. W.

Parts Eng. Tr'k. sch. ---

Air pump --- Pos. ---

Train connections ---

Train signal, sch. ---

SEPARATE LUBRICATOR FOR STEAM BRAKE VALVE.

Tender NONE

Tank OIL 150 5311
WATER 800 Gallons. Bill 5218

SADDLE TANK ON TOP OF BOILER EXTENDING TO FRONT OF SMOKE BOX.
OIL TANK IN LEFT SIDE OF CAB.

OIL BURNING ARRANGEMENT - W. W. BEST EQUIPMENT, WITH BURNER IN FRONT END OF FIRE BOX.

ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

* SPARE PARTS ORDERED ON EXTRA ORDER NO. 15945 DATED 3.16.20 TO BE SHIPPED WITH LOCO.

List of tools, sch. 28 TWO TRAVERSING JACKS.

Photo sch. NONE Inspection B. L. W.

To be weighed No Material spec'ns B. L. W.

Certificate of boiler test THREE COPIES OF B.L.W. FORM 1036

Junior fans to 2.17.20 Shipment BOXED IN ONE PIECE (SEE SUP.)*

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. / Patents NONE

Property plates NONE

LOCOMOTIVE TO BE PAINTED WITH AT LEAST TWO COATS OF STANDARD BLACK LOCOMOTIVE PAINT AND TO BE PROPERLY VARNISHED.

Painting, style 222, BLACK AND ALUMINUM.

Mark on TANK SIDES, C. T. P.

Road Nos. Pos. Road Nos. Name NONE

F. No. PLATE 3

CAB SIDES.

Actual Dimensions of Loco. Extreme height over all 9'0 3/8"

Extreme Width Over cab boards 7'0"
Over cylinders 6'0 3/8"

Length outside face of front bumper to outside face of back bumper of engine 18'5"

THE BALDWIN LOCOMOTIVE WORKS Memorandum Spec'n ~~F-20177~~ 21008

Dup. of 8 30 D 704, ~~WITH SOME EXTRAS~~ EXCEPT WHERE OTHERWISE SPECIFIED. As Specn. F-2103.

SPECIFICATION FOR LOCOMOTIVES 8 30 D 728 ~~to (3)~~

Gen. as Photo. 7234

Engine Drawing No. 85

SP **FOR** ~~Stock~~ JOHN A. HUNT COMPANY.

HW. ~~(Cuba)~~

~~11-29-20~~ 3-1-21. (NOT SPEC)

Gauge of Road 4'8½" Play ¾"
Wheelbase, Rigid 11' 6" Driving 11' 6" Total 19'4"
Total wheelbase, eng. and tend. {Actual 46'3½" Limited to ---
~~RAILS 60 AND 65 POUNDS.~~
Curves ~~12 DEGREES.~~ ~~MAIN LINE FROGS, No. 8 (603 FT. RAD).~~
~~GRADE AGAINST LOAD 1.7%.~~ ~~DAIRY FROGS, No. 6 (339 FT. RAD).~~
Limits, Height --- Width ---
Weight (approximate) in working order, Total ~~112,000~~ 112,500 POUNDS.
On F. tr'k ~~16,800~~ 15,800 lbs., Drivers ~~95,000~~ 96,700 lbs., B. tr'k --- lbs.
WEIGHT OF ENGINE, EMPTY, ABOUT 99,500 POUNDS.
Tractive power ~~23,000~~ 22,580 lbs., Ratio of adhesion ~~4.1~~ 4.2
Work'g St'm Pres. 180 lbs., Service ~~PLANTATION~~ FREIGHT.
* **Fuel** ~~SINCLAIR~~ OIL ~~WITH GRAVITY 11 TO 14 DEGREES BAUME WITH 135 TO 180 FLASH POINT.~~
Boiler STEEL Thick 9/16" Bill 9205
Front Tube Sheet ½" Thick ~~BOILER FOR EXPORT~~
Boiler, Diam. 54" Plan EXTENDED WAGON TOP
Allowable st'm pres. 180 lbs. **Tested to** 200 lbs. steam pres.
With Factor of Safety of 5.22 240 lbs. water pres.
Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.
DOME TO BE ONE-PIECE TYPE.
Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL Combustion chamb. NONE
Firebox, length 74 3/16" Width 41½" Depth F. 59¼" B. 57¼"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.
Water space, Front 4" Sides 3" Back 3"
Water space frame DOUBLE Riveted
Water space stays ⅞" DIAM. WITH 3/16" HOLES 1¼" DEEP FROM O.S.
Radial stays 1" DIAM. Sling stays front {TWO ROWS B.L.W. EXPANSION STAYS
Button heads below crown on SIX central rows
Crown bars NONE Placed --- above crown
~~Crown bolts~~ ---
INSIDE AND OUTSIDE SHEETS OF FIRE BOX TO BE WELDED TO MUDRING.
~~Flues ---~~
Tubes #12 W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)
Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.
Number 219 Diam. 2" Length 11'0"
TUBES TO BE ELECTRICALLY WELDED IN FIRE BOX TUBE SHEET.

Heating Flues --- Combus. Chamb. --- Total 1355⁰
Surface Tubes 1252⁰ Fire Box 103⁰ Fire Brick Tubes NONE
Grate area 21.3⁰ Ratio to Heating Surface 1: 63
Superheater ~~NONE~~

Fire Brick ARCH, NONE
FIRE BOX LINED WITH FIRE BRICK FOR OIL BURNING.
FIRE BRICK PAVEMENT IN PAN.
Grates NONE
Ash Pan, Dampers FRONT AND BACK
OIL BURNING ARRANGEMENT B. L. W. STANDARD WITH BURNER IN FRONT END OF FIRE BOX. ROYALTY, IF ANY, PAYABLE BY THE B.L.W.
Throttle BALANCE Pos. DOME
Dry pipe STEEL

Superheater NONE
OIL BURNING DETAILS ARRANGED FOR FUEL OIL, WITH GRAVITY 11 TO 14 DEGREES BAUMÉ, WITH 135 TO 180 FLASH POINT.
* **Smokebox** extension WITH Cleaning hole and cap L.S.ONLY
Spark ~~arrester or~~ hopper WITH
Netting and deflect. plates NONE

Exhaust nozzles DOUBLE-LOW
CLEANING PIPE - WITH
Stack STRAIGHT Dia. 16"

Safety Valves TWO COALE 2½" PLAIN
Safety valves NONE with relief lever, Set to 180 POUNDS
Whistle ONE B.L.W. PLAIN

Steam Gauge ONE BRASS 7" MAKER: ASHCROFT (NOT SPEC)
Steam gauge stand BRASS **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC
Gauge Cocks THREE BACK Surface valve NONE
Lowest gauge cock 3" above highest part of crown
Lubricator steam valve WITHOUT separate dry pipe to dome
Blower Valve B.L.W.

Blow off Cock ONE EVERLASTING POS: FRONT
Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER.
Firebox, CORNERS DIAGONAL AND BACK
Crown, THREE EACH SIDE AND TWO BACK
Waist, ONE UNDER FRONT
Front tube sheet, ONE Fusible plug ONE
~~Pressed~~ ~~Handled~~ STEEL COLLAR RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE
* DETAILS TO BE ARRANGED SO THAT LOCO. CAN BE EASILY CHANGED TO BURN COAL FUEL. LOCOMOTIVE TO OPERATE IN MEXICO.

INJECTORS FOR USE WITH HOT WATER.
Injectors TWO SIMPLEX TYPE "R" (NOT SPEC) No. 8
Injectors, Pos. R. AND L. Steam pipes COPPER
Pipes, Check COPPER Feed COPPER Overflow IRON
Check B. L. W. Pos. TOP OF BOILER
THIS LOCOMOTIVE WAS ORIGINALLY ORDERED FOR STOCK ON FOREIGN SALES DEPT. MEMO. SPEC'N. NO. F-20177.
Steam Heat NONE

Cab STEEL, LINED WITH WOOD.
CRYSTAL PLATE GLASS CAB WINDOWS.
Cab boards STEEL Nosing T-IRON
Running boards STEEL Nosing T-IRON
Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 33¾"

Pilot WOOD Pushing shoes NONE
Front Bumper ~~YELLOW~~ PINE Bumper plate WITH
Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 34½"
Coupler M.C.B. AUTO. WITH SLOTTED KNUCKLE.

Signal fixtures IRON ON BUMPER
HEADLIGHT EQUIPMENT TO BE SUNBEAM ELECTRIC WITH INCANDESCENT HEADLIGHTS.
Headlight TWO ROUND CASE 18" Reflector,
Headlight, Nos. on sides WITH H'd'l't stop WITH
Lamp shelf NONE Nosing ---

Bell 92 POUNDS GOLLMAR AIR BELL RINGER.
Sand Box TWO Diam. 28" Body HIGH, IRON PTD. Pipes IRON
Sander HAND, IN EACH BOX, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED, PRESSED STEEL TOP AND BOTTOM RINGS.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON Style 9 AND 14
Boiler Lagging MAGNESIA SECTIONAL
BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

H.B. LIGHETTI MCH. 1921.

SPECIFICATION FOR LOCOMOTIVES 8 30 D ~~728~~ ~~729~~

FOR ~~Stock~~ JOHN A. HUNT COMPANY.

HW.

372
374

Frames CAST STEEL

Cylinders, Diam 18" Stroke 24"
St'm ports, Length 16" Width 1½" Bridges 1"
Exh. ports, Length 16" Width 2½" Valve lead ¼"
Valve travel 5¼" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 9 3/16" By-pass valve NONE
(NOT SPEC) S.F. Lubr. NATHAN No. 9 TRIPLE BULLS EYE.
Cyl'r heads CAST IRON LUBR. PIPES OF COPPER O.S. OF JACKET.
Cyl'r casings IRON PTD. Head covers STEEL PAINTED
St'm chest casings IRON PTD. Covers STEEL PAINTED
St'm chest valves BALANCED, WITH VACUUM VALVES.
(NOT SPEC) Mot. pkg. PISTON ROD PISTON STEM UNITED STATES, KING TYPE.
PISTON RODS TO BE KEYED TO CROSSHEADS.
Pistons CAST IRON RINGS SPRUNG INTO SOLID HEAD.
Guides STEEL Oil cups NEEDLE
Crossheads CAST STEEL WITH BEARINGS OF CAST IRON, TINNED.
Wrist Pins STEEL Rod cups PLUNGER, FORGED ON RODS.
PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.
Driving wheel hub liners NONE
Drivers, O. S. Diam. 52" Cen. diam. 46" CENTRES CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER
Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"
Tires, Plain, Pos. MIDDLE Size 3" x 6½"
Lateral play between driving boxes and wheel hubs 3/16" TOTAL
Driving Boxes STEELED CAST IRON.
Journals, Diam. 7½" Length 9"

ALL SPRINGS TO BE ONE PLATE HEAVIER THAN USUAL.
Springs. Make B.L.W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING
To swing 4" each side of cen., Cen. pin liners NONE
Journals, Diam. 5" Length 10" Boxes CAST IRON
Wheel hub liners NONE
Wheels, Diam. 28" Tread --- Kind CAST IRON SPOKE CENTER
Tires STEEL Cen. diam. 23" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE

★ ~~BELL, WHISTLE, OIL CUPS, TOOLS, CAB LAMPS AND ELECTRIC LIGHT BULBS, TO BE PACKED IN A BOX AND PLACED IN SMOKE BOX FOR SAFE KEEPING DURING TRANSIT.~~

★ ~~SPARE PARTS COVERED ON EXTRA ORDER No. 1116 DATED 9-22-20 TO BE SHIPPED WITH LOCOMOTIVES.~~

Brake, position ON ALL DRIVING AND TENDER WHEELS.
Operating Engine, sch. No. 6 ET WESTG. COMBINED AUTO. AND
Parts Eng. Tr'k, sch. --- STRAIGHT AIR
Foundation Drivers, sch. MM-1 AMERICAN O. S. EQUALIZED
Parts Eng. Tr'k, sch. ---
Air pump ONE 9½" Pos. LEFT SIDE
Train connections FRONT AND BACK
Train signal, sch. NONE
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.
AIR DRUM TO BE PLACED ABOVE FRONT DRIVING WHEELS (INSTEAD OF BACK DRIVERS)

Tender EIGHT Wheeled, Drawing No. 1429 {WEIGHT EMPTY
Weight, with fuel and water, about 85,000 LBS. ABOUT 38,000 LBS.
TENDER TO BE WEIGHED: ~~YES~~ No.
Tank {OIL 1800 Gallons, Bill 4975
WATER 4000 4952
TANK "U" SHAPE, STRAIGHT TOP.

Tool Boxes OF STEEL, TOP.
TENDER FLOOR OF STEEL.
Frame STEEL 8" AND 10" CHANNELS, WITH BUMPERS OF STEEL PLATE.

Front Drawbar height 32"
Pilot WOOD, AT REAR Pushing shoes NONE
Back ... center above rail 34½"
Coupler M. C. B. AUTOMATIC, WITH SLOTTED KNUCKLE.

Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTERS.

Springs ELLIPTIC, B.L.W.
Journals, Diam. 4½" Length 8"
Wheels, Diam. 33" Tread --- Kind CAST IRON, PLATE CENTRES
Tires STEEL Cen. diam. 28" Size 2½" x 5½"
Tires held by SHRINKAGE AND SHOULDER
Safety chains SINGLE

Brake Position ON ALL WHEELS
Brake sch. No. 6 ET WESTINGHOUSE AUTOMATIC AND STRAIGHT AIR, WITH 10" x 12" TENDER CYLINDERS.

List of tools, sch. 37 TWO TRAVERSING JACKS.
Photo sch. NONE Inspection B.L.W.
To be weighed YES Material spec'ns B.L.W.
Certificate of boiler test DUPLICATE
Junior laws to 7-28-20 Shipment ~~SHOVED~~ ON OWN WHEELS ~~(SHOVED)~~

Brass shop finish, No. 3, EXCEPT INJECTOR CHECKS TO BE PAINTED.
Machine shop finish, D-158, EXCEPT CYLINDER HEAD COVERS AND STEAM CHEST COVERS TO BE PAINTED.

B. L. W. Patents NONE

Property plates NONE

Painting, style 231, OLIVE GREEN AND ALUMINUM

Mark on TANK SIDES:- TAMPICO - PANUCO VALLEY RAILWAY

FRONT NUMBER PLATE A BLANK.
Road Nos. Pos. Road Nos. Name NONE. NONE

Actual Dimensions of Loco. Extreme height over all 13' 8½"
Extreme Width: Cab boards 9' 7" Cylinders ~~over valve motion~~ 9' 9½"
Length outside face front bumper of engine to face of tender wedge 28' 7½"
Length face of tender wedge to outside face back bumper of tender 23' 3½"
Total length outside face front bumper of engine to outside face back bumper of tender 51' 11"

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-4952
Memorandum Spec'n 17120 Dup. 10 30 E 108, except where otherwise specified.

SPECIFICATION FOR LOCOMOTIVES 10 30 E 149

Gen. as Photo. 3486 except with piston valves and outside steam pipes.

FOR Moctezuma Copper Company (Mexico)

Engine Drawing No. 25. 8.14.17.

Gauge of Road 3' 0" Play ⅜" except ⅞" for #4 & 6 wheels
Wheelbase, Rigid 11' 0" Driving 11' 0" Total 18' 4"
Total wheelbase, eng. and tend. Actual 44' 6½" Limited to ----

3 **Curves** 45 degrees compensated. Rails 30 lbs. per yard
Maximum grade against loaded cars 1.½%.
Limits, Height ---- Width ----
Weight (approximate) in working order, Total 114,000 pounds
On F. tr'k 10,000 lbs., Drivers 104,000 lbs., B. tr'k ---- lbs.

Tractive power 26,090 lbs., Ratio of adhesion 4
Work'g St'm Pres. 180 lbs., Service Freight
Fuel Bituminous Coal

Front tube sheet to be ½" thick
Boiler Steel Thick 9/16" Bill 8242
Boiler, Diam. 60" Plan Straight Top
1 Boiler st'm pres. 180 lbs., Tested to 200 lbs. steam pres. / with factor of safety of 4.9 240 lbs. water pres.
Longitud. seams (See sup. 2)

Dome, diam. 29" Pos. Central

Firebox Steel Combustion chamb. None
3 Firebox, length 54⅛" Width 49⅞" Depth F. 57" B. 46½"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"
Firedoor opening 16" diam.
Water space, Front 3½" Sides 3" Back 3"
Water space, Frame Single Riveted
Water space stays ⅞" diam. (See sup. 4)

14 Radial stays 1" diam. Sling stays front Two rows of B.L.W. Expansion Stays.
Button heads below crown on Six central rows
Crown bars None Placed ---- above crown ----
Crown bolts ----

Flues #9 W.G. Charcoal Iron or Steel
Tubes #12 W.G. Charcoal Iron or Steel
Tube ends Swaged for copper ferrules, fire box ends
Number 18 / 115 Diam. 5⅛" / 2" Length 15' 4"

Heating Surface					
	Flues	386⁰	Combus. Chamb. ---	Total	1387⁰
	Tubes	918⁰	Fire Box 83⁰	Fire Brick Tubes	--
	Grate area	18.8⁰	Ratio to Heating Surface 1 :		73.8
	Superheater	334⁰			

Fire Brick Arch, None

5 **Grates** Rocking, finger type, (no dump grates)
6 **Ash Pan,** Dampers Right and Left

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater (See sup. 7)

9 **Smokebox** extension With ⅜" cleaning hole and cap L. S. only
Spark arrester hopper With, M.M. Standard
Netting and deflect. plates With, M.M. Standard

Exhaust nozzles Single, High

Stack Cast Iron, Tapered Dia. 16" Hole in S. B., dia. 19"

Safety Valves (Specl) Two Crosby 3"
Safety valves None with relief lever, Set to 180 pounds
Whistle B. L. W. Plain

Steam Gauge One Iron 7" MAKER:- Ashcroft (Specl)
Steam gauge stand Iron **Clock** None

Water Gauge One Klinger **Cab Lamps** Electric
Gauge Cocks Three, Back Surface valve None
Lowest gauge cock 4" above highest part of crown
Lubricator steam valve without separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock Two Crane, No. A-1281 and one B.L.W. (Sup. 10)
11 **Cleaning Plugs** 412-418
Firebox Corners, diagonal, front and back
Crown, Two each side and two back
Waist, (See sup. 11)
Front tube sheet, One Fusible plug One

Pump None Pos. ----
Top chamb. ---- Bottom chamb. ----
Feed Cock ---- Feed pipes ----
Checks ---- Check pipes ----

Injectors Two Ohio (Specl) No. 7
Injectors, Pos. Right and Left Steam pipes Copper
Pipes, Check Iron Feed Iron Overflow Iron
Check B. L. W. Pos. R. and L.

Steam Heat None

12 **Cab** Steel, lined with white wood

Cab boards Wood Nosing Angle Iron
Running boards Steel Plate Nosing T-Iron
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 22" (Specl) 9.15.18.

Pilot Metal Pushing shoes None
Front Bumper Cast Iron Bumper plate With
Steps (See sup. 13)

Front Drawhead, Center above rail 26⅜"
Coupler Climax Auto., three quarter size, with stub shank and with cast steel pocket casting.

Signal fixtures Iron or bumper

15 **Headlight** One Round Case 18" Reflector,
Headlight, Nos. on sides With H'd'l't step With
Lamp shelf None Nosing None

Bell 85 pounds
Sand Box One Diam. 28" Body Iron painted Pipes Iron
Sander Leach Air, trap A-10, to sand front and back

Dome casing Iron painted

Boiler Jacket #22 Plan. Steel Bands Iron Style 9.
Boiler Lagging Magnesia Sectional.

THE BALDWIN LOCOMOTIVE WORKS
E H C Kalbach Aug 1918.

SPECIFICATION FOR LOCOMOTIVES 10 30 E 149

FOR Moctezuma Copper Company

3763 3764

Furnish drawings etc. (See sup. 1)

Frames O. S. of wheels, Cast Steel Braces Solid

Cylinders, Diam. 18" Stroke 20"
St'm ports, Length 20 27/32" Width 1¼" Bridges ----
Exh. ports, Length ---- Width ---- Valve load 3/16"
Valve travel 4½" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 1 13/16" By-pass valve ----
(Specl)
S. P. Lubr. Nathan Five Feed Bulls Eye
Cyl'r heads Cast Iron. Lubr. pipes of copper under jacket
Cyl'r casings Iron Painted Head covers Steel Painted
St'm chest casings ---- Covers ----
St'm chest valves 9½" diam. Piston Type
Met. pkg (Piston rods / Valve stems) U. S. King Type (Specl)

10 **Pistons** Cast Iron rings sprung into solid heads
Guides Laird type, Steel Oil cups Needle
Crossheads Cast Steel, with Phosphor Bronze bearings
Wrist Pins Steel Rod cups Grease Cups, forged on rods
Parallel rods to have solid ends.

Valve Motion Walschaerts
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheels without hub liners
Drivers, O. S. Diam. 38" Cen. diam. 32" centers, Cast Iron

17 **Tires** Steel Held by Shrinkage and Shoulder
Tires, Flanged, Pos. All Size 3" x 5½"
Tires, Plain, Pos. None Size ------
Lateral play between driving boxes and wheel hubs = (See sup. 18)
Driving Boxes Steeled Cast Iron
Journals, Diam. 7½" Length 7"

18 **Springs.** Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster
To swing 6⅜" each side of cen., Cen. pin liners None
Journals, Diam. 4⅛" Length 8" Boxes Cast Iron
Wheels, Diam. 24" Tread 4½" Kind Chilled Cast Iron spoke
Tires None Cen. diam. --- Size ----
Tires held by ----
Engine truck wheels without hub liners
Back Engine Truck None Wheeled ----
To swing --- each side of cen., Cen. pin liners ----
Journals, Diam. --- Length ---- Boxes ----
Wheels, Diam. --- Tread ---- Kind ----
Tires --- Cen. diam. --- Size ---
Tires held by ----

20 **Brake,** position On all driving and tender wheels
Operating / Parts: Engine, Sch. A-1 West'g. Auto. Air
Foundation / Parts: Drivers, sch. W-1, American O.S. Equalized; Eng. Tr'k, sch. ----
20 Air pump) Two 9½" Pos. Both Left Side
Train connections Front and Back
Train signal, sch. None
Le Chatelier brake, with valve on line of lower gauge cock.

Tender Eight Wheeled, Drawing No. 338
Weight, with fuel and water, about 50,000 pounds

Tank 2500 Gallons, Bill 4634
Tank "U" shape, straight top, Coal capacity 5 tons
Tank man hole to be oblong
Tool Boxes of hard wood, Top
Tender floor of Iron

21 **Frame** Steel 8" channels, with long side channels turned in at ends to form bumpers.
21 Front Drawbar height 22"
Pilot None Pushing shoes None
Back drawhead, center above rail 26⅜"
Coupler Climax Auto., three quarter size, with stub shank and with cast steel pocket casting.

Steps (See sup. 32 a.)

Trucks Arch bar type, with cast steel bolsters
Side bearings on front and back trucks.
Springs Elliptic B. L. W.
24 Journals, Diam. 3⅞" Length 7"
Wheels, Diam. 26" Tread 4¼" Kind Chilled cast iron plate.
Tires None Cen. diam. --- Size ----
Tires held by ----
Safety chains Single

Brake Position On all wheels
Brake sch. FL-812, West'g. Auto. Air.

List of tools, sch. 29
Photo sch. #2 Inspection B. L. W.
To be weighed Yes Material spec'ns B. L. W.
1 Certificate of boiler test Three copies of B.L.W. form 1036.
Junior laws to 6.1.18. Shipment Erected, on car

Brass shop finish, No. 1
Machine shop finish D-165

B. L. W. Patents: Feed Water Strainer, Patented Sept. 1, 1903 (Cast on); Steam Pipe Casing, Patented July 18, 1911 (Cast on)

Property plates None

Painting:—Engine, style 291, Olive Green and Aluminum
Painting:—Tender, style 291, Olive Green and Aluminum

Lettering to be same as for 10 30 E 108
Mark on Cab sides, M. C. C.
Mark on tank sides, Moctezuma Copper Co.

Road Nos. Pos. Road Nos. Name None
F. No. Plate 6
(Sides of Cab / Under mark)
(Sides of Tank / Under mark.)

Actual Dimensions of Loco.— Extreme height over all 13'6½"
Extreme Width:—Cab (handles) 10'0" Cylinders over valve casings 9'10½"
Length outside face front bumper of engine to face of tender wedge 39'11"
Length face of tender wedge to outside face back bumper of tender 19'7"
Total length outside face front bumper of engine to outside face back bumper of tender 59'7"

SPECIFICATION FOR LOCOMOTIVES 10 30 E 149

FOR MOCTEZUMA COPPER COMPANY

J.

1 SPECIFICATION CARDS OF THE BOILER, AND ONE COMPLETE SET OF BLUE PRINTS, TO BE FURNISHED BY THE B. L. W. TO THE MASTER MECHANIC'S IN CHARGE OF THE LOCOMOTIVE.

2 LONGITUDINAL SEAMS TO BE BUTT JOINTED WITH DOUBLE COVERING STRIPS, SEXTUPLE RIVETED.

3 CROWN SHEET SLOPED DOWNWARD FROM FRONT TO REAR, NOT LESS THAN $\frac{3}{8}$" PER FOOT OF LENGTH OF FIRE BOX.

4 WATER SPACE AND RADIAL STAYS TO BE MADE OF ULSTER SPECIAL STAY BOLT IRON.
THE STAYBOLTS IN BOTTOM ROW ABOVE MUD RING, BACK OF EXPANSION PADS, TO BE FALLS HOLLOW BOLTS.
OTHER STAY BOLTS TO HAVE $\frac{3}{16}$" HOLE, $1\frac{1}{4}$" DEEP FROM OUTSIDE.

5 GRATES TO BE OPERATED FROM THE GROUND.

6 ASH PAN TO HAVE OPENINGS FOR CLEANING FROM SIDES.

7 SUPERHEATER AS LOCOMOTIVE SUPERHEATER CO'S SPEC'N. #AH1-280-A DATED SEPT. 24, 1917. (COPY ATTACHED)
SUPERHEATER TO BE SCHMIDT TYPE, CONNECTING WITH TOP HEADER IN SMOKE BOX AND WITH OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY ON SUPERHEATER, PAYABLE BY THE B. L. W.

8 PLUG 3" DIAM. TO BE PROVIDED IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

9 SMOKE BOX SHEET TO BE $\frac{1}{2}$" THICK.

10 ONE B.L.W. BLOW OFF COCK IN BELLY OF BOILER, AND ONE CRANE ON EACH SIDE IN WATER LEG.
Crane blowoff cocks to be as shown on Crane Co's print 5381 9/11/18

11 TWO LONG WASHOUT PLUGS TO BE PUT IN BELLY OF BOILER, AND THREE ON EACH SIDE, ALL TO BE LOCATED AT THE MOST CONVENIENT PLACE WHERE THE BEST EFFICIENCY CAN BE HAD IN REMOVING SCALE.

12 CAB TO HAVE VENTILATOR IN ROOF
CAB FRONT DOORS TO OPEN OUTWARDS
CAB TO HAVE SLIDING WINDOWS
CRYSTAL PLATE GLASS CAB WINDOWS
ARM RESTS FOR ENGINEER AND FIREMAN.

13 SAFETY APPLIANCES TO CONFORM TO THE I. C. C. REQUIREMENTS

14 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC TYPE "K" WITH INCANDESCENT HEADLIGHT, FURNISHED FREE THESE WORKS BY MOCTEZUMA COPPER CO. AND APPLIED BY THE B. L. W.

16 PISTON RODS HAMMERED STEEL, GROUND AND KEYED TO CROSSHEAD

17 CHICAGO FLANGE OILER, ELLIOT SYSTEM, WITH PIPES TO FRONT AND BACK DRIVING WHEELS.

18 EXTRA LATERAL PLAY TO BE PROVIDED FOR SECOND AND FOURTH PAIRS OF DRIVERS, I. E., LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS TO BE $\frac{1}{16}$" TOTAL FOR FIRST AND THIRD DRIVERS AND $\frac{5}{16}$" FOR SECOND AND FOURTH DRIVERS.

19 SPRING LINK PINS TO BE APPLIED WITH HEAD OUTSIDE.

20 AIR PUMP EXHAUST TO BE PIPED INTO CYLINDER SADDLE.

21 MAIN AIR RESERVOIR TO HAVE CAPACITY OF AT LEAST 30,000 CUBIC INCHES, AND TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

22 BRAKE TO HAVE DUPLEX AIR GAUGE.

TENDER

31 FRONT CHANNEL IRON ON TENDER FRAME MUST BE REINFORCED, BACK OF CHAFING CASTING, WITH $1\frac{1}{2}$" IRON PLATE, APPLIED AS PER PURCHASER'S SKETCH, RECEIVED MARCH 4, 1909.

32 FOOT BOARD AT REAR END OF TANK, WITH HAND RAIL ON BACK END OF TANK, CENTRALLY LOCATED.

33 SAFETY APPLIANCES TO CONFORM TO THE I. C. C. REQUIREMENTS.

34 AXLES, JOURNALS AND BOXES, TO BE M. C. B. STANDARD.

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378

SPECIFICATION FOR LOCOMOTIVES 10 30 E 149

FOR MOCTEZUMA COPPER COMPANY

Specification for Type A Double Loop Superheater #AH1-280-A, DATED SEPT. 24, 1917.

BOILER TUBES	115 in number 2 o. d 15 ft 4 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end.
BOILER FLUES	18 in number 5½ o. d #9 BWG of cold drawn seamless steel. Flues to be straight, true to gauge and wall not to vary more than one gauge from specified thickness. Card 1409-A
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end to be set with copper ferrule, rolled, beaded and prosered except for copper sheets. Front end to be rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card 1136
TUBE SHEET LAYOUT	Card 50095
UNITS	18 units 1½ o. d #9 BWG of seamless steel. Pipes united by return bends. Each unit to be tested, before being placed in boiler, with water under pressure of 250 lb. per sq. in. for screwed return bends or 500 lb. per sq. in. for welded return bends.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card 10773
UNIT PIPE JOINT	To be made in best possible manner to insure absolutely tight joints in accordance with the notation on. Card 1043
UNIT CLAMP BOLT	To be in accordance with requirements of Locomotive Superheater Company Material Specification No. 12. Card 10695
HEADER	To be of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card 1587
HEADER SUPPORTS	To be securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. To be properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card 1323
STEAM PIPE JOINT RINGS	Should be of cast iron.
DEFLECTING PLATE	To be constructed so as to permit easy inspection and removal of superheater units and joints. Design to be in accordance with. Card SEE ARRGT.
DAMPER CYLINDER	To be carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Pistons to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in cylinder. Pipe to be well protected against freezing. Card 1149
DAMPER SHAFT COUNTERWEIGHT	To be painted a light color to render it easily visible by the engineer. Card 1067
S. H. ARRANGEMENT	To be in accordance with. Card 40114
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 11037-A	DAMPER SHAFT LINK	Card 1070
DAMPER CYL. ARM	Card 1074	PATENT PLATE	Card 3159
DAMPER CYL. PIPE FITTING	Card 1069-A	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. PIPE UNION	Card 1287	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPING DIAGRAM	Card 3258	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. SUPPORT	Card	S. H. PIPE END	Card 1344
DAMPER SHAFT	Card 1068	S. H. PIPE BAND	Card 1988
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 10300
DAMPER SHAFT BEARING (O.S.)	Card 1148	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT BEARING (I.S.)	Card 1275-C	LUBRICATOR CONNECTION	Card 3023
SPACING OF BANDS & SUPPORTS	Card 10792	DEFLECTING PLATE STUDS	Card 10809
TYPE OF RETURN BENDS	CAST STEEL	DEFLECTING PLATE CLAMP	Card 10809-A

THE BALDWIN LOCOMOTIVE WORKS Dup. of 10 3/4 E 2057 WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED. As Specification F-1956

Memorandum Spec'n ~~F-20178~~ 21016

SPECIFICATION FOR LOCOMOTIVES 10 3/4 E ~~2099~~ 2101

FOR ~~Stock~~ MONTERREY IRON & STEEL CO.

H.P. ~~1000~~ MEXICO.

Gen. as PHOTO. 7203

Engine Drawing No. 177

~~5-28-20~~ 4-29-21

Gauge of Road 4'8½" Play ¾"

Wheelbase, Rigid 14'6" Driving 14'6" Total 22'0"

Total wheelbase, eng. and tend. {Actual 51'9" / Limited to ---

* THIS LOCO. WAS ORIGINALLY ORDERED FOR STOCK ON FOREIGN SALES DEPARTMENT MEMO. SPECN. F-20178.

Curves 8 DEGREES GRADES 2% FOR LENGTH OF 300 METERS.

Limits, Height --- Width ---

Weight (approximate) in working order, Total ~~132,000~~ 132,000 POUNDS.

On F. tr'k ~~14,000~~ lbs., Drivers ~~118,000~~ lbs., B. tr'k --- lbs.

WEIGHT OF ENGINE EMPTY, ABOUT ~~117,360~~ POUNDS.

Tractive power 27,800 lbs., Ratio of adhesion ~~4.25~~ 4.29

Work'g St'm Pres. 170 lbs., Service ~~PLANTATION~~ FREIGHT

Fuel OIL

Boiler STEEL Thick ~~9/16~~ 5/8" Bill ~~8831~~

Front Tube Sheet ½" Thick ~~BOILER FOR EXPORT~~

Boiler, Diam. 56" Plan EXTENDED WAGON TOP.

Allowable st'm pres. 200 lbs. / With Factor of Safety of 4.55 **Tested to** 220 / 267 lbs. steam pres. / lbs. water pres.

Longitud. seams BUTT JOINTED, DOUBLE COVERING STRIPS.

AUXILIARY DOME - NONE

Dome, diam. 29" Pos. FORWARD OF FIRE BOX.

Firebox STEEL Combustion chamb. NONE

Firebox, length 102-1 1/16" Width 42½" Depth F. 63½" B. 60⅞"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame DOUBLE Riveted

Water space stays ⅞" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O.S.

WATER SPACE STAYS TO PROJECT THROUGH SHEET 5/16" FOR RIVETING.

Radial stays 1" DIAM. Sling stays from THREE ROWS B.L.W. EXPANSION STAYS

Button heads below crown on EIGHT central rows

Crown bars NONE Placed --- above crown

Crown bolts ---

Flues ---

Tubes #12 W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 241 Diam. 2" Length 13'0"

TUBES TO BE ELECTRICALLY WELDED IN FIRE BOX TUBE SHEET, AND TO PROJECT THROUGH SMOKE BOX TUBE SHEET A UNIFORM DISTANCE ½".

Heating Surface Flues --- Combus. Chamb. --- Total 1774

Tubes 1630 Fire Box 144 Fire Brick Tubes ---

Grate area 30.3 Ratio to Heating Surface 1: 58.5

Superheater ---

Fire Brick ARCH NONE

FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

Grates NONE

Ash Pan, Dampers FRONT ONLY.

OIL BURNING ARRANGEMENT B.L.W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extension WITH Cleaning hole and cap L. S. ONLY

Spark ejector hopper WITH

Netting and deflect. plates NONE

Exhaust nozzles DOUBLE LOW

CLEANING PIPE - WITH.

Stack STRAIGHT Dia. 16"

(Not Spec) **Safety Valves** TWO ASHTON 2½" OPEN

Safety valves NONE with relief lever, Set to 170 POUNDS

Whistle ONE B. L. W. PLAIN

Steam Gauge ONE BRASS 7" MAKER: ASHCROFT (Not Spec)

Steam gauge stand BRASS **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK Surface valve NONE

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve WITHOUT separate dry pipe to dome

Blower Valve B.L.W.

Blow off Cock ONE EVERLASTING Pos: R.S.

Cleaning Plugs ONE FILLING PLUG IN TOP OF BOILER.

Firebox, CORNERS, BACK ONESDIAGONAL, SIDES, FRONT AND BACK.

Crown, TWO EACH SIDE AND TWO BACK.

Waist, ONE UNDER FRONT

Front tube sheet, TWO Fusible plug ONE

~~PRESSED~~ ~~STEEL~~ STEEL COLLARS RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE

DETAILS TO BE ARRANGED SO THAT LOCOMOTIVE CAN BE READILY CHANGED TO BURN COAL FUEL.

(Not Spec) **Injectors** TWO NATHAN SIMPLEX, TYPE "R" No. 8

Injectors, Pos. R. AND L. Steam pipes COPPER

Pipes, Check COPPER Feed COPPER Overflow IRON

Check B. L. W. Pos. R. AND L.

{For Hewitt: Provide a cast steel crosstie for guide yoke and brake cylinder support instead of supporting brake cylinders on a separate plate. Brake cylinders to be raised 1".

Steam Heat NONE

Cab STEEL CRYSTAL PLATE GLASS CAB WINDOWS.

Cab boards STEEL Nosing T-IRON

Running boards STEEL Nosing T-IRON

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 33¾"

Pilot WOOD Pushing shoes NONE

Front Bumper YELLOW PINE Bumper plate WITH

Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler (Not Spec) SHARON M.C.B. AUTO. WITH SLOTTED KNUCKLE.

Signal fixtures IRON ON BUMPER

HEADLIGHT EQUIPMENT TO BE SCHROEDER ELECTRIC WITH INCANDESCENT HEADLIGHTS.

Headlight Two ROUND GASE 18" Reflector,

Headlight, Nos. on sides WITH H'dl't step WITH

Lamp shelf NONE Nosing ---

Bell 92 POUNDS

Sand Box ONE Diam. 31" Body HIGH, IRON PTD. Pipes IRON

Sander (Not Spec) LEACH AIR TRAP A-10 DOUBLE, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED: PRESSED STEEL TOP AND BOTTOM RINGS.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON Style 9 AND 14

Boiler Lagging MAGNESIA SECTIONAL

BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

E.K. Dell & E.H. Roberts May 1921.

SPECIFICATION FOR LOCOMOTIVES 10 3/4 E ~~2099~~ 2101

FOR ~~Stock~~ MONTERREY IRON & STEEL CO.

H.P.

Frames CAST STEEL

Cylinders, Diam. 20" Stroke 24"

St'm ports, Length 16" Width 1½" Bridges 1"

Exh. ports, Length 16" Width 2½" Valve lead 3/16"

Valve travel 5¾" Steam lap 1 5/16" Exhaust clearance ---

Eccentric crank throw 12¾" By-pass valve NONE

(Not Spec) S. F. Lubr. NATHAN TRIPLE BULLS EYE.

Cyl'r heads CAST IRON LUBR. PIPES OF COPPER O.S. OF JACKET

Cyl'r casings IRON PTD. Head covers STEEL PAINTED

St'm chest casings IRON PTD. Covers STEEL PAINTED

St'm chest valves RICHARDSON BALANCED, WITH VACUUM VALVES.

Met. pkg. (Not Spec) PISTON RODS / VALVE STEMS. UNITED STATES, KING TYPE.

PISTON RODS TO BE KEYED, TO CROSSHEADS.

Pistons CAST IRON RINGS SPRUNG INTO SOLID HEAD.

Guides ALLIGATOR, TYPE, STEEL Oil cups NEEDLE

Crossheads CAST STEEL WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL Rod cups PLUNGER, FORGED ON.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.

Driving wheel hub liners BRONZE FOR MAIN WHEELS ONLY.

Drivers, O. S. Diam. 50" Cen. diam. 44"

CENTERS, MAIN CAST STEEL, OTHERS CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. FRONT AND BACK Size 3" x 5½"

Tires, Plain, Pos. INTERMEDIATE Size 3" x 6"

Lateral play between driving boxes and wheel hubs 3/16" TOTAL

Driving Boxes STEELED CAST IRON.

Journals, Diam. MAIN 8" Length 8½" / OTHERS 7½"

Springs. Make B.L.W.

Front Engine Truck TWO Wheeled SWINGBOLSTER, CENTRE BEARING.

To swing 3" each side of cen., Cen. pin liners NONE

Journals, Diam. 5" Length 10" Boxes CAST IRON

Wheel hub liners NONE

Wheels, Diam. 30" Tread --- Kind CAST IRON SPOKE CENTER

Tires STEEL Cen. diam. 25" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER.

Back Engine Truck NONE

~~* BELL, WHISTLE, OIL OUTFIT, TOOLS, AND LAMPS AND ELECTRIC LIGHT BULBS TO BE PACKED IN A BOX AND PLACED IN SMOKE BOX FOR SAFE KEEPING DURING TRANSIT.~~

~~* EXTRAS COVERED ON EXTRA ORDER No. 1116 DATED 9-22-20 TO BE SHIPPED WITH LOCO.~~ (OMIT)

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating Engine, sch. No. 6 ET WESTG. COMBINED AUTO. AND STRAIGHT AIR.

Parts Eng. Trk. sch. ---

Foundation Drivers, sch. WN-1 AMERICAN O.S. EQUALIZED

Parts Eng. Trk. sch. ---

Air pump ONE 9½" Pos. L.S.

Train connections FRONT AND BACK

Train signal, sch. NONE

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.

Tender EIGHT-Wheeled, Drawing No. 1589

Weight, with fuel and water, about ~~112500~~ 112500 POUNDS. {WEIGHT EMPTY ~~52800~~ 52800 / ABOUT ~~54,000~~ 54,000 LBS.

TENDER TO BE WEIGHED:- ~~Yes~~ No.

Tank {OIL 2500 / WATER 5000 Gallons, Bill 5134 / 5289

TANK "U" SHAPE, STRAIGHT TOP. TANK COCK AND HOSE - WITH.

TWO SIDE TANK FUNNELS.

Tool Boxes of STEEL, TOP.

TENDER FLOOR OF STEEL.

Frame STEEL, 10" CHANNELS, WITH BUMPERS OF WOOD.

Front Drawbar height 30⅞"

Pilot NONE Pushing shoes NONE

Back drawbeam, center above rail 33½"

Coupler (Not Spec) SHARON M. C. B. AUTO. WITH SLOTTED KNUCKLE.

Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE WITH CAST STEEL BOLSTERS.

JOURNAL BRASSES TO BE M. C. B. STANDARD, LEAD LINED.

Springs ELLIPTIC, B.L.W. JOURNAL BOX WEDGES, M.C.B. TYPE.

Journals, Diam. 5" Length 9" AXLES M.C.B. STANDARD

Wheels, Diam. 33" Tread 1¼" Kind CAST IRON SPOKE CENTER.

Tires STEEL Cen. diam. 28" Size 2½" x 5½"

Tires held by SHRINKAGE AND SHOULDER

Safety chains SINGLE

Brake Position ON ALL WHEELS.

Brake sch. No. 6 ET WESTINGHOUSE AUTOMATIC AND STRAIGHT AIR WITH 12" x 12" TENDER CYLINDERS.

List of tools, sch. 37 TWO TRAVERSING JACKS

Photo sch. ~~None~~ No. 2 Inspection ~~BLANK~~ (SEE * BELOW)

To be weighed No Material specifns B.L.W.

Certificate of boiler test ~~DUPLICATE~~ THREE COPIES BLW FORM 1036.

Junior laws to 7-23-20 Shipment ERECTED, ON WHEELS ~~(SEE)~~

Brass shop finish, No. 3, EXCEPT INJECTOR CHECKS TO BE PAINTED.

Machine shop finish D-158, EXCEPT CYLINDER HEAD COVERS AND STEAM CHEST COVERS TO BE PAINTED.

B. L. W. / Patents NONE

Property plates ~~NONE~~, B. L. W. FOR ENGINE AND TENDER.

* INSPECTION BY R. W. HUNT & CO. ADVISE HUNT & CO'S NEW YORK OFFICE, ATTENTION MR. J. C. OGDEN, WHEN LOCO. IS READY FOR EXAMINATION AND TEST.

Painting, style 291, OLIVE GREEN AND ALUMINUM

MARK ON CAB PANELS: ACERO

Mark on TANK SIDES:- ~~MONTERREY~~ {ACERO / MONTERREY

NUMBER ON TANK SIDES TO BE UNDER MARK.

Road Nos. Pos. Road Nos. Name NONE

F. No. PLATE 2102

~~DOME~~ SAND BOX

SIDES OF TANK

SIDES OF CAB ABOVE MARK

Actual Dimensions of Loco. Extreme height over all 13'11½"

Extreme Width: Cab boards 9'9" Cylinders or valve motion 9'11"

Length outside face front bumper of engine to face of tender wedge 32'11½"

Length face of tender wedge to outside face back bumper of tender 24'6½"

Total length outside face front bumper of engine to outside face back bumper of tender 57'5"

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7086.

Memorandum Spec'n 21015.

SPECIFICATION FOR LOCOMOTIVES 10 34 E 2108 to 2111. Gen. as Photo. 3843.

FOR Mr. Fernando Tirado, Engine Drawing No. 159.

HW. For the Cia Mexicano de Combustibles, Mexico. 4-28-21.

Gauge of Road 4' 8½" Play ⅜", except ⅞" for F.& B. Drivers.
Wheelbase, Rigid 14' 0" Driving 14' 0" Total 22' 7"
Total wheelbase, eng. and tend. {Actual 55' 5½" {Limited to ----

Curves ---

Limits, Height --- Width ---
Weight (approximate) in working order, Total 162,000 pounds.
On F. tr'k 17,000 lbs., Drivers 145,000 lbs., B. tr'k ---- lbs.

Tractive power 34,800 lbs., Ratio of adhesion 4.16
Work'g St'm Pres. 200 lbs., Service Freight.
Fuel Heavy Mexican Oil.

Boiler Steel. Thick ¾" & 13/16" Bill 9403
Front Tube Sheet ½" Thick
Boiler, Diam. 70" Plan Extended wagon top.
{Allowable st'm pres. 200 lbs. **Tested to** {220 lbs. steam pres.
{With Factor of Safety of 4.52 {267 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips.
Auxiliary dome: None.
Dome, diam. 33" Pos. Central.

Firebox Steel. Combustion chamb. None.
Firebox, length 112-3/16" Width 42" Depth F. 71¼" B. 69¼"
Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" diam. Crown and sides in one sheet.
Water space, Front 4" Sides 3" Back 3".
Water space frame Double Riveted
Water space stays ⅞" diam. with 3/16" holes 1½" deep from O.S.
Radial stays 1" diam. Sling stays front {Three rows B. L. W. {Expansion stays.
~~Button~~ heads below crown on central rows (See sup*)
Crown bars None. Placed --- above crown
~~Crown bolts~~ {Crown stays to be flat, not headed.
*{Eight central rows to have taper thread thru crown and to be riveted over under sheet.
Tubes No. 12 B.W.G. Charcoal iron or steel, (B.L.W. Option)
Tube ends Swaged for copper ferrules, fire box ends.
Number 280 Diam. 2" Length 13' 6"
Tubes to be welded to fire box tube sheet.

Heating Surface {Flues --- Combus. Chamb. --- Total 2137⁰
{Tubes 1967⁰ Fire Box 170⁰ Fire Brick Tubes —
Grate area 32.7⁰ Ratio to Heating Surface 1: 65.2
Superheater ---

Fire Brick Arch, none.
Fire box lined with fire brick, for oil burning.
Fire brick pavement in pan.
Grates None.
Ash Pan, Dampers Front only.
Oil burning arrangement B. L. W. Standard with burner in front end of fire box. Royalty, if any, payable by The B. L. W.
Throttle Balance. Pos. Dome.
Dry pipe Steel.

Superheater None.

Smokebox extenstion None. Cleaning hole and cap None.
Spark ejector or hopper None.
Netting and deflect. plates None.

Exhaust nozzles Double low.
Cleaning pipe, with.
Stack Straight. Dia. 18"

Safety Valves Two Consolidated 2½" Open. (Not Spec.)
Safety valves None with relief lever, Set to 200 pounds.
Whistle One B. L. W. Plain.

Steam Gauge One Iron, 6½". Maker: U.S. Gauge Co. (Not Spec.)
Steam gauge stand Iron. **Clock** None.

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric.
Gauge Cocks Three back. Surface valve None.
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One B. L. W. Pos: Front.
Cleaning Plugs
Firebox, Corners, back ones diagonal, front and back.
Crown, Two each side and two back.
Waist, One under front.
Front tube sheet, One Fusible plug One
One plug each side above crown ahead of back tube sheet.

Pump None.

Injectors Two Monitor (Not Spec.) No. 10.
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Iron. Feed Iron. Overflow Iron.
Check B. L. W. Pos. Right and left.

Steam Heat None.

Cab Steel.

Cab boards to be covered with wood.
Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 33½"

Pilot Wood.
Front Bumper Oak. Bumper plate With.
Steps and hand holes to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"
Coupler Simplex M. C. B. Auto.

Signal fixtures Iron on bumpers.
Headlight equipment to be Sunbeam electric, type RE-3, with incandescent headlight.
Headlight One round case 18" Reflector,
Headlight, Nos. on sides With. H'dl't step With.
Lamp shelf None. Nosing ---

Bell 92 pounds.
Sand Box One Diam. 31" Body Iron painted. Pipes Iron.
Sander Leach air double trap A-10, to sand front of front drivers and back of main drivers. (Not Spec.)
Dome casing Iron painted.

Boiler Jacket #18 soft steel pts. Bands Iron. Style 9.
Boiler Lagging Magnesia sectional.

THE BALDWIN LOCOMOTIVE WORKS

E. H. C. Kalbach May-1921.

SPECIFICATION FOR LOCOMOTIVES 10 34 E 2108 to 2111.

FOR Mr. Fernando Tirado,

HW. For the Cia Mexicano de Combustibles.

Frames Cast steel.

Cylinders, Diam. 20" Stroke 26"
St'm ports, Length 16" Width 1½" Bridges 1"
Exh. ports, Length 16" Width 2½" Valve lead ¼"
Valve travel 5½" Steam lap ⅞" Exhaust clearance ---
Eccentric crank throw 11⅛" By-pass valve None.
S. F. Labr. Detroit triple No. 22 Bull's Eye. (Not Spec.)
Cyl'r heads Cast iron. Lubr. pipes of iron under jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings Iron painted. Covers Steel painted.
St'm chest valves Balanced with vacuum valves.
Met. pkg. {Piston rods / Valve stems} United States, King type. (Not Spec.)
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron, rings of cast iron sprung in.
Guides Steel. Oil cups Needle.
Crossheads Cast steel, with bearings of cast iron tinned.
Wrist Pins Steel. Rod cups Plunger, drged on.
Parallel rods to have solid ends.

Valve Motion Walschaerts.
{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be {well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners Bronze, for main drivers only.
Drivers, O. S. Diam. 51" Cen. diam. 44"
Wheel centers: main, cast steel; others, cast iron.
Tires Steel. Held by Shrinkage and shoulder.
Tires, Flanged, Pos. All. Size 3½" x 5½"
Tires, Plain, Pos. None. Size ---

Driving Boxes Steeled cast iron.
Journals, Diam 9" Length 10"
Lateral play between driving boxes and wheel hubs, including lateral play in box pedestal fits,- 7/32" total.
Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing.
To swing 2½" each side of cen., Cen. pin liners None.
Journals, Diam. 5" Length 10" Boxes Cast iron.
Wheel hub liners
Wheels, Diam. 30" Tread --- Kind Rolled steel.
Tires None. ~~Cen. diam.~~ Rims ~~Size~~ 2½" thick.
~~Tires held by~~ Lateral play between front engine truck boxes and wheel hubs, including lateral play in box pedestal fits,- 5/32" total.
B. L. W. {
Patents { None.
Property plates None.

Back Engine Truck None. Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels.
Operating Parts {Engine, sch. No. 6 ET. Westg. combined auto. and {Eng. Tr'k, sch. --- straight air.
Foundation Parts {Drivers, sch. WN-2, American O. S. equalized. {Eng. Tr'k, sch. ----
Air pump Two 9½" Pos. Both left side.
Train connections Front and back.
Train signal, sch. None.
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1672. {Tender to be weighed: Yes.
Weight, with fuel and water, about 138,500 pounds.
Tank {Oil, 3200 {Water, 6500 Gallons, Bill 5660 5659
Tank "U" shape, straight top.

Tool Boxes Wood, top.

Frame Steel, 12" channels, with bumpers of wood and channel

Front Drawbar height 31⅞"
Pilot None.
Back drawhead, center above rail 33½"
Coupler Simplex M. C. B. Auto.

Steps and hand holds to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.
Side bearings for both trucks.
Springs Elliptic, B. L. W. make
Journals, Diam. 5" Length 9"
Wheels, Diam. 33" Tread 4½" Kind Chilled cast iron plate.
Tires None. Cen. diam. --- Size ---
Tires held by ---
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6 ET. Westg. auto. and straight air, with 12" x 12" tender cylinder.

List of tools, sch. 160
Photo sch. No. 2. Inspection B. L. W.
To be weighed Yes. Material spec'ns B. L. W.
Certificate of boiler test {Three copies B. L. W. form 1036, and {two copies B. L. W. form 491.
Junior laws to 4-30-21. Shipment On own wheels.
Brass shop finish, No. 1.
Machine shop finish D-165.

Painting, style ---Olive green, no striping.
Painting, including style and size of marking, to be similar to 12 34 E 50 to 54.
Mark on Cab panel, under road number: C. M. de C.
Mark on back of tank: {Capacidad {Agua 24600 Litros. {Aceite 12110 Litros.
Road Nos. Pos. Road Nos. Name
F. No. Plate. 911 to 914. None.
Cab panel over mark.
Tank sides.

Actual Dimensions of Loco. Extreme height over all 15' 0½"
Extreme Width: Cab boards 10' 3" ; Cylinders ~~or valve motion~~ 10' 0"
Length outside face front bumper of engine to face of tender wedge - 34' 10"
Length face of tender wedge to outside face back bumper of tender - 26' 11½"
Total length outside face front bumper of engine to outside face back bumper of tender 61' 1¼"

THE BALDWIN LOCOMOTIVE WORKS DUPLICATE OF 10 3½ E 2108, WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 21031

SPECIFICATION FOR LOCOMOTIVES 10 3½ E 2112 **Ry. Co's Class** G-46

Sp'd

FOR LA FE MINING COMPANY, LTD. Gen. as PHOTO. 7978

J.McD. MEXICO. **Engine Drawing No.** 159

9-22-21

Gauge of Road 4' 8½" Play ⅜" EXCEPT ⅞" FOR F. & B. DRIVERS.

Wheelbase, Rigid 14' 0" Driving 14' 0" Total 22' 7"

Total wheelbase, eng. and tend. {Actual 55' 5½" {Limited to —

Curves —

GRADES GENERALLY 1% BUT SOME PORTIONS MAY RUN AS HIGH AS 6%.

Limits, Height — Width —

Weight (approximate) in working order, Total 162,000 POUNDS

On F. tr'k 17,000 lbs., Drivers 145,000 lbs., B. tr'k — lbs.

Tractive power 34,800 lbs., Ratio of adhesion 4.16

Work'g St'm Pres. 200 lbs., Service FREIGHT

Fuel HEAVY MEXICAN OIL

Boiler STEEL Thick ¾" & 13/16" Bill 9410

Front Tube Sheet ½" Thick

Boiler, Diam. 70" Plan EXTENDED WAGON TOP

{Allowable st'm pres. 200 lbs. **Tested to** {220 lbs. steam pres.

{With Factor of Safety of 4.7 {267 lbs. water pres.

Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

MAIN DOME, ONE-PIECE TYPE. AUXILIARY DOME, NONE.

Dome, diam. 33" Pos. CENTRAL

Firebox STEEL Combustion chamb. NONE

Firebox, length 112-3/16" Width 42" Depth F. 71½" B. 69½"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening 16" DIAM. CROWN AND SIDES IN ONE SHEET.

Water space, Front 4" Sides 3" Back 3"

Water space frame DOUBLE Riveted

Water space stays ⅞" DIAM., WITH 3/16" HOLES 1½" DEEP FROM O.S. THREE ROWS B.L.W.

Radial stays 1" DIAM. Sling stays front EXPANSION STAYS.

~~Button-heads~~ below crown on ——→ central rows (SEE ✱ BELOW)

Crown bars NONE Placed — above crown

~~Crown bolts~~ ✱ {CROWN STAYS TO BE FLAT, NOT HEADED. EIGHT CENTRAL ROWS TO HAVE TAPER THREAD THROUGH CROWN AND TO BE RIVETED OVER UNDER SHEET.

~~Flues~~

Tubes No. 12 B.W.G. CHARCOAL IRON OR STEEL (B.L.W. OPTION)

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 280 Diam. 2" Length 13' 6"

TUBES TO BE WELDED TO FIRE BOX TUBE SHEET.

Heating Surface {Flues — Combus. Chamb. — Total 2137⁰

{Tubes 1967⁰ Fire Box 170⁰ Fire Brick Tubes —

Grate area 32.7⁰ Ratio to Heating Surface 1: 65.2

Superheater NONE

Fire Brick ARCH, NONE

FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

Grates NONE

Ash Pan, Dampers FRONT ONLY

OIL BURNING ARRANGEMENT B.L.W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX. ROYALTY, IF ANY, PAYABLE BY THE B.L.W.

Throttle BALANCE Pos. DOME

Dry pipe STEEL

Superheater NONE

Smokebox extenstion NONE Cleaning hole and cap NONE

Spark ejector or hopper NONE

Netting and deflect. plates NONE

Exhaust nozzles DOUBLE, LOW

CLEANING PIPE, WITH.

Stack STRAIGHT Dia. 18"

Safety Valves TWO CONSOLIDATED 2½" OPEN (Spec.)

Safety valves NONE with relief lever, Set to 200 POUNDS

Whistle ONE B.L.W. PLAIN

Steam Gauge ONE IRON 6½" MAKER:- U.S. GAUGE CO. (Spec.)

Steam gauge stand IRON **Clock** NONE

Water Gauge ONE B.L.W. IRONCLAD **Cab Lamps** ELECTRIC

Gauge Cocks FOUR BACK Surface valve NONE

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve TO HAVE separate dry pipe to dome

Blower Valve B.L.W.

Blow off Cock TWO B.L.W. POS:- R. AND L.

Cleaning Plugs

Firebox, CORNERS, BACK ONES DIAGONAL AND BACK

Crown, TWO EACH SIDE AND TWO BACK

Waist, ONE UNDER FRONT

Front tube sheet, ONE Fusible plug ONE

ONE PLUG EACH SIDE ABOVE CROWN AHEAD OF BACK TUBE SHEET.

Pump NONE

Injectors (Spec.) TWO NATHAN NON-LIFTING, TYPE "MF" No. 10

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check IRON Feed IRON Overflow IRON

Check B.L.W. Pos. R. AND L.

Steam Heat NONE

Cab STEEL

CAB BOARDS TO BE COVERED WITH WOOD.

Cab boards STEEL Nosing T-IRON

Running boards STEEL Nosing T-IRON

Hand rail IRON Located on BOILER

Back Bumper BAR STEEL Back drawbar height 33½"

Pilot WOOD

Front Bumper OAK Bumper plate WITH

Steps AND HAND HOLDS, TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail 33½"

Coupler SIMPLEX M.C.B. AUTOMATIC

SIGNAL FLAG AND CLASSIFICATION LAMP HOLDERS.

Signal fixtures IRON ON BUMPER AND ON SMOKE BOX.

HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE "K-2" WITH INCANDESCENT HEADLIGHT.

Headlight ONE ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH H'd'l't step WITH

Lamp shelf NONE Nosing —

Bell 92 POUNDS

Sand Box (Spec.) ONE Diam. 31" Body IRON PAINTED Pipes IRON

Sander LEACH AIR, DOUBLE, TRAP A-10, TO SAND FRONT OF FRONT DRIVERS AND BACK OF MAIN DRIVERS.

Dome casing IRON PAINTED

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON Style 9

Boiler Lagging MAGNESIA SECTIONAL.

THE BALDWIN LOCOMOTIVE WORKS

E.H.C. Kalbach. Oct. 1921.

SPECIFICATION FOR LOCOMOTIVES 10 3½ E 2112

FOR LA FE MINING COMPANY, LTD.

J.McD.

387

384

Frames CAST STEEL

Cylinders, Diam. 20" Stroke 26"

St'm ports, Length 16" Width 1½" Bridges 1"

Exh. ports, Length 16" Width 2½" Valve lead ¼"

Valve travel 5½" Steam lap ⅞" Exhaust clearance —

Eccentric crank throw 11⅛" By-pass valve NONE

S. F. Lubr. DETROIT TRIPLE No. 22 BULL'S EYE (Spec.)

Cyl'r heads CAST IRON LUBR. PIPES OF IRON UNDER JACKET.

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED

St'm chest casings IRON PAINTED Covers STEEL PAINTED

St'm chest valves BALANCED, WITH VACUUM VALVES.

Met. pkg. {PISTON RODS / VALVE STEMS UNITED STATES, KING TYPE. (Spec.)

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST IRON, RINGS OF CAST IRON SPRUNG IN.

Guides STEEL Oil cups NEEDLE

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL Rod cups FOR GREASE, FORGED ON.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion WALSCHAERTS

{Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B.L.W.

Driving wheel hub liners BRONZE, FOR MAIN DRIVERS ONLY

Drivers, O. S. Diam. 51" Cen. diam. 44"

WHEEL CENTERS; MAIN, CAST STEEL; OTHERS, CAST IRON.

Tires STEEL Held by SHRINKAGE AND SHOULDER.

Tires, Flanged, Pos. ALL Size 3½" x 5½"

Tires, Plain, Pos. NONE Size —

{LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS; / INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS — 7/32" TOTAL

Driving Boxes STEELED CAST IRON

Journals, Diam. 9" Length 10"

Springs. Make B.L.W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING.

To swing 3½" each side of cen., Con. pin liners NONE

Journals, Diam. 5" Length 10" Boxes CAST IRON

Wheel hub liners BRASS, ON HUBS OF WHEELS

{LATERAL PLAY BETWEEN FRONT TRUCK BOXES AND WHEEL; / PLAY INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 5/32" TOTAL

Wheels, Diam. 30" Tread — Kind ROLLED STEEL

Tires NONE Cen. diam. — Size —

Tires held by WHEEL RIMS 2½" THICK x 5½" WIDE

Back Engine Truck NONE

DISTANCE BETWEEN TRUCK WHEEL FLANGE AND FRAME EXTENSION TO BE A MINIMUM OF 3", ACCOUNT OF CURVES AND ROUGH TRACK.

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Parts {Engine, sch. No. 6-ET WEST'G. COMBINED AUTO. AND STRAIGHT AIR / Eng. Tr'k, sch. —

Foundation Parts {Drivers, sch. WN-2 AMERICAN O.S. EQUALIZED. / Eng. Tr'k, sch. —

Air pump TWO 9½" Pos. BOTH LEFT SIDE.

Train connections FRONT AND BACK

Train signal, sch. NONE

AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS

Tender EIGHT Wheeled, Drawing No. 1672 {TENDER TO BE WEIGHED: YES.

Weight, with fuel and water, about 138,500 POUNDS

Tank {OIL 3200 / WATER 6500 Gallons, Bill 5660 / 5659

TANK "U" SHAPE, STRAIGHT TOP.

Tool Boxes WOOD, TOP

Frame STEEL, 12" CHANNELS, WITH BUMPERS OF WOOD AND CHANNEL.

SIGNAL FLAG AND CLASSIFICATION LAMP HOLDERS, ON BACK OF TENDER.

Front Drawbar height 31⅞"

Pilot NONE

Back drawhead, center above rail 33½"

Coupler SIMPLEX M.C.B. AUTOMATIC

Steps AND HAND HOLDS, TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ARCH BAR TYPE, WITH BOLSTERS OF CAST STEEL.

BOTH TRUCKS TO HAVE SIDE BEARINGS.

Springs ELLIPTIC, B.L.W. MAKE

Journals, Diam. 5" Length 9"

Wheels, Diam. 33" Tread — Kind ROLLED STEEL

Tires NONE Cen. diam. — Size —

Tires held by — WHEEL RIMS 2½" THICK x 5½" WIDE

Safety chains SINGLE

Brake Position ON ALL WHEELS

Brake sch. No. 6-ET WEST'G. AUTO. AND STRAIGHT AIR, WITH 12" x 12" TENDER BRAKE CYLINDERS.

List of tools, sch. 160

Photo sch. NONE Inspection B.L.W.

To be weighed NO Material spec'ns B.L.W.

Certificate of boiler test THREE COPIES B.L.W. FORM 1036

Junior laws to 4-30-21 Shipment ON OWN WHEELS

Brass shop finish, No. 1

Machine shop finish D-165

B. L. W. Patents } NONE

Property plates NONE

LETTERING, ETC., TO BE IN ALUMINUM LEAF, SAME STYLE AS FOR NATIONAL RAILWAYS OF MEXICO LOCOS. NOW BUILDING.

Painting, style — OLIVE GREEN, NO STRIPING.

CLASSIFICATION MARK ON CAB SIDES, CLASE G-46

MARK ON TANK SIDES, LA FE MINING CO., LTD.

MARK ON BACK OF TANK, {CAPACIDAD / AGUA 24605 LITROS. / ACEITE 12115 LITROS.

Road Nos. Pos. Road Nos. Name NONE

F. No. PLATE 831

SAND BOX

CAB SIDES

BACK OF TENDER FRAME

Actual Dimensions of Loco. Extreme height over all 15' 0½"

Extreme Width: Cab boards 10' 3" ; Cylinders or valve motion = 10' 0"

Length outside face front bumper of engine to face of tender wedge = 34' 4⅜"

Length face of tender wedge to outside face back bumper of tender = 26' 11¾"

Total length outside face front bumper of engine to outside face back bumper of tender = 61' 1¼"

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7431

Memorandum Spec'n 22040

SPECIFICATION FOR LOCOMOTIVES 12 28 ¼ E 22

FOR United Sugar Companies, S. A.

P Los Mochis, Sinola, Mexico.

Gen. as B. L. W. Tracing 48497

Engine Drawing No. 9

4-28-22

Gauge of Road 4' 8½" Play ⅜"
Wheelbase, Rigid 12' 3" Driving 12' 3" Total 27' 6"
Total wheelbase, eng. and tend. { Actual 67' 10¼" / Limited to ---

Curves 8 degrees on main line: 40 and 28 degrees in sidings.
Rails, 50 pounds per yard. Grades 1%.
Limits, Height ---- Width ---
Weight (approximate) in working order, Total 128,500 pounds
On F. tr'k 16,500 lbs., Drivers 98,000 lbs., B. tr'k 14,000 lbs.

Tractive power 24,100 lbs., Ratio of adhesion 4.06
Work'g St'm Pres. 180 lbs., Service Plantation
Fuel Wood

Boiler Steel Thick ⅜" Bill 9588
Front Tube Sheet ½" Thick
Boiler, Diam. 54" Plan Extended wagon top.
{ Allowable st'm pres. 200 lbs. / With Factor of Safety of 4.76 } **Tested to** { 220 lbs. steam pres. / 267 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips.
Main dome, one-piece type. Auxiliary dome, None
Dome, diam. 29" Pos. Forward of fire box

Firebox Steel Combustion chamb. None
Firebox, length 78" Width 40⅜" Depth F. 59" B. 52"
Firebox, Tube 2" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening 16" diam. Crown and sides in one sheet.
Water space, Front 4" Sides 3" Back 3"
Water space frame Double Riveted
Water space stays ⅞" diam. with 3/16" holes 1½" deep from O. S.
Radial stays 1" diam. Sling stays front { Two rows B. W. L. / Expansion Stays
Button heads below crown on Eight central rows
Crown bars None Placed --- above crown
Crown bolts ----

Flues No. 9 B. W. G. Seamless Steel
Tubes No. 12 B. W. G. Charcoal Iron or Steel (B.L.W. Option)
Tube ends Swaged for copper ferrules, fire box ends.
Number { 18 / 94 } Diam. { 2⅝" / 2" } Length 13' 2"

Heating Surface { Flues 341 sq. ft. / Tubes 644 sq. ft. } Combus. Chamb. --- Total 1087 sq. ft.
Fire Box 102 sq. ft. Fire Brick Tubes ---
Grate area 22.2 sq. ft. Ratio to Heating Surface 1: 48.8
Superheater 274 sq. ft.

Fire Brick Arch, None

Grates Plain bars and dead plate.
Ash Pan, Dampers Front and Back
Ash pan to have netting under dampers.

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater Schmidt type (See Sup. 3 (a))

Smokebox extenstion None Cleaning hole and cap None
Spark ejector or hopper None
Netting and deflect. plates None

Exhaust nozzles Double, Low
Cleaning pipe, With
Stack Ruston, Improved Dia. 17"

Safety Valves Two Crosby 2½" Open, Style HA-110 (Not Spec.)
Safety valves None with relief lever, Set to 180 pounds
Whistle One Chime

Steam Gauge One Iron 7" from Jas. P. Marsh & Co. (Not Spec.)
Steam gauge stand Iron **Clock** None

Water Gauge One Reflex **Cab Lamps** Electric
Gauge Cocks Three back Surface valve None
Lowest gauge cock 3½" above highest part of crown
Lubricator steam valve without separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock One Everlasting Pos. Front
Cleaning Plugs One filling plug in top of boiler
Firebox, Corners diagonal, and back
Crown, Two each side and two back
Waist, One under front
Front tube sheet, One Fusible plug One

Pump None

Injectors Two Monitor (Spec.) No. 7
Injectors, Pos. Right and Left Steam pipes Copper
Pipes, Check Iron Feed Iron Overflow Iron
Check B.L.W. combined with stop valve Pos. Right and Left

Steam Heat (With) With train connections to front of engine and to back of tender.

Cab Steel, lined with wood
Cab boards to be covered with wood.
Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

Back Bumper Bar Steel Back drawbar height 33½"

Pilot Steel
Front Bumper Cast Steel Bumper plate None
Steps Hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 33½"
Coupler M. C. B. Full-Size Auto. with friction draft gear and with slotted knuckle.

Signal fixtures None
Headlight and equipment to be Pyle National Electric, type "K-2" with incandescent headlights.
Headlight Two round case 18" Reflector,
Headlight, Nos. on sides With H'd'l't step With
Lamp shelf None Nosing ---

Bell 85 pounds Gedlmar air bell ringer
Sand Box Two Diam. 28" Body Iron painted Pipes Iron
Sander Leach Air, Trap A-1, in each box, to sand front and back. (Spec.)

Dome casing Iron painted, with pressed steel top and bottom rings.

Boiler Jacket #22 Soft Steel pts. Bands Iron Style 9 and 14
Boiler Lagging Magnesia Sectional
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

H. K. Hamwick Oct. 1922.

SPECIFICATION FOR LOCOMOTIVES 12 28 ¼ E 22

FOR United Sugar Companies, S. A., Los Mochis, Sinola.

P

{ One complete set of blue prints to be furnished.

Frames Cast Steel

Cylinders, Diam. 17" Stroke 24"
St'm ports, Length 16.88" Width 1⅜" Bridges ---
Exh. ports, Length --- Width --- Valve bars ⅝"
Valve travel 5¼" Steam lap ¾" Exhaust clearance ---
Eccentric crank throw 12-1 1/16" By-pass valve None
S. F. Lubr. Nathan five feed No. 31 Bulls Eye. (Spec.)
Cyl'r heads Cast Iron Lubr. pipes of iron, under jacket.
Cyl'r casings Iron painted Head covers Steel painted
St'm chest casings ---------- Covers ----
St'm chest valves Piston type, 8" diam.
Met. pkg. { Piston rods / Valve stems } United States, King Type (Not Spec.)
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron, rings of cast iron sprung in.
Guides Steel Oil cups Needle
Crossheads Cast Steel, with bearings of cast iron, tinned
Wrist Pins Steel Rod cups Plunger
Parallel rods to have solid ends.

Valve Motion Walschaerts.
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners None
Drivers, O. S. Diam. 44" Cen. diam. 38" Centers Cast Iron

Tires Steel Held by Shrinkage and shoulder
Tires, Flanged, Pos. Front and Back Size 3" x 5½"
Tires, Plain, Pos. Intermediate Size 3" x 6½"
Lateral play between driving boxes and wheel hubs = (See Sup. 8)
Driving Boxes Steeled cast iron
Journals, Diam. 7½" Length 8"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing
To swing 5½" each side of cen., Cen. pin liners None
Journals, Diam. 4½" Length 7½" Boxes Cast Iron
Wheel hub liners None
Wheels, Diam. 28" Tread --- Kind Cast Iron Plate Centers
Tires Steel Cen. diam. 23" Size 2½" x 5½"
Tires held by Shrinkage and shoulder

Back Engine Truck Two Wheeled Swing bolster, side bearing
To swing 6½" each side of cen., Cen. pin liners None
Journals, Diam. 4½" Length 7½" Boxes Cast Iron
Wheel hub liners None
Wheels, Diam. 28" Tread --- Kind Cast Iron Plate Centers
Tires Steel Cen. diam. 23" Size 2½" x 5½"
Tires held by Shrinkage and shoulder.

Brake, position On all driving and tender wheels
Operating Parts { Engine, sch. No. 6-ET Westinghouse combined auto. and straight air / Eng. Tr'k, sch. -- }
Foundation Parts { Drivers, sch. WN-1-BC American O. S. Equalized. / Eng. Tr'k, sch. --- }
Air pump One 9½" Pos. Left Side
Train connections Front and Back
Train signal, sch. None
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1728
Weight, with fuel and water, about 142,000 pounds
Tender to be weighed: Yes
Tank 6,000 Gallons, Bill 5858
Tank rectangular shape. Fuel capacity, 10 cords.

Tool Boxes of wood, top.

Frame Steel, 13" channels with front and back bumpers of cast steel.
Front Drawbar height 32⅜"
Pilot Steel, at rear
Back drawhead, center above rail 33½"
Coupler M.C.B. full-size auto., with Westinghouse Type "D" 3 friction draft gear, and with slotted knuckle.

Steps Hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type, with bolsters of cast steel.

Springs Elliptic, B. L. W.
Journals, Diam. 5½" Length 10"
Wheels, Diam. 33" Tread --- Kind Cast Iron Plate Centers
Tires Steel Cen. diam. 28" Size 2½" x 5½"
Tires held by Shrinkage and shoulder.
Safety chains Single

Brake Position On all wheels
Brake sch. No. 6-ET Westinghouse Automatic and Straight Air, with 12" x 12" tender brake cylinder.

List of tools, sch. 156
Photo sch. No. 2 Inspection B. L. W.
To be weighed Yes Material specns B. L. W.
Certificate of boiler test Three copies B. L. W. form 1036.
Junior laws to 8-12-22 Shipment On own wheels

Brass shop finish, No 1
Machine shop finish D-165

B. L. W. Patents Stack "Patent applied for"

Property plates B. L. W., for engine and tender.

Painting, style 291, Olive green and aluminum

Mark on tank sides: FERROCARRIL MEXICANO DEL PACIFICO

Road Nos. Pos. Road Nos. Name None
F. No. Plate 4
F. Sand Box
Cab Sides
Back of Tank

Actual Dimensions of Loco. Width over cab handles 10' 2" Extreme height over all 14' 3"
Extreme Width: Cab boards 9' 7" Cylinders or valve motion 9' 2"
Length outside face front bumper of engine to face of tender wedge 32' 9⅜"
Length face of tender wedge to outside face back bumper of tender 40' 9½"
Total length outside face front bumper of engine to outside face back bumper of tender 73' 7⅞"

SPECIFICATION FOR LOCOMOTIVES 12 28 ♯ E 22

FOR UNITED SUGAR COMPANIES, S. A., LOS COCHIS, SINOLA.

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1 COMPANY'S TRACK IS NOT BALLASTED, AND TIES ARE LAID ON DIRT FILL.

2 ALL OPENINGS AROUND FIRE BOX TO BE CAREFULLY SCREENED TO MINIMIZE FIRE RISK.

3 SUPERHEATER AS THE SUPERHEATER CO'S. SPECN. NO.O-18408, DATED 5-6-22 (COPY ATTACHED)
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO STEAM CHESTS.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

4 PATENT PLATE (FROM STOCK) FROM THE SUPERHEATER CO., COVERING THE SUPERHEATER DAMPER CYLINDER TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

5 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF THE SUPERHEATER.

6 SYPHON UNDER CAB BOARD ON LEFT SIDE, WITH PIPE CONNECTION TO TANK, AND WITH 25 FEET OF WIRE-BOUND SUCTION HOSE WITH STRAINER.

7 DRAFT GEAR AT FRONT TO BE GOULD SELF CONTAINED FRICTION GEAR COMPLETE, INCLUDING COUPLER AND PILOT BEAM, SIMILAR TO GOULD CO'S. PRINT LE-401.

8 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 7/32" TOTAL.

9 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 5/16" TOTAL.

10 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 5/16" TOTAL.

TENDER

26 TENDER TO BE 40 FEET LONG FROM FACE TO FACE OF BUMPERS, WITH FLOOR OF STEEL. A RECTANGULAR SHAPED TANK WITH A CAPACITY OF 6,000 GALLONS PLACED AT REAR OF TENDER, WITH A STEEL WOOD RACK AROUND TANK. A WOOD RACK IN FRONT OF TANK TO BE MADE OF STEEL WITH SIDE STAKES AMPLY STRONG AND SIDE SLATS, PARTICULARLY WITHIN TWO OR THREE FEET OF THE FLOOR, SPACED FAR ENOUGH APART SO THAT WOOD UP TO 12" IN DIAMETER CAN BE LOADED BY PASSING THRU THE SLATS.
SLIDING DOORS, APPROXIMATELY 2' 0" LONG BY 3' 0" ON EACH SIDE OF WOOD RACK, LOCATED ABOUT TWO-THIRDS OF THE DISTANCE FROM FRONT OF TANK.

27 WATER TANK TO HAVE ONE 1" AND ONE 2½" GATE VALVE ON EACH SIDE AND NEAR BOTTOM OF TANK, FOR USE IN WATERING MEN AND CAMPS, AND ALSO IN CASE OF FIRE.

28 SYPHON CONNECTION TO TANK ON LEFT SIDE.

29 BASKET TO BE PROVIDED ALONGSIDE TENDER FOR CARRYING SYPHON SUCTION HOSE, INSTEAD OF HOOKS GENERALLY APPLIED. THIS BASKET TO CONSIST OF THREE STRIPS OF 1" OR 1½" BAR IRON FASTENED TO THE USUAL CARRYING IRONS FOR THE HOSE, THEREBY FORMING A BASKET.

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SPECIFICATION FOR LOCOMOTIVES 12 28 ♯ E 22

FOR UNITED SUGAR COMPANIES, S. A.

Specification for Type A Double Loop Superheater SPECN. O-18408 DATED MAY 26, 1922.

BOILER TUBES	2½ in number 2" o. d. 13 ft. 2 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	18 in number 5½" o. d. #9 B.W.G. thick of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 Card	1713-M
BOILER FLUE SETTING	⅛ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and pressured except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections Card	1136
TUBE SHEET LAYOUT	Card	3-5093?
UNITS	18 units 1½" o. d. #9 B. W. G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide Card	10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints Card	1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A Card	1084-M
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls Card	A.H.M. 3 x 6 11129-D
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place Card	1323
STEAM PIPE JOINT RINGS	Of cast iron. Card	SEE ANNEX.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units Card	
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing Card	4L-11436A 1067
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer Card	NONE
PYROMETER	Model No. Pyrometer Card	
PYROMETER ARRANGEMENT	Generally in accordance with Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration Card	4L-40904A
S. H. ARRANGEMENT	In accordance with	
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card	2-11649	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card	1065-A	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card	11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card	11114	S. H. PIPE END	Card 1344
DAMPER CYCL. PIPE CONNECTION	Card	1L-11437	S. H. PIPE BAND	Card 1888
DAMPER CYL. PIPING DIAGRAM	Card	3-11440	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	11073-C	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card	1068-H	RETURN BENDS	Card 3023
DAMPER SHAFT ARM	Card	1074-C	LUBRICATOR CONNECTION	Card 1487
DAMPER SHAFT BEARING O. S.	Card	2-11627-D	DEFLECTING PLATE HANDLE	Card 10809
DAMPER SHAFT BEARING I. S.	Card	10386-N	DEFLECTING PLATE STUDS	Card 10809-A
DAMPER SHAFT LINK	Card	11177-L	DEFLECTING PLATE CLAMP	
PATENT PLATE	Card	3-3387-A		
DAMPER RIGGING CARD		2-11473-F		

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-?106. (See sup. 41)

Memorandum Spec'n 21021.

SPECIFICATION FOR LOCOMOTIVES 10 38 E 3727 to 3737. Gen. as Photo. 5081.

FOR Mexican Railway. Engine Drawing No. 114.

Mex. Mexico. 5-23-21.

Gauge of Road 4' 8½" Play ⅜"
Wheelbase, Rigid 14' 3" Driving 14' 3" Total 23' 4"
Total wheelbase, eng. and tend. {Actual 56' 0" / Limited to ----

Curves and grades. (See sup. 2)

Limits, Height (See sup. 1) Width (See sup. 1)
Weight (approximate) in working order, Total 193,000 pounds.
On F. tr'k 22,000 lbs., Drivers 171,000 lbs., B. tr'k ---- lbs.
Weight of engine, empty, about 172,500 pounds.
Tractive power 43,000 lbs., Ratio of adhesion 3.98
Work'g St'm Pres. 190 lbs., Service Freight.
Fuel Oil, (See sup. 4. 10)

Boiler Steel. Thick ¾" Bill 9420
Front Tube Sheet 9/16" Thick
Boiler, Diam. 76" Plan Straight top.
Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.
With Factor of Safety of 4.88 267 lbs. water pres.
Longitud. seams (See sup. 5)

6. **Dome,** diam. 33" Pos. Central.

Firebox Steel. Combustion chamb. None.
Firebox, length 108⅛" Width 66⅛" Depth F. 71⅞" B. 59⅜"
9. Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"
Firedoor opening Oval, 15" x 20". Crown and sides in one sheet.
Water space, Front 4" Sides 4" Back 4"
Water space frame Double Riveted
7. Water space stays ⅞" diam. with 3/16" holes 1½" deep from O.S.
8. Radial stays 1" Diam. Sling stays front {Three rows B. L. W. / Expansion stays.
Button heads below crown on ←→ central rows (See sup. 8)
Crown bars None. Placed --- above crown
Crown bolts ---

Flues No. 9 B. W. G. Seamless steel.
Tubes No. 12 B. W. G. Seamless steel.
9. Tube ends Beaded for copper ferrules, fire box ends.
Number {32 / 226} Diam. {5⅜" / 2"} Length 13' 10"

Heating Surface {Flues 619 sq. ft. / Tubes 1627 sq. ft.} Combus. Chamb. --- Total 2425 sq. ft.
Fire Box 179 sq. ft. Fire Brick Tubes ---
Grate area 49.5 sq. ft. Ratio to Heating Surface 1: 49.
Superheater 511 sq. ft.

Fire Brick Arch, None.
10. Fire box lined with fire brick, for oil burning.
Fire brick pavement in pan.
Grates None.
Ash Pan, Dampers Front only.

Throttle to have auxiliary drifting valve.

Throttle Chambers balance. Pos. Dome.
Dry pipe Steel.

Superheater Schmidt type, (See sup. 11 etc)

Smoke box to have short extension.
Smokebox extension Short 13. Cleaning hole and cap None.
Spark ejector or hopper None.
Superheater
Setting of connect. plates With.

Exhaust nozzles Double low.
Cleaning pipe, with.
Stack Straight. Dia. 18"

Safety Valves Two Coale 3½" Open. (Mch. Spce)
Safety valves None. with relief lever. Set to 190 pounds.
Whistle One three-chamber chime.

Steam Gauge One Iron 7" from Crosby Gauge Co. (Spce)
Steam gauge stand Iron. **Clock** None.

14. **Water Gauge** One B.L.W. Ironclad. 16. **Cab Lamps** Electric.
Gauge Cocks Three Back. (Sup. 15) Surface valve None.
Lowest gauge cock 5½" above highest part of crown
Lubricator steam valve to have separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock Two Johnstone 2" Pos: Right and left.
Cleaning Plugs One plug above fire door.
Firebox, Corners diagonal, sides and front and back.
Crown, three each side and three back.
Waist, one under front.
Front tube sheet, One Fusible plug One,
Pressed steel collars riveted to jacket around cleaning holes.

Pump None.

Injectors Two Sellers, Class "N" (Spce) No. 10½
Injectors, Pos. Right and left. Steam pipes Copper.
Pipes, Check Copper. Feed Copper. Overflow Iron.
Check Sellers, combined ←— check and stop valve. Pos: R. & L.

Steam Heat None.

17. **Cab** Steel, not lined.
Crystal plate glass cab windows.

Cab boards Steel. Nosing T-Iron.
Running boards Steel. Nosing T-Iron.
Hand rail Iron. Located on Boiler.

18. **Back Bumper** Bar steel. Back drawbar height 34"

20. **Pilot** Wood.
Front Bumper Cast steel. Bumper plate With.
3. **Steps** and hand holds to conform to I. C. C. requirements.

Front Drawhead, Center above rail 34"
3. **Coupler** Pitt, pivoted M. C. B. Automatic.

Signal fixtures Iron on bumper.

21. **Headlight** One round case 18" Reflector,
Headlight, Nos. on sides With. H'd'l't step With.
Lamp shelf None. Nosing ---

Bell 92 pounds. Gollmar air bell ringer.
Sand Box One Diam. 31" Body Iron painted. Pipes Iron.
(Mch. Spce) Sander Leach air, trap A-10, to sand front of forward and back of main drivers.
Dome casing Iron painted.

Boiler Jacket #18 Soft steel ptd. Bands Iron. Style 9 and 14.
Boiler Lagging Magnesia sectional, (See sup. 26)
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

C. H. C. Kalbach June 1921. 388

SPECIFICATION FOR LOCOMOTIVES 10 38 E 3727 to 3737.

FOR Mexican Railway. 390

Mex.

Frames Cast steel.

Cylinders, Diam. 22" Stroke 28"
St'm ports, Length 31" Width 1½" Bridges ---
Exh. ports, Length --- Width --- Valve lead 3/16"
Valve travel 5½" Steam lap 1" Exhaust clearance ---
Eccentric crank throw 14-3/16" By-pass valve None.
S. F. Lubr. Detroit five feed No. 42 Bull's eye. (Mch. Spce)
2. Cyl'r heads Cast steel. Lubr. pipes of copper O.S. of jacket.
Cyl'r casings Iron painted. Head covers Steel painted.
St'm chest casings ---- Covers ----
St'm chest valves 14" diam., piston type, inside admission.
Met. pkg. {Piston rods / Valve stems} United States, King type. (Mch. Spce)
Piston rods to be keyed to crossheads.
Pistons Heads of cast iron, rings of cast iron sprung in.
Guides Alligator type, steel. Oil cups Needle.
Crossheads Cast steel, with bearings of cast iron, tinned.
Wrist Pins Steel. Rod cups Plunger, forged on.
Parallel rods to have solid ends.

Valve Motion Walschaerts.
Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.
Driving wheel hub liners Bronze, on face of box next to wheel.
Drivers, O. S. Diam. 51" Cen. diam. 14", centers cast steel.

28. **Tires** Steel. Held by Shrinkage and shoulder.
Tires, Flanged, Pos. Front and back. Size 3½" x 5½"
Tires, Plain, Pos. Intermediate. Size 3½" x 6½"
Lateral play between driving boxes and wheel hubs = (See sup. 29)
Driving Boxes Cast steel.
Journals, Diam {Main, 9½" / Others, 9"} Length 12"

Springs. Make Standard Steel Works.

Front Engine Truck Two Wheeled Swing bolster, center bearing.
30. To swing 38" each side of cen., Cen. pin liners None.
Journals, Diam. 6" Length 10" Boxes Cast Iron.
Wheel hub liners Bronze, on face of box next to hub of wheel.
31. Wheels, Diam. 30" Tread --- Kind Cast steel spoke center.
Tires Steel. Cen. diam. 25" Size 2½" x 5½"
Tires held by Shrinkage and shoulder.

Back Engine Truck None. Wheeled ---
To swing --- each side of cen., Cen. pin liners ----
Journals, Diam. ---- Length ---- Boxes ----
Wheel hub liners ----
Wheels, Diam. ---- Tread ---- Kind ----
Tires ---- Cen. diam. ---- Size ----
Tires held by ----

Brake, position On all driving and tender wheels.
32. Operating Parts / Engine, sch. No. 6 ET. Westg. combined auto. and straight air.
Eng. Tr'k, sch. ----
Foundation Parts / Drivers, sch. WN-2, American outside equalized.
Eng. Tr'k, sch. ----
Air pump One 9½" Pos. Left side.
Train connections Front and back.
Train signal, sch. None.
Air reservoirs to have hydrostatic test of 210 pounds.

W. **Tender** Eight Wheeled. Drawing No. 1673. {Weight empty
Weight, with fuel and water, about 120,000 lbs. {about 59,000 lbs.
Tank {Oil,, 2500 U.S. 5639 / Water, 6000 U.S. Gallons. Bill 5640} {Tender to be w / weighed: Yes
Tank "U" shape, straight top.

Tool Boxes Steel, top.
Tender floor of steel.
Frame Steel, 12" channels, with front and back bumpers of cast steel.
Front Drawbar height 34½"
Pilot None.
Back drawhead, center above rail 34½"
Coupler Pitt M. C. B. Automatic with Bradford Rocker draft gear.
Steps and hand holds to conform to I. C. C. requirements.

Trucks Andrews steel side frames, with bolsters of cast steel.
Both trucks to have side bearings.
Springs Elliptic, Make: Standard Steel Works.
W. Journals, Diam. 5½" Length 10"
Wheels, Diam. 33" Tread 4⅛" Kind Davis cast steel.
Tires None. Cen. diam. ---- Size ----
Tires held by ----
Safety chains Single.

Brake Position On all wheels.
Brake sch. No. 6 ET. Westg. auto. and straight air, with 12" x 12" tender brake cylinder.

Do not fail to get photograph.
List of tools, sch. 160. Two traversing jacks.
* Photo sch. No. 2. Inspection B. L. W.
To be weighed Yes. Material specifns B. L. W.
Certificate of boiler test Three copies B. L. W. form 1036.
Junior laws to 6-1-21. Shipment On own wheels.

Brass shop finish, No. 1.
Machine shop finish D-165.

Trademarks B. L. W. {Patents None.

Property plates B. L. W., for engine and tender, for 3727 to 3736 only.
Property Plates: None, for 10 38 E 3737 only.

Painting, style --- Black, no striping.
Lettering and road numbers painted in yellow, as Ry. Co's prints 7141 and 72116.
Mark on tank sides:- {Mexicano for 3727 to 3736 / C. I. V. for 10 38 E 3737}

Road Nos. Pos. Road Nos. Name None.
F. No. Plate. 200 to 209, for 3727 to 3736.
Sand box. 1 for 10 38 E 3737.
Cab sides.

Actual Dimensions of Loco. Extreme height over all 14' 8"
Extreme Width: Cab boards 10' 3" Cylinders ~~valve motion~~ 10' 3"
Length outside face front bumper of engine to face of tender wedge 36' 0⅝"
Length face of tender wedge to outside face back bumper of tender 26' 6½"
Total length outside face front bumper of engine to outside face back bumper of tender 62' 7½"

SPECIFICATION FOR LOCOMOTIVES:- 10 38 E 3727 TO 3737.

FOR:- MEXICAN RAILWAY.
HNW.

1 CLEARANCES AS B. L. W. DIAGRAM 44532, EXCEPT WIDTH ACROSS CYLINDERS MAY BE 9' 10" AT CENTER OF CYLINDER BARREL, AND 10' 3" AT WIDEST POINT.

2 GRADES RUN AS HIGH AS 4¼%, BUT COMPANY CONSIDERS THE WORST AS ONE OF 3% IN COMBINATION WITH A CURVE 100 METERS RADIUS, UNCOMPENSATED AND IN A TUNNEL.

3 LOCOMOTIVE TO CONFORM TO ALL I. C. C. REQUIREMENTS.

4 FUEL OIL GRAVITY SAME AS FOR 12 34 & E 50 TO 54.

5 LONGITUDINAL SEAMS TO BE BUTT JOINTED, WITH DOUBLE COVERING STRIPS, SEXTUPLE RIVETED, 90% SEAMS.

6 MAIN DOME, ONE-PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

7 FLEXIBLE STAYBOLTS ABOUT 350 (TATE) IN BREAKING ZONES.
HOLLOW STAYBOLTS BEHIND BRICK WORK.

8 CROWN STAYS TO BE B. L. W. REGULAR FOR OIL FUEL.

9 TUBES AND FLUES TO BE WELDED TO FIRE BOX TUBE SHEET.

10 OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH BURNER IN FRONT END OF FIRE BOX. OIL BURNER TO BE RY. CO'S STANDARD AS PRINT 210. THIS BURNER IS MODIFICATION OF THE BOOTH BURNER. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.
OIL AND STEAM CONNECTIONS BETWEEN ENGINEAND TENDER TO BE BARCO FLEXIBLE JOINTS.

11 SUPERHEATER AS THE SUPERHEATER CO'S SPECIFICATION NO. O-16281, DATED 5-27-21, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY PAYABLE BY THE B. L. W.
SUPERHEATER HEADERS TO BE MADE BY THE B. L. W. AT EDDYSTONE FOR 3733 TO 3737 ONLY.

12 PATENT PLATES (HEREWITH) FROM THE SUPERHEATER CO. COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

13 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

14 WATER GAUGE TO BE B. L. W. STANDARD SAFETY GLASS, WITH O'MALLEY-BEARE PERFECTION DRAIN VALVE.

15 GAUGE COCKS TO BE O'MALLEY-BEARE.

16 CAB TO HAVE USUAL LIGHTS WITH ONE LIGHT LOCATED AT REAR OF CAB ROOF FOR INSPECTION OF OIL GAUGE, ETC.

17 BREATHER PIPE ARRANGEMENT TO BE APPLIED IN CAB SAME AS FOR 10 48 E 1 TO 40.

18 DECK AND BUFFER CASTING BETWEEN ENGINE AND TENDER TO BE OF CAST STEEL.

19 B.L.W. SPRING BUFFER BETWEEN ENGINE AND TENDER.

20 BOTTOM OF PILOT TO BE NOT LESS THAN 6" FROM TOP OF RAIL FOR 10 38 E 3728 TO 3737.

21 HEADLIGHT EQUIPMENT TO BE SUNBEAM ELECTRIC TYPE RE-3, WITH INCANDESCENT HEADLIGHTS.

26 BOILER LAGGING FROM JOHNS-MANVILLE CO.

27 CYLINDER HEAD STUDS TO BE NICKED.

28 DRIVING TIRES FROM STANDARD STEEL WORKS.

29 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN PEDESTAL FITS, 7/32" TOTAL.

30 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING PLAY IN PEDESTAL FITS, 9/32" TOTAL.

31 ENGINE TRUCK WHEELS FROM STANDARD STEEL WORKS.

32 LECHATELIER BRAKE, VALVE ON LINE OF LOWER GAUGE COCK.

FOR HEREAFTER:- HOLE IN TOP OF DOME TO BE LARGER; HOLE IN BOILER UNDER DOME TO BE LARGER; THROTTLE TO BE LOCATED SO THAT THE BOILER MAY BE ENTERED WITHOUT REMOVING THROTTLE.

TENDER.

41 TENDER TO BE EXACT DUPLICATE OF FIVE TENDERS BUILDING ON EXTRA ORDER NO. 7035, DATED MARCH, 15TH, 1921, EXCEPT WHERE OTHERWISE SPECIFIED.

42 BUFFER CASTING BETWEEN ENGINE AND TENDER OF CAST STEEL.

43 B.L.W. SPRING BUFFER BETWEEN ENGINE AND TENDER.

44 TENDER TO CONFORM TO ALL I. C. C. REQUIREMENTS.

45 McCORD TENDER JOURNAL BOXES.

46 TENDER BRAKE BEAMS:- ACME 6" BRAKE BEAMS, 14¾ POUNDS PER FOOT, AND WITH CHRISTIE HEADS AND STEEL FULCRUMS.

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SPECIFICATION FOR LOCOMOTIVES 10 38 E 3727 TO 3737

FOR:- THE MEXICAN RAILWAY

Specification for Type A Double Loop Superheater SPECN. NO. 16281, DATED MAY 27TH, 1921.

BOILER TUBES	226 ...in number.....2.....o. d.....13.....ft.....10.....in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	32 ...in number.....2".....o. d. #9 BWG .....of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18	Card 1197-S
BOILER FLUE SETTING	¼ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prosserted except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections	Card 1136
TUBE SHEET LAYOUT		Card 5214
UNITS	32 ....units.....12.....o. d.....#9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 1043
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 10695
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casing should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls.	AT 4x8 Card 10984-A
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card 1998
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	Card 4-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card 1067
PYROMETER	Model No..... Pyrometer	Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 4195-A
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card	1982-E	S. H. UNIT BOLT WASHER	Card	1071
DAMPER CYL. ARM	Card	1074	S. H. UNIT CLAMP	Card	1073
DAMPER CYL. PIPE FITTING	Card	11115	S. H. UNIT CLAMP WASHER	Card	10305
DAMPER CYL. PIPE UNION	Card	11114	S. H. PIPE END	Card	1944
DAMPER CYCL. PIPECONNECTION	Card	1L-11437	S. H. PIPE BAND	Card	1988
DAMPER CYL. PIPING DIAGRAM	Card	2L-11442	SPACING OF BANDS & SUPPORTS	Card	10759
DAMPER CYL. SUPPORT	Card		TYPE OF RETURN BENDS		FORGED
DAMPER SHAFT	Card	1068	RETURN BENDS	Card	11022
DAMPER SHAFT ARM	Card	1055	LUBRICATOR CONNECTION	Card	3023
DAMPER SHAFT BEARING (O. S.)	Card	1148	DEFLECTING PLATE HANDLE	Card	11487
DAMPER SHAFT BEARING (I.S.)	Card	1275-D	DEFLECTING PLATE STUDS	Card	10809
DAMPER SHAFT LINK	Card	1070	DEFLECTING PLATE CLAMP	Card	10809-A
PATENT PLATE	Card	3367			

THE BALDWIN LOCOMOTIVE WORKS As Spec'n. C-7100

Memorandum Spec'n 21026

SPECIFICATION FOR LOCOMOTIVES 10 30 E 180 to 199

FOR National Railways of Mexico, Mexico

8-15-21

Ry. Co's Class G-033

Gen. as Photo. 2310 { Except to be "Bob-tailed" back.

Engine Drawing No. 30

1. **Gauge of Road** 3' 0" Play 3/8", except 3/4" for F. & B. drivers.
Wheelbase, Rigid 11' 6" Driving 11' 6" Total 18' 11"
Total wheelbase, eng. and tend. { Actual. 47' 0 1/4" / Limited to ---

Curves 13 degrees 40 minutes, Metric.
Grades 4.53%.

Limits, Height (See Sup. 2) Width (See Sup. 2)
Weight (approximate) in working order, Total 110265 pounds
On F. tr'k 11,000 lbs., Drivers 99265 lbs., B. tr'k --- lbs.

Tractive power (Sup. 7) lbs., Ratio of adhesion (See Sup. 7)
Work'g St'm Pres. 180 lbs., Service Freight
Fuel Oil

8. **Boiler** Steel Thick 11/16" Bill 9461
Front Tube Sheet 1/2" Thick
Boiler, Diam. 60" Plan Straight top
{ Allowable st'm pres. 180 lbs. **Tested to** { 200 lbs. steam pres. / With Factor of Safety of 5.81 { 240 lbs. water pres.
Longitud. seams Butt jointed, with double covering strips

15. **Dome,** diam. 29" Pos. Central
Auxiliary Dome: None

10. **Firebox** Steel Combustion chamb. None
Firebox, length 53-15/16" Width 42 3/8" Depth F. 58" B. 47 1/2"
9. Firebox, Tube 1/2" Crown 3/8" Sides 3/8" Back 5/16"
Firedoor opening 16" diam. Crown and sides in one sheet.
Water space, Front 3 1/2" Sides 2 1/2" Back 2 1/2"
Water space frame Single Riveted
Water space stays 7/8" diam. with 3/16" holes 1 1/2" deep from O. S.
All staybolts of Rome Superior Iron. Two Rods B. L. W.
Radial stays 1" diam. Sling stays front Expansion Stays
Button heads below crown on None central rows
Crown bars None Placed --- above crown
Crown bolts ---

Flues ---
Tubes No. 12 B. W. G. Parkesburg Charcoal Iron
Tube ends Swaged for copper ferrules, fire box ends
Number 180 Diam. 2 1/4" Length 15' 0"
All tubes to be welded to fire box tube sheet.

Heating { Flues --- Combus. Chamb. --- Total 1661 sq. ft.
Surface { Tubes 1582 sq. ft. Fire Box 79 sq. ft. Fire Brick Tubes ---
Grate area 18.7 sq. ft. Ratio to Heating Surface 1: 88.8
Superheater ---

Fire Brick Arch, None
10. Fire box lined with fire brick, for oil burning
Fire brick pavement in pan.
Grates None
Ash Pan, Dampers Front
Pan to have hopper bottom for oil burning.

Throttle Balance Pos. Dome
Dry pipe Steel

Superheater None
Smoke box front and door of cast iron.
Smoke box to have short extension
Smokebox extension Short Cleaning hole and cap None
Spark ejector or hopper None
Netting and deflect. plates None

Exhaust nozzles Double, Low
Cleaning pipe, With
Stack Cast Iron, Straight Dia. 16"

15. **Safety Valves** Two Consolidated 2" Open (Spec.)
Safety valves None with relief lever, Set to 180 pounds
15. **Whistle** One B. L. W. Plain

Steam Gauge One Brass 7" Maker: Ashcroft (Spec.)
Steam gauge stand Brass **Clock** None

Water Gauge One Reflex **Cab Lamps** Electric
Gauge Cocks Three R. S. Surface valve None
Lowest gauge cock 4" above highest part of crown
Lubricator steam valve without separate dry pipe to dome
Blower Valve B. L. W.

Blow off Cock Two Everlasting 1 1/2" Pos: R. and L.
16. **Cleaning Plugs**
Firebox, Corners diagonal, and front
Crown, Two each side and two back.
Waist, Two under, one front and one back
Front tube sheet, One Fusible plug One
Pressed steel collars riveted to jacket around cleaning holes.

Pump None

(Spec.)
Injectors Two Nathan type "MF" Nonlifting No. 8
Injectors, Pos. Right and Left Steam pipes Copper
Pipes, Check Copper Feed Copper Overflow Iron
Check Nathan 1 1/2" Type 280-A with stop valve. Pos: R. and L.

Steam Heat None

Cab Steel plate (See Sup. 17) Ventilator in cab roof.

Cab boards to be covered with wood
Cab boards Steel Nosing T-Iron
Running boards Steel Nosing T-Iron
Hand rail Iron Located on Boiler

18. **Back Bumper** Bar Steel Back drawbar height 25 1/4"

Pilot Steel Sections
Front Bumper Cast Steel Bumper plate With
Steps Front of bumper at ends

Front Drawhead, Center above rail 28"
Coupler M. C. B. Automatic from American Steel Foundries, with coupler pocket from National Malleable Castings Company.

19. Signal fixtures Iron on bumper
Headlight and equipment to be Pyle National Electric, Type K-2 with incandescent headlight.
Headlight One Round Case 18" Reflector.
Headlight, Nos. on sides With H'dl't step With
Lamp shelf None Nosing ---

Bell 85 pounds
(Spec.) **Sand Box** One Diam. 31" Body Iron painted Pipes Iron
Sander Graham White Double, Air, to deliver to front of front drivers and to back of main drivers.
Dome casing Iron painted

Boiler Jacket #18 Soft Steel ptd. Bands Iron Style 9 and 14
Boiler Lagging Magnesia Sectional
Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

L. G. Dandy

SPECIFICATION FOR LOCOMOTIVES 10 30 E 180 Oct. 1921. to 199.

FOR The National Railways of Mexico

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1. 20 **Frames** Cast Steel, outside of wheels

Cylinders, Diam. 18" Stroke 22"
St'm ports, Length 16" Width 1 1/2" Bridges 1"
Exh. ports, Length 16" Width 2 1/2" Valve lead 1/8"
Valve travel 4 3/8" Steam lap 3/4" Exhaust clearance ---
21. Eccentric crank throw 11 1/2" By-pass valve None
S. F. Lubr. Nathan Triple No. 9 Bulls Eye (Spec.)
Cyl'r heads Cast Iron Lubr. pipes of copper under jacket
Cyl'r casings Iron painted Head covers Steel painted
St'm chest casings Iron painted Covers Steel painted
St'm chest valves Balanced, with vacuum valves
Met. pkg. { Piston rods / Valve stems } United States, King Type (Spec.)
Piston rods to be keyed to crossheads
Pistons Heads of cast iron, rings of cast iron sprung in.
Guides Alligator type, Steel Oil cups Needle
Crossheads Cast Steel, with bearings of cast iron, tinned.
Wrist Pins Steel Rod cups For Grease
Parallel rods to have solid ends.

Valve Motion Walschaerts
Links, sliding blocks, pins, fitting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.
All finished movable nuts of steel or of iron case hardened.
Five Gallons Locoline Engine Oil Specn. "P"
Five Gallons Locoline Valve Oil Specn. "R"
Wearing Bearings "V in"
Driving wheel hub liners None
Drivers, O. S. Diam. 41" Cen. diam. 35" Centers cast iron.
Driving tires from Standard Steel Work.
Tires Steel (Sup. Held by Shrinkage and shoulder
Tires, Flanged, Pos. All Size 3" x 5 1/2"
Tires, Plain, Pos. None Size ---
Lateral play between driving boxes and wheel hubs = (See Sup. 22)
Driving Boxes Steeled cast iron
Journals, Diam. 7 1/2" Length 7"

Springs. Make B. L. W.
Engine truck frame of wrought steel.
Front Engine Truck Two Wheeled Swing bolster, center bearing
23. To swing 3 1/16 each side of cen., Cen. pin liners None
Journals, Diam. 4 1/2" Length 8" Boxes Cast Iron
Wheel hub liners Bronze, on face of box next to wheel
★ Wheels, Diam. 24" Tread --- Kind Rolled Steel
Tires None Cen. diam. --- Size ---
Tires held by --- Wheel rims 2 1/2" thk. x 5 1/2" wide.
★ Engine truck wheels from Standard Steel Works.
Back Engine Truck None Wheeled ---
To swing --- each side of cen., Cen. pin liners ---
Journals, Diam. --- Length --- Boxes ---
Wheel hub liners ---
Wheels, Diam. --- Tread --- Kind ---
Tires --- Cen. diam. --- Size ---
Tires held by ---

Brake, position On all driving and tender wheels
24. Operating { Engine, sch. No. 6-ET Westg. Combined Auto and / Parts { Eng. Tr'k, sch. --- Straight Air
25. Foundation { Drivers, sch. WN-1 8C American O. S. Equalized / Parts { Eng. Tr'k, sch. ---
25 Air pump Two 9 1/2" Pos. Both L. S.
Train connections Front and Back
Train signal, sch. "L"
Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1685
Weight, with fuel and water, about 72,000 pounds. { Tender to be weighed: Yes
10. **Tank** { Oil 1511 5701
21. { Water 3600 Gallons. Bill 5700
Tank "U" shape, straight top.

Tool Boxes Iron, built in tank.

Frame Steel, 6" and 8" channels, with front bumper of wood and back bumper of cast steel.
Front Drawbar height 25 3/4"
Pilot None
Back drawhead, center above rail 28"
Coupler M. C. B. Auto. from American Steel Foundries, with Bradford Draft Gear, with Farlow Attachments.

Steps Front and Back

Trucks Andrews Cast Steel Side Frames, with bolsters of cast steel.
Springs Elliptic, B. L. W. make
Journals, Diam. 4 1/2" Length 8"
Wheels, Diam. 30" Tread --- Kind Rolled Steel (Sup. 36)
Tires None Cen. diam. --- Size ---
Tires held by --- Wheel rims 2 1/2" thick x 5 1/2" wide.
Safety chains Single

Brake Position On all wheels
Brake sch. No. 6-ET Westinghouse Auto. and Straight Air, with 10" x 12" tender brake cylinder.

List of tools, sch. #166, except omit packing list case (See Sup. 6)
Photo sch. No. 2 Inspection (See Sup. 4)
To be weighed Yes Material specifns (See Sup. 3)
Certificate of boiler test Three copies B. L. W. form 1036
Junior laws to 8-22-21 Shipment (See Sup. 5)

Brass shop finish, No. 1
Machine shop finish D-165

B. L. W. Patents { Engine Truck, No. 952402, Patd. March 15, 1910 (brass plate)

Property plates B. L. W., for engine and tender

Painting, style --- Olive Green, No Striping
Lettering to be Ry. Co's. standard in aluminum leaf.
Classification mark on cab sides: Clase G-033
Mark on tank sides N. de M.
Mark on back of tank { Capacidad / Agua 13630 Litros. / Aceite 5720 Litros.
Road Nos. Pos. Road Nos Name None
F. No. Plate 187 to 206
Sand Box
Cab Sides
Back of tender frame
Actual Dimensions of Loco. Extreme height over all 12' 9 1/2"
Extreme Width: Cab boards 9' 3" ; Cylinders ~~or valve motion~~ 9' 11"
Length outside face front bumper of engine to face of tender wedge 29' 10 3/8"
Length face of tender wedge to outside face back bumper of tender 22' 4 1/2"
Total length outside face front bumper of engine to outside face back bumper of tender 52' 3 1/4"

JANUARY 20, 1922

MR. GLAENZER:

IN ACCORDANCE WITH YOUR REQUEST, I CONSULTED WITH OUR ENGINEER, MR. J. J. PHILLIPS, WHO SUPERVISED THE RE-ERECTION OF THE CONSOLIDATION LOCOMOTIVES RECENTLY DELIVERED TO THE NATIONAL RAILWAYS OF MEXICO, OUR CLASS 10 30 E 180 TO 199.

HE ADVISES THAT AFTER THESE ENGINES WERE ACCEPTED AND PUT INTO SERVICE, THE RAILWAY COMPANY MADE THE FOLLOWING CHANGES, WHICH WE MIGHT WISH TO CONSIDER FOR ANY FURURE EQUIPMENT;

1. EXHAUST CHANGED TO HAVE SINGLE NOZZLE - 4½" DIAMETER, INSTEAD OF DOUBLE.

2. CLEANING PIPE CHANGED TO 10" DIAMETER INSTEAD OF 12".

3. FIRE PAN - HOPPER REMOVED FROM BOTTOM OF PAN AND A STRAIGHT PLATE APPLIED INSTEAD, AT A DISTANCE BELOW PAN EQUAL TO A DEPTH OF HOPPER. THIS PLATE WAS SUPPORTED BY STRAPS, FRONT AND BACK, FROM BOTTOM OF PAN, AND HAD EDGES FLANGED UP 1" HIGH. THIS PLATE WAS COVERED WITH A LAYER OF FIRE BRICK 1" THICK AND THE SIDES AND ENDS WERE LEFT OPEN.

4. THE AIR PUMP EXHAUST WAS REMOVED FROM INSIDE OF SMOKE BOX AND EXTENDED AROUND OUTSIDE AND UPWARD AT FRONT OF STACK.

5. FIRE DOOR WAS REPLACED BY A PLAIN CIRCULAR DOOR, WITH PEEP HOLE IN CENTER, BUT WITHOUT THE AIR INLET AND DAMPERS USUALLY APPLIED BY US.

6. BLOW-DOWN VALVE WAS APPLIED IN DOME CAP AT LEFT SIDE.

THESE ITEMS ARE FOR YOUR INFORMATION AND CONSIDERATION.

I QUESTION WHETHER WE WOULD WANT TO MAKE ALL OF THESE CHANGES, UNLESS THEY WERE SPECIALLY REQUESTED BY THE CUSTOMER, AS FOR EXAMPLE, ITEMS 3 OR 5.

PLEASE ADVISE WHETHER YOU WISH ME TO MAKE ANY FURTHER INVESTIGATION REGARDING THESE ITEMS.

J. HARRY STEPHAN

JHS: RTL

SPECIFICATION FOR LOCOMOTIVES 10 30 E 180 TO 199

FOR NATIONAL RAILWAYS OF MEXICO.

P

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1 LOCOMOTIVES TO BE SO CONSTRUCTED THAT THEY MAY READILY BE CHANGED TO OPERATE ON STANDARD GAUGE (4' 8½") TRACK. IF THE TRACK GAUGE IS INCREASED TO 4' 8½" AND FRAMES PLACED INSIDE THE WHEELS, LOCATE THE FRAMES 47½" FROM CENTER TO CENTER.

2. SMALLEST TUNNEL TO BE PASSED IS 3.50 METERS (11' 5⅞") WIDE AND 4.50 METERS (14' 9-3/16")HIGH.

3 THE PYHSICAL AND CHEMICAL PROPERTIES OF MATERIALS USED IN THE LOCOMOTIVES TO BE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE AMERICAN SOCIETY FOR TESTING MATERIALS AS FOLLOWS:-

——STEEL——

* A 10-16 STRUCTURAL STEEL FOR LOCOMOTIVES
A 18-18 CLASS A FORGINGS TO BE WELDED OR CASE HARDENED
A 20-16 CARBON STEEL FORGINGS FOR LOCOMOTIVES
A 21-18 CARBON STEEL TENDER AXLES
A 26-16 STEEL TIRES
* A 27-16 STEEL CASTINGS, CLASS B MEDIUM GRADE (SPECIAL REQUIREMENTS FOR CASTINGS FOR RAILWAY ROLLING STOCK).
* A-28-18 LAP WELDED AND SEAMLESS STEEL BOILER TUBES, BOILER FLUES AND SUPERHEATER PIPES, SAFE ENDS AND ARCH TUBES FOR LOCOMOTIVES
A 30-18 BOILER AND FIRE BOX STEEL
A 57-16 WROUGHT SOLID CARBON STEEL WHEELS FOR STEAM RAILWAY SERVICE
A 61-16 HELICAL SPRINGS FOR RAILWAYS
A 62-16 ELLIPTIC SPRINGS FOR RAILWAYS

——WROUGHT IRON——

A 38-18 LAP WELDED, CHARCOAL IRON BOILER TUBES, BOILER FLUES SAFE ENDS AND ARCH TUBES FOR LOCOMOTIVES
A 39-18 STAYBOLT IRON

——CAST IRON——

A 45-14 LOCOMOTIVE CYLINDERS (CAST IRON)
A 48-18 GRAY IRON CASTINGS

* THESE SPECIFICATIONS ARE TO INCLUDE THE MODIFICATIONS IN SULPHUR AND PHOSPHORUS AND MANGANESE LIMITS RECOMMENDED BY THE SOCIETY ON ACCOUNT OF THE WAR AND WILL APPLY UNTIL THE LIMITS SHOWN ON THE SPECIFICATIONS ARE RESTORED BY THE SOCIETY.

4- MATERIALS TO BE INSPECTED BY THE B. L. W.
CONSTRUCTION OF THE LOCOS. AT THE PLANTS TO BE INSPECTED BY R. W. HUNT & CO. SAME AS FOR 12 44 ½ E 127 TO 134.

5 SHIP ERECTED ON FLAT CAR FOR 10 30 E 180 TO 182.
SHIP ERECTED, BUT WITH CAB REMOVED AND BOXED IN ONE PIECE AND ALL SHIPPED BY WATER, FOR 10 30 E 183 TO 199.

6 TWO TRAVERSING JACKS.
TWO JOHNSON TYPE RE-RAILING FROGS.

7 TRACTIVE POWER AT .85 WORKING PRESSURE 26600 POUNDS, AND RATIO OF ADHESION 3.73.
TRACTIVE POWER AT .70 WORKING PRESSURE 21905 POUNDS, AND RATIO OF ADHESION 4.52.

8 BOILER SHELL THOROUGHLY REINFORCED AT OPENINGS.

9 FIRE BOX TUBE SHEET SEAMS TO BE WELDED ON FIRE SIDE ABOVE FIRE BRICK ONLY.

10 OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH VON BODEN INGLES BURNER PLACED IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.
OIL AND STEAM CONNECTIONS BETWEEN ENGINE AND TENDER TO HAVE BARCO FLEXIBLE JOINTS.

15 SAFETY VALVES AND WHISTLE IN TOP OF MAIN DOME.

16 WASHOUT PLUGS PROVIDED AT CORNERS, SIDES AND ENDS OF FIRE BOX, ABOVE CROWN SHEET AND FOR WASHING SHELL OF BOILER.

17 CAB TO BE LINED WITH WOOD THROUGHOUT, INCLUDING ROOF.
CAB GLASS MUST BE EQUAL TO QUALITY AND THICKNESS FURNISHED BY A. L. CO., I. E. AMERICAN DOUBLE "A".

18 FRANKLIN RADIAL BUFFER AND DRAW BAR (SINGLE) WITH SAFETY CHAINS, BETWEEN ENGINE AND TENDER.

19 CLASSIFICATION LAMP HOLDERS ON SIDES OF SMOKE BOX.

20 ENGINE FRAMES TO BE THOROUGHDY ANNEALED.

21 CYLINDERS TO HAVE U. S. GRAPHITE LUBRICATOR, DRY GRAPHITE AMORPHOUS.

22 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUB, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS 3/32" TOTAL.

23 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN PEDESTAL FITS 3/16" TOTAL.

24 LE CHATELIER BRAKE, WITH VALVE ON LINE OF LOWER GAUGE COCK.

25 ALL AIR BRAKE CONNECTIONS BETWEEN ENGINE AND TENDER TO HAVE BARCO FLEXIBLE JOINTS.
BRAKE PIPE FITTINGS TO BE WESTINGHOUSE.
AIR PUMPS TO HAVE WESTINGHOUSE NO. 5½ STRAINER.

26 DRIVER BRAKES TO BE BUSHED AND CASE HARDENED, SCH. BC.
* For Hereafter see note Jan 20, 20, from JNS to HG. — Copy attached

——TENDER——

31 TENDER TANK TO BE SO CONSTRUCTED THAT THE OIL TANK CAN BE REMOVED SO THAT THE TENDER CAN BE USED, IF DESIRED, FOR COAL BURNING ENGINES.

32 OIL TANK TO BE BRACED TO HOLD WORKING PRESSURE OF 5 POUNDS.
OIL TANK TO HAVE ONE SAFETY VALVE SET TO 5 LBS (APPROVED MAKE)

33 OIL HEATERS TO BE OF THE CLOSED TYPE.

34 OIL TANK CAPACITY CHART AND MEASURING ROD TO BE MARKED IN SPANISH, IN THE METRIC SYSTEM, IN LITROS PER DECIMETER WITH A SMALL MARK PLACED CENTRALLY BETWEEN THE DECIMETER GRADUATIONS, FOR 10 30 E 196 AND AFTER.

35 CLASSIFICATION LAMP HOLDERS ON BACK OF TENDER.

36 TENDER TRUCK WHEELS FROM STANDARD STEEL WORKS.

THE BALDWIN LOCOMOTIVE WORKS As Specn. 0-7102.

Memorandum Spec'n 21023.

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ D 232 to 241.

FOR NATIONAL RAILWAYS OF MEXICO. See X 860 28 on 238

MEXICO. 6-28-21.

Ry. Co's Class M-15.

Gen. as PHOTO. 4338. {EXCEPT TO HAVE YOUNG VALVE GEAR.

Engine Drawing No. 17.

Gauge of Road 4' 8½" Play ¾"

Wheelbase, Rigid 12' 0" Driving 12' 0" Total 33' 2"

Total wheelbase, eng. and tend, {Actual 66' 4½" / Limited to ----

Curves 10 METRIC DEGREES. GRADES 2.20%

Limits, Height (SEE SUP. 3) Width (SEE SUP. 3)

Weight (approximate) in working order, Total 256,000 POUNDS.

On F. tr'k 49,000 lbs., Drivers 163,000 lbs., B. tr'k 44,000 lbs.

Tractive power 40,000 lbs., Ratio of adhesion 4.07

Work'g St'm Pres. 180 lbs., Service PASSENGER.

Fuel OIL. (SEE SUP. 9)

Boiler STEEL. Thick ¾" & 13/16" Bill 9437.

Front Tube Sheet ½" Thick

Boiler, Diam. 76" Plan EXTENDED WAGON TOP.

{Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.02 — Tested to 200 lbs. steam pres. / 240 lbs. water pres.

Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

Domes, diam. 32" Pos. FORWARD OF FRE BOX.

Firebox STEEL. Combustion chamb. NONE.

Firebox, length 114⅛" Width 84⅛" Depth F. 84½" B. 66"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening OVAL, 16" x 20.

Water space, Front 5" Sides 5" Back 5"

Water space frame DOUBLE Riveted

Water space stays ⅜" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O.S. TATE FLEXIBLE STAYS IN BREAKING ZONE. {THREE ROWS B. L. W. EXPANSION STAYS.

Radial stays 1" DIAM. Sling stays front

Button heads below crown on NONE central rows

Crown bars NONE. Placed ---- above crown

Crown bolts ----

Flues NO. 9 B. W. G. STEAMLESS STEEL.

Tubes NO. 11 B. W. G. CHARCOAL IRON.

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 36 / 231 Diam. 5⅜" / 2" Length 19' 3"

ALL TUBES AND FLUES TO BE WELDED TO FIRE BOX TUBE SHEET.

Heating Surface — Flues 971⁰⁰ Combus. Chamb. ---- Total 3517⁰⁰ / Tubes 2318⁰⁰ Fire Box 228⁰⁰ Fire Brick Tubes ----

Grate area 66.6⁰⁰ Ratio to Heating Surface 1: 52.8

Superheater 828⁰⁰

Fire Brick ARCH, NONE.

FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

Grates NONE.

Ash Pan, Dampers FRONT AND BACK.

Throttle CHAMBERS, BALANCE. Pos. DOME.

Dry pipe STEEL OR IRON. DRY PIPE TO HAVE SUPPORT.

Superheater SCHMIDT TYPE, (SEE SUP. 10. 15 ETC)

Smokebox extenstion NONE. Cleaning hole and cap NONE.

Spark ejector or hopper NONE.

SUPERHEATER deflect. plates WITH.

Exhaust nozzles SINGLE, LOW.

CLEANING PIPE, WITH.

Stack CAST IRON, STRAIGHT. Dia. 18"

Safety Valves TWO CONSOLIDATED, 3", BOTH MUFFLED. (Spec)

Safety valves NONE with relief lever, Set to 180 POUNDS.

Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE BRASS 7" MAKE: ASHCROFT. (Spec)

Steam gauge stand CAST IRON. **Clock** NONE.

Water Gauge ONE REFLEX **Cab Lamps** ELECTRIC.

Gauge Cocks THREE BACK. Surface valve NONE.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve WITHOUT separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock TWO EVERLASTING. POS: ONE EACH SIDE OF FIRE BOX.

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS DIAGONAL, SIDES AND BACK.

Crown, THREE EACH SIDE AND FOUR BACK.

Waist, ONE UNDER FRONT AND ONE UNDER BACK.

Front tube sheet. NONE. Fusible plug ONE.

PRESSED STEEL COLLARS RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE.

INJECTOR STARTING VALVES TO BE NATHAN SCREW TYPE, NO. 144. (Spec)

Injectors TWO NATHAN TYPE MF NON-LIFTING No. 12.

Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.

Pipes, Check COPPER. Feed COPPER. Overflow IRON.

{Check NATHAN, WITH STOP VALVE. Pos. RIGHT AND LEFT.

INJECTOR CHECKS TO BE NATHAN 1918 SPECIAL.

Steam Heat NONE.

CAB STEEL, LINED WITH WOOD THROUGHOUT, INCLUDING ROOF.

CRYSTAL PLATE GLASS CAB WINDOWS.

CAB BOARDS TO BE COVERED WITH WOOD.

Cab boards STEEL. Nosing T-IRON.

Running boards STEEL. Nosing T-IRON.

Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 35"

FRANKLIN RADIAL BUFFER BETWEEN ENGINE AND TENDER.

DRAWBAR TO BE SINGLE, WITH SAFETY CHAINS BETWEEN ENG. AND TEND.

Pilot OF STEEL SECTIONS.

Front Bumper CAST STEEL. Bumper plate WITH.

Steps AND HAND HOLDS TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail I.C.C. STANDARD, I.E., 33½"

Coupler M. C. B AUTOMATIC, FROM AMERICAN STEEL FOUNDRIES, WITH EXTENDED FLOOR POCKET FROM NATIONAL MALLEABLE CASTINGS CO.

Signal fixtures IRON ON BUMPERS.

HEADLIGHT AND EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHTS.

Headlight ONE ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH. H'd'l't step WITH.

Lamp shelf NONE. Nosing ---

Bell 92 POUNDS.

Sand Box ONE Diam. 33" Body IRON PAINTED. Pipes IRON.

Sander GRAHAM WHITE, AIR, DOUBLE, TO SAND FRONT AND REAR.

Dome casing IRON PAINTED.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON. Style 9 AND 14.

Boiler Lagging MAGNESIA SECTIONAL.

BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

H. B. Lichetti August 1921. 395

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ D 232 to 241.

FOR NATIONAL RAILWAYS OF MEXICO. See X.O. 860 28 on 238 397

MEXICO.

Frames CAST STEEL, WITH SEPARATE SECTION AT REAR.

Cylinders, Diam. 25" Stroke 28"

St'm ports, Length 33" Width 3" Bridges ---

Exh. ports, Length --- Width --- Valve lead ¼"

Valve travel 9" Steam lap 1⅜" Exhaust clearance ⅜"

Eccentric crank throw ---- By-pass valve NONE.

S. F. Lubr. NATHAN FIVE FEED NO. 31, BULL'S EYE. (Spec)

Cyl'r heads CAST STEEL. LUBR. PIPES OF COPPER UNDER JACKET.

Cyl'r casings IRON PAINTED. Head covers STEEL PAINTED.

St'm chest casings ---- Covers ----

St'm chest valves 14" DIAM., PISTON TYPE.

Met. pkg. {PISTON ROD / VALVE STEMS} UNITED STATES, KING TYPE. (Spec)

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST STEEL, RINGS OF CAST IRON SPRUNG IN.

Guides ALLIGATOR TYPE, STEEL. Oil cups NEEDLE.

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL. Rod cups PLUNGER.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion YOUNG, (SEE SUP. 18 ETC)

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

REVERSE GEAR: (SEE SUP. 20)

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened

FIVE GALLONS LOCOLINE ENGINE OIL, SPECIFICATION "B".

FIVE GALLONS LOCOLINE VALVE OIL, SPECIFICATION A-2.

Wearing Bearings "Yes"

Driving wheel hub liners BRONZE.

Drivers, O. S. Diam. 67" Cen. diam. 60" CENTERS CAST STEEL.

DRIVING TIRES FROM STANDARD STEEL WORKS.

Tires STEEL. Held by SHRINKAGE AND SHOULDER.

Tires, Flanged, Pos ALL. Size 3½" x 5½"

Tires, Plain, Pos. NONE. Size ---

Lateral play between driving boxes and wheel hubs = (SEE SUP. 23)

Driving Boxes CAST STEEL.

Journals, Diam. {MAIN, 10½" / OTHERS, 9½"} Length 12"

Springs. Make B. L. W.

Front Engine Truck FOUR Wheeled SWING BOLSTER, CENTER BEARING.

To swing 2⅜" each side of cen., Cen. pin liners NONE

Journals, Diam. 6" Length 12" Boxes CAST IRON.

Wheel hub liners BRONZE ON FACE OF BOX NEXT TO HUB OF WHEEL.

Wheels, Diam. 33" Tread --- Kind {ROLLED STEEL, FROM STANDARD STEEL WORKS.

Tires NONE. Cen. diam. --- Size ---

Tires held by --- WHEEL RIMS 2½" THICK x 5½" WIDE.

Back Engine Truck TWO Wheeled HODGES TYPE, (SEE SUP. 25)

To swing 3⅜" each side of cen., Cen. pin liners NONE

Journals, Diam. 8" Length 14" Boxes CAST STEEL.

Wheel hub liners BRONZE.

Wheels, Diam. 40" Tread --- Kind CAST STEEL, SPOKE CENTER.

Tires STEEL. Cen. diam. 34" Size 3" x 5½"

Tires held by SHRINKAGE AND SHOULDER.

BACK TRUCK TIRES FROM STANDARD STEEL WORKS.

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating Parts — Engine, sch. NO. 6 ET. WESTG. COMBINED AUTO. AND STRAIGHT AIR. / Eng. Tr'k, sch. ---

Foundation Parts — Drivers, sch. MM-3-BC, AMERICAN OUTSIDE EQUALIZED. / Eng. Tr'k, sch. ---

Air pump TWO 11" Pos. BOTH LEFT SIDE.

Train connections FRONT AND BACK.

Train signal, sch. "L"

Tender EIGHT Wheeled, Drawing No. 1675 {TENDER TO BE WEIGHED: YES.

Weight, with fuel and water, about 169,000 POUNDS.

Tank — OIL, 3500 / WATER, 8500 Gallons, Bill 5691 / 5682

TANK WATER BOTTOM TYPE, WITH STRAIGHT TOP.

Tool Boxes STEEL, TOP.

Frame STEEL, 12" CHANNELS, WITH FRONT BUMPERS OF WOOD AND BACK BUMPERS OF CAST STEEL.

Front Drawbar height 33¾"

Pilot NONE.

Back drawhead, center above rail I. C. C. STANDARD, I.E., 33"

Coupler M. C B. AUTO. WITH 6" x 8" SHANK, FROM AMERICAN STEEL FOUNDRIES CO., WITH BRADFORD DRAFT GEAR WITH FARLOW ATTACHMENTS.

Steps AND HAND HOLDS TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks ANDREWS CAST STEEL SIDE FRAMES. BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B. L. W. MAKE

Journals, Diam 5½" Length 10"

Wheels, Diam. 33" Tread --- Kind {ROLLED STEEL, FROM STANDARD STEEL WORKS.

Tires NONE. Cen. diam. --- Size ---

Tires held by --- WHEEL RIMS, 2½" THICK x 5½" WIDE.

Safety chains SINGLE.

Brake Position ON ALL WHEELS.

Brake sch. No. 6 ET. WESTG. AUTO. AND STRAIGHT AIR, WITH 14" x 12" TENDER BRAKE CYLINDER.

List of tools, sch. 166, EXCEPT OMIT PACKING LIST CASE. (SEE SUP. 4)

Photo sch. No. 2. Inspection (SEE SUP. 2)

To be weighed YES. Material specns (SEE SUP. 1)

Certificate of boiler test THREE COPIES B. L. W. FORM 1036.

Junior laws to 6-29-21. Shipment ON OWN WHEELS.

Brass shop finish, No. 1.

Machine shop finish D-165

B. L. W. Patents REAR TRUCK, 1060499, PAT. APRIL 20, 1913, (BRASS PLATE)

Property plates B. L. W. FOR ENGINE AND TENDER.

MARKING, ETC., TO BE SAME AS FOR 12 30 ½ E 50 TO 54.

Painting, style—OLIVE GREEN, NO STRIPING.

LETTERING TO BE RY. CO'S STANDARD IN ALUMINUM LEAF.

CLASSIFICATION MARK ON CAB SIDES: M-15.

Mark on TANK SIDES:— N. DE M.

MARK ON BACK OF TANK:— CAPACIDAD / AGUA 32175 LITROS. / ACEITE 13250 LITROS.

Road Nos. Pos. Road Nos. Name NONE.

F. No. PLATE. 139 TO 148

SAND BOX.

CAB SIDES.

BACK OF TENDER FRAME.

Actual Dimensions of Loc. Extreme height over all 15' 6"

Extreme Width: Cab boards 10' 5" ; Cylinders ~~at valve motion~~ 10' 2⅝"

Length outside face front bumper of engine to face of tender wedge 44' 0"

Length face of tender wedge to outside face back bumper of tender 28' 9½"

Total length outside face front bumper of engine to outside face back bumper of tender 72' 9½"

SPECIFICATION FOR LOCOMOTIVES:- 12 44 ½ D 232 to 241.

FOR:- National Railways of Mexico.

HNW.

1 The physical and chemical properties of materials used in the locomotives to be in accordance with the specifications of The American Society for Testing Materials, as follows:-

— STEEL —

* A-10-16 Structural steel for locomotives.
A-18-18 Class A forgings to be welded or case hardened.
A-20-16 Carbon steel forgings for locomotives.
A-21-18 Carbon steel tender axles.
A-26-16 Steel tires.
* A-27-16 Steel castings, Class B Medium grade (Special requirements for Castings for Railway Rolling Stock.)
Lap welded and seamless steel boiler tines, boiler
* A-28-18 flues and superheater pipes, safe ends, and arch tubes for locomotives.
A-30-18 Boiler and fire box steel.
A-57-16 Wrought solid Carbon steel wheels for steam Railway service.
A-61-16 Helical springs for Railways.
A-62-16 Elliptic springs for Railways.

— WROUGHT IRON —

A-38-18 Lap welded, Charcoal iron boiler tubes, boiler flues safe ends, and arch tubes for locomotives.
A-39-18 Staybolt iron.

— CAST IRON —

A-45-14 Locomotive Cylinders, (Cast iron).
A-48-18 Gray iron castings.

* These specifications are to include the modifications in sulphur and phosphorus and manganese limits recommended by the Society on account of the war, and will apply until the limits shown in the specifications are restored by the society.

2 Materials to be inspected by The B. L. W.
Consutruction of loco. to be inspected by R. W. Hunt & Co.

3 Limits of height and width as Ry. Co's Gabarit, i.e., B.L.W. Tracing 45256.

4 Tool equipment to include two re-railing frogs, Johnson type, for 75 pound rails.
Two traversing jacks.

5 Boiler:- Outside diam. of largest course to be 86".
Boiler to have sloping back head and throat.

6 Main dome to be one-piece type.
Auxiliary dome for safety valves and whistle located over fire box.

7 Fire box to be especially designed for oil burning with flush crown bolts.
Fire box crown and sides in one sheet.
Fire box tube sheet seam to be welded on the fire side above the fire brick only.

8 All staybolts of Rome Superior Iron.

9 Oil burning arrangement to be B. L. W. Standard, with Von-Boden Ingles burner in front end of fire box.
Royalty, if any, payable by The B. L. W.
Oil burning connections between engine and tender for oil and steam to be Barco Flexible Joints.

10 Superheater to be as The Superheater Co's specification No. N37-282-D, dated June 13th, 1921, (Copy attached).
Superheater to connect with top header in smoke box and to have outside steam pipe connections to valve chambers.
Royalty payable by The B. L. W.

For Hereafter- See note on Specn. 12-44 ½ E 156 to 165, Book No. 74, page 426, regarding stacks, exhaust, and oil burning arrangement. R.S.McG. 6.8.32.

15 Patent plates (herewith) from the Superheater Company, covering the superheater damper cylinder, to be applied to the Superheater Damper Cylinder.

16 Hand hole and cap in each side of smoke be for inspection of superheater.

17 Cylinders to have U. S. Graphite Lubrication.
Dry Graphite Amorphous.

18 Young Valve Gear to be made and applied by The B. L. W.
Royalty, if any, payable by The B. L. W.
Stops for reverse shaft to be applied on the reverse link bearing.

19 Patent plates (2 plates per engine herewith) Nos. 374 to 383 covering Young Valve Gear, to be applied to reverse link bearing each side of engine.

20 Ragonnet Power Reverse Gear, type "B" covered by Extra Order No. 9513, dated 7-19-21.

21 Detroit flange lubricator for front drivers.

22 Main driving journals same as for 12 44 ½ E 127 to 134.

23 Lateral play between driving boxes and wheel hubs, including lateral play in box pedestal fits, 7/32" total.

24 Lateral play between front engine truck boxes and wheel hubs, including lateral play in box pedestal fits, 5/16" total.

26 Back engine truck to have swing link with side bearings.

26 Lateral play between back engine truck boxes and wheel hubs, ½" total. There will be no lateral play in back engine truck box pedestal fits.

27 Air pump to have Westinghouse No. 5½ strainer.

28 Air reservoirs to have hydrostatic test of 210 pounds.
Brake pipe fittings to be Westinghouse.
Air brake and air signal connections between engine and tender to be Mo. Laughlin Flexible Joints.

29 Foundation brakes to be bushed and case hardened, Sch. BC.

— TENDER —

36 Tender tanks to be so constructed that oil tank can be removed so that tender can be used, if desired, or coal burning locomotives.

37 Franklin Radial Buffer between engine and tender.
Drawbar to be single with safety chains, between eng. and tend

For Hereafter:- Classification lamp holders to be provided at sides of smoke box.
For Hereafter:- Classification lamp holders to be provided at back of tender.
For Hereafter:- Oil tank capacity chart and measuring rod to be marked in Spanish, in the metric system, in Litros per decimeter with a small mark placed centrally between the decimeter graduations.

397
399

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ D 232 to 241

FOR: NATIONAL RAILWAYS OF MEXICO

Specification for Type A Double Loop Superheater SPECN. #N37-282-D DATED JUNE 13TH, 1921.

BOILER TUBES	231 in number 2 o. d. 19 ft. 3 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	36 in number 5½ o. d. #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 ..... Card 14098
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. ..... Card 10051
TUBE SHEET LAYOUT	..... Card 3L50845
UNITS	36 units 12 o. d. #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide ..... Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints ..... Card 1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A ..... Card 1064-N
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls ..... Card 11120 AHM 4x9
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place ..... Card 1323
STEAM PIPE JOINT RINGS	Of cast iron. ..... Card SEE ABRGT.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units ..... Card
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing ..... Card 4L 11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer ..... Card 1067
PYROMETER	Model No. ..... Pyrometer ..... Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with ..... Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration ..... Card
S. H. ARRANGEMENT	In accordance with ..... Card 4L 40827
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 2L 11518-H	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYCL. PIPE CONNECTION	Card 1L 11437	S. H. PIPE BAND	Card 1068
DAMPER CYL. PIPING DIAGRAM	Card 2L 11442	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card 1068-Z	RETURN BENDS	Card 11022
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 1023
DAMPER SHAFT BEARING (O. S.)	Card 1148	DEFLECTING PLATE HANDLE	Card 1437
DAMPER SHAFT BEARING (I.S.)	Card 10386-W	DEFLECTING PLATE STUDS	Card 10809
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE CLAMP	Card 10809-A
PATENT PLATE	Card ~~3367~~ 3L33674	DAMPER RIGGING	Card 11384-S

THE BALDWIN LOCOMOTIVE WORKS DUP. 12 4½ D 241 WITH SAME EXTRAS EXCEPT WHERE OTHERWISE SPECIFIED

Memorandum Spec'n 21023

SPECIFICATION FOR LOCOMOTIVES 12 4½ D 242 TO 251

FOR NATIONAL RAILWAYS OF MEXICO,

MEXICO

8-17-21

Ry. Co's Class M-15

Gen. as PHOTO. 8037, EXCEPT TO MAKE BAKER VALVE GEAR

Engine Drawing No. 18

Gauge of Road 4' 8½" Play 7/8"

Wheelbase, Rigid 12' 0" Driving 12' 0" Total 33' 2"

Total wheelbase, eng. and tend. {Actual 66' 4½" / Limited to ——

Curves 10 METRIC DEGREES. GRADES 2.20%

Limits, Height (SEE SUP. 3) Width (SEE SUP. 3)

Weight (approximate) in working order, Total 256,000 POUNDS.

On F. tr'k 49,000 lbs., Drivers 163,000 lbs., B. tr'k 44,000 lbs.

Tractive power 40,000 lbs., Ratio of adhesion 4.07

Work'g St'm Pres. 180 lbs., Service PASSENGER.

Fuel OIL. (SEE SUP. 9)

Boiler STEEL. Thick 7/16 & 13/16 Bill 9437

Front Tube Sheet ½" Thick

5. Boiler, Diam. 76" Plan EXTENDED WAGON TOP.

{Allowable st'm pres. 180 lbs. / With Factor of Safety of 5.02} Tested to {200 lbs. steam pres. / 240 lbs. water pres.}

Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

6. **Dome,** diam. 32" Pos. FORWARD OF FIRE BOX.

7. **Firebox** STEEL Combustion chamb. NONE

Firebox, length 114 1/16" Width 84 1/16" Depth F. 84 1/16" B. 66"

7. Firebox, Tube ½" Crown 3/8" Sides 3/8" Back 3/8"

Firedoor opening OVAL, 16" x 20.

Water space, Front 5" Sides 5" Back 5"

Water space frame DOUBLE Riveted

8. Water space stays 7/16" DIAM. WITH 3 4/16" HOLES 12" DEEP FROM O.S.

8. TATE FLEXIBLE STAYS IN BREAKING ZONE.

Radial stays 1" DIAM. Sling stays front THREE ROWS B. L. W. EXPANSION STAYS

7. Button heads below crown on NONE. central row

Crown bars NONE. Placed —— above crown

Crown bolts ——.

Flues No. 9 B. W. G. SEAMLESS STEEL.

Tubes No. 11 B. W. G. PARKESBURGH CHARCOAL IRON.

Tube ends SEAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number 36 / 231 Diam. 5 3/8" / 2" Length 19' 3"

ALL TUBES AND FLUES TO BE WELDED TO FIRE BOX TUBE SHEET.

Heating Surface Flues 971.6 Combus. Chamb. —— Total 3517.6

Tubes 2318.0 Fire Box 228.6 Fire Brick Tubes ——

Grate area 66.6 Ratio to Heating Surface 1: 52.8

Superheater 828.6

Fire Brick ARCH, NONE.

9. FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

Grates NONE.

Ash Pan, Dampers- FRONT AND BACK.

Throttle CHAMBERS, BALANCE. Pos. DOME.

Dry pipe STEEL OR IRON. DRY PIPE TO HAVE SUPPORT.

Superheater SCHMIDT TYPE. (SEE SUP. 10, 11 & 6)

Smokebox extension NONE. 12. Cleaning hole and cap NONE.

Spark ejector or hopper NONE.

~~Nothing~~ SUPERHEATER flanged plates WITH.

Exhaust nozzles SINGLE, LOW.

CLEANING PIPE, WITH.

Stack CAST IRON, STRAIGHT Dia. 18"

Safety Valves TWO CONSOLIDATED, 3", BOTH MUFFLED. (Spec.)

Safety valves NONE with relief lever, Set to 180 POUNDS.

Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE BRASS 7" MAKE: ASHCROFT. (Spec.)

Steam gauge stand CAST IRON. **Clock** NONE.

Water Gauge ONE REFLEX **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK. Surface valve NONE.

Lowest gauge cock 3½" above highest part of crown

Lubricator steam valve WITHOUT separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock TWO EVERLASTING. POS: ONE EACH SIDE OF FIRE BOX

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS DIAGONAL, SIDES AND BACK.

Crown, THREE EACH SIDE AND FOUR BACK.

Waist, ONE UNDER FRONT AND ONE UNDER BACK.

Front tube sheet. NONE. Fusible plug ONE

PRESSED STEEL COLLARS RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE.

(Spec.) INJECTOR STARTING VALVES TO BE NATHAN SCREW TYPE, No. 144.

Injectors TWO NATHAN TYPE MF NON-LIFTING No. 12.

Injectors, Pos. RIGHT AND LEFT Steam pipes COPPER

Pipes, Check COPPER Feed COPPER Overflow IRON

Check NATHAN, WITH STOP VALVE. Pos. RIGHT AND LEFT

INJECTOR CHECKS TO BE NATHAN 1918 SPECIAL.

Steam Heat NONE.

15. **Cab** STEEL, LINED WITH WOOD THROUGHOUT, INCLUDING ROOF.

CAB BOARDS TO BE COVERED WITH WOOD.

Cab boards STEEL. Nosing T-IRON.

Running boards STEEL. Nosing T-IRON.

Hand rail IRON Located on BOILER.

Back Bumper BAR STEEL Back drawbar height 35"

FRANKLIN RADIAL BUFFER BETWEEN ENGINE AND TENDER.

DRAWBAR TO BE SINGLE, WITH SAFETY CHAINS BETWEEN ENG. AND TENDER.

Pilot OF STEEL SECTIONS.

Front Bumper CAST STEEL. Bumper plate WITH.

Steps AND HAND HOLDS TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail I.C.C. STANDARD, I.E., 33½"

Coupler M. C. B. AUTOMATIC, FROM AMERICAN STEEL FOUNDRIES, WITH EXTENDED FLOOR POCKET FROM NATIONAL MALLEABLE CASTINGS CO.

13. Signal fixtures IRON ON BUMPERS.

HEADLIGHT AND EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHT.

Headlight ONE ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH. H'd'l't step WITH.

Lamp shelf NONE. Nosing ——

Bell 92 POUNDS.

(Spec.) **Sand Box** ONE Diam. 33" Body IRON PAINTED Pipes IRON.

Sander GRAHAM WHITE, AIR, DOUBLE, TO SAND FRONT AND REAR.

Dome casing IRON PAINTED.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON Style 9 AND 14

Boiler Lagging MAGNESIA SECTIONAL.

BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

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SPECIFICATION FOR LOCOMOTIVES 12 4½ D 242 TO 251

FOR NATIONAL RAILWAYS OF MEXICO. 401

Frames CAST STEEL, WITH SEPARATE SLAB SECTION AT REAR.

Cylinders, Diam. 25" Stroke 28"

St'm ports, Length 33" Width 1 3/4" Bridges ——

Exh. ports, Length —— Width —— Valve lead 5/16"

Valve travel 8½" Steam lap 1¼" Exhaust clearance 3/16"

Eccentric crank throw 22½" By-pass valve NONE.

16. S. F. Lubr. NATHAN FIVE FEED No. 31, BULL'S EYE. (Spec.)

Cyl'r heads CAST STEEL. LUBR. PIPES OF COPPER UNDER JACKET

Cyl'r casings IRON PAINTED. Head covers STEEL PAINTED.

St'm chest casings —— Covers ——

St'm chest valves 14" DIAM., PISTON TYPE.

Met. pkg. (PISTON RODS / VALVE STEMS) UNITED STATES, KING TYPE. (Spec.)

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST STEEL, RINGS OF CAST IRON SPRUNG IN.

Guides ALLIGATOR TYPE, STEEL. Oil cups NEEDLE.

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL. Rod cups FOR GREASE.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion BAKER. (SEE SUP. 17 & 6)

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

REVERSE GEAR: (SEE SUP. 18)

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

FIVE GALLONS LOCOLINE ENGINE OIL, SPECIFICATION "P".

FIVE GALLONS LOCOLINE VALVE OIL, SPECIFICATION R-2

Wearing Bearings "V M"

Driving wheel hub liners BRONZE.

19. **Drivers,** O. S. Diam. 67" Cen. diam. 60" CENTERS CAST STEEL.

DRIVING TIRES FROM STANDARD STEEL WORKS.

Tires STEEL. Held by SHRINKAGE AND SHOULDER.

19. Tires, Flanged, Pos. ALL. Size 3½" x 5½"

Tires, Plain, Pos. NONE. Size ——

Lateral play between driving boxes and wheel hubs = (SEE SUP. 20)

Driving Boxes CAST STEEL.

Journals, Diam. {MAIN, 10½" Length 12" / OTHERS, 9½"}

Springs. Make B. L. W.

Front Engine Truck FOUR Wheeled SWING BOLSTER, CENTER BEARING.

21. To swing 2 3/8" each side of cen., Cen. pin liners NONE

Journals, Diam. 6" Length 12" Boxes CAST IRON.

Wheel hub liners BRONZE ON FACE OF BOX NEXT TO HUB OF WHEEL.

Wheels, Diam. 33" Tread —— Kind {ROLLED STEEL, FROM STANDARD STEEL WORKS.}

Tires NONE. Cen. diam. ——

Tires held by —— WHEEL RIMS 2½" THICK x 5½" WIDE.

Back-Engine Truck TWO Wheeled HODGES TYPE, (SEE SUP. 22)

23. To swing 3 3/8" each side of cen., Cen. pin liners NONE

Journals, Diam. 8" Length 14" Boxes CAST STEEL.

Wheel hub liners BRONZE

Wheels, Diam. 40" Tread —— Kind CAST STEEL, SPOKE CENTER.

Tires STEEL Cen. diam. 34" Size 3" x 5½"

Tires held by SHRINKAGE AND SHOULDER.

BACK TRUCK TIRES FROM STANDARD STEEL WORKS.

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating { Engine, sch. No. 6 ET. WESTG. COMBINED AUTO. AND STRAIGHT AIR. / Parts { Eng. Tr'k, sch. ——

26. Foundation { Drivers, sch. WM-3-BC, AMERICAN OUTSIDE EQUALIZED. / Parts { Eng. Tr'k, sch. ——

24. Air pump TWO 11" Pos. BOTH LEFT SIDE.

Train connections FRONT AND BACK.

Train signal, sch. "L"

Tender Eight Wheeled, Drawing No. 1675 {TENDER TO BE WEIGHED: YES.

Weight, with fuel and water, about 169,000 POUNDS.

31. Tank {OIL, 3500 / WATER, 8500} Gallons, Bill 5691 / 5682

TANK WATER BOTTOM TYPE, WITH STRAIGHT TOP.

Tool Boxes STEEL, TOP.

Frame STEEL, 12" CHANNELS, WITH FRONT BUMPERS OF WOOD AND BACK BUMPERS OF CAST STEEL.

35. Front Drawbar height 33½"

Pilot NONE.

Back drawhead, center above rail I. C. C. STANDARD, I.E., 33"

Coupler M. C. B. AUTO. WITH 6" x 8" SHANK, FROM AMERICAN STEEL FOUNDRIES CO., WITH BRADFORD DRAFT GEAR WITH FARLOW ATTACHMENTS.

Steps AND HAND HOLDS TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks ANDREWS CAST STEEL SIDE FRAMES. BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B. L. W. MAKE

Journals, Diam. 5½" Length 10" {ROLLED STEEL, FROM STANDARD STEEL WORKS.}

Wheels, Diam. 33" Tread —— Kind

Tires NONE. Cen. diam. —— Size ——

Tires held by —— WHEEL RIMS, 2½" THICK x 5½" WIDE.

Safety chains SINGLE.

Brake Position ON ALL WHEELS.

Brake sch. No. 6 ET. WESTG. AUTO. AND STRAIGHT AIR, WITH 14" x 12" TENDER BRAKE CYLINDER.

* BACK HEAD OF BOILER TO BE PHOTOGRAPHED TO SHOW LOCATION OF FITTINGS IN CAB.

List of tools, sch. 166, EXCEPT OMIT PACKING LIST CASE. (SEE SUP. 4)

* Photo sch. No. 3-R Inspection (SEE SUP. 2)

To be weighed YES Material spec'ns (SEE SUP. 1)

Certificate of boiler test. THREE COPIES B. L. W. FORM 1036

Junior laws to 6-29-21. Shipment ON OWN WHEELS.

Brass shop finish, No. 1.

Machine shop finish D-165

B. L. W. Patents {REAR TRUCK, 1060499, PAT. APRIL 20, 1913, (BRASS PLATE) / SPRING CLIP, 1013774, PAT. JAN. 3, 1912, (CAST ON)}

Property plates B. L. W. FOR ENGINE AND TENDER.

MARKING, ETC., TO BE SAME AS FOR 12 3½ E 50 TO 54

Painting, style — OLIVE GREEN, NO STRIPING.

LETTERING TO BE AY. CO'S STANDARD IN ALUMINUM LEAF.

CLASSIFICATION MARK ON CAB SIDES: CLASE M-15

Mark on TANK SIDES:- N. DE M.

MARK ON BACK OF TANK: {CAPAC. DAD. AGUA 32,720 LITROS. / ACEITE 1320 LITROS.}

Road Nos. Pos. Road Nos. 149 TO 158 Name NONE.

F. No. PLATE.

SAND BOX.

CAB SIDES.

BACK OF TENDER FRAME.

Actual Dimensions of Loco. Extreme height over all 15' 6"

Extreme Width: Cab boards 10'5" ; Cylinders ~~or valve motion~~ 10'2½"

Length outside face front bumper of engine to face of tender wedge 14' 0"

Length face of tender wedge to outside face back bumper of tender 28' 9½"

Total length outside face front bumper of engine to outside face back bumper of tender 72' 9½"

SPECIFICATION FOR LOCOMOTIVES:- 12 44 ± D 242 to 251

FOR:- NATIONAL RAILWAYS OF MEXICO.

NW

1 THE PHYSICAL AND CHEMICAL PROPERTIES OF MATERIALS USED IN THE LOCOMOTIVES TO BE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE AMERICAN SOCIETY FOR TESTING MATERIALS, AS FOLLOWS:-

——— STEEL ———

* A-10-16 STRUCTURAL STEEL FOR LOCOMOTIVES.
A-18-18 CLASS A FORGINGS TO BE WELDED OR CASE HARDENED.
A-20-16 CARBON STEEL FORGINGS FOR LOCOMOTIVES.
A-26-16 STEEL TIRES. A-21-18 CARBON STEEL TENDER AXLES
* A-27-16 STEEL CASTINGS, CLASS B-MEDIUM GRADE (SPECIAL REQUIREMENTS FOR CASTINGS FOR RAILWAY ROLLING STOCK.)
* A-28-18 LAP WELDED AND SEAMLESS STEEL BOILER TUBES, BOILER FLUES AND SUPERHEATER PIPES, SAFE ENDS, AND ARCH TUBES FOR LOCOMOTIVES.
A-30-18 BOILER AND FIRE BOX STEEL.
A-57-16 WROUGHT SOLID CARBON STEEL WHEELS FOR STEAM RAILWAY SERVICE.
A-61-16 HELICAL SPRINGS FOR RAILWAYS.
A-62-16 ELLIPTIC SPRINGS FOR RAILWAYS.

——— WROUGHT IRON ———

A-38-18 LAP WELDED, CHARCOAL IRON BOILER TUBES, BOILER FLUES SAFE ENDS, AND ARCH TUBES FOR LOCOMOTIVES.
A-39-18 STAYBOLT IRON.

——— CAST IRON ———

A-45-14 LOCOMOTIVE CYLINDERS, (CAST IRON).
A-48-18 GRAY IRON CASTINGS.

* THESE SPECIFICATIONS ARE TO INCLUDE THE MODIFICATIONS IN SULPHUR AND PHOSPHORUS AND MANGANESE LIMITS RECOMMENDED BY THE SOCIETY ON ACCOUNT OF THE WAR, AND WILL APPLY UNTIL THE LIMITS SHOWN IN THE SPECIFICATIONS ARE RESTORED BY THE SOCIETY.

2 MATERIALS TO BE INSPECTED BY THE B. L. W.
CONSTRUCTION OF LOCO. TO BE INSPECTED BY R. W. HUNT & Co.

3 LIMITS OF HEIGHT AND WIDTH AS Ry. Co's GABARIT, I.E., B.L.W. TRACING 45256.

4 TOOL EQUIPMENT TO INCLUDE TWO RE-RAILING FROGS, JOHNSON TYPE, FOR 75 POUND RAILS.
TWO TAVERSING JACKS.

5 BOILER:- OUTSIDE DIAM. OF LARGEST COURSE TO BE 86".
BOILER TO HAVE SLOPING BACK HEAD AND THROAT.

6 MAIN DOME TO BE ONE-PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE, LOCATED OVER FIRE BOX.

7 FIRE BOX TO BE ESPECIALLY DESIGNED FOR OIL BURNING, WITH FLUSH CROWN BOLTS.
FIRE BOX CROWN AND SIDES IN ONE SHEET.
FIRE BOX TUBE SHEET SEAM TO BE WELDED ON THE FIRE SIDE ABOVE THE FIRE BRICK ONLY.

8 ALL RIGID STAYBOLTS INCLUDING RADIAL STAYS TO BE MADE OF READING IRON CO'S STAYBOLT IRON FOR THESE ENGINES, EXCEPT HOLLOW STAYS TO BE MADE OF ROME HOLLOW IRON.
TATE FLEXIBLE STAYS TO BE MADE OF BURDEN IRON, OF THE SAME QUALITY AS ROME SUPERIOR IRON.

9 OIL BURNING ARRANGEMENT TO BE B. L. W. STANDARD, WITH VON-BODEN INGLES BURNER IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.
OIL BURNING CONNECTIONS BETWEEN ENGINE AND TENDER FOR OIL AND STEAM TO BE BARCO FLEXIBLE JOINTS.

10 SUPERHEATER TO BE AS THE SUPERHEATER CO'S SPECIFICATION NO. N37-282-D, DATED JUNE 13TH, 1921, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOD AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
ROYALTY PAYABLE BY THE B. L. W.

11 PATENT PLATES (HEREWITH) FROM THE SUPERHEATER COMPANY, COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

12 HAND HOLD AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

13 CLASSIFICATION LAMP HOLDERS AT SIDES OF SMOKE BOX.

14 GAUGE COCKS TO BE O'MALLEY-BEARE PERFECTION.

15 CAB GLASS MUST BE EQUAL TO QUALITY AND THICKNESS FURNISHED BY ALCO., I.E., AMERICAN DOUBLE "A".

16 CYLINDERS TO HAVE U. S. GRAPHITE LUBRICATOR, DRY GRAPHITE AMORPHOUS.

17 BAKER VALVE GEAR TO BE PURCHASED FROM PILLIOD COMPANY. ROYALTY, IF ANY, PAYABLE BY THE B. L. W.
STOPS FOR REVERSE SHAFT TO BE APPLIED ON THE REVERSE LINK BEARING.

18 RAGONNET POWER REVERSE GEAR, TYPE "B" COVERED BY EXTRA ORDER NO. 10262, DATED 8-27-21.

19 DETROIT FLANGE LUBRICATOR FOR FRONT DRIVERS.

20 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

21 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

22 BACK ENGINE TRUCK TO HAVE SWING LINK WITH SIDE BEARINGS.

23 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS, ½" TOTAL. THERE WILL BE NO LATERAL PLAY IN BACK ENGINE TRUCK BOX PEDESTAL FITS.

24 AIR PUMP TO HAVE WESTINGHOUSE No. 5½ STRAINER.

25 AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.
BRAKE PIPE FITTINGS TO BE WESTINGHOUSE.
AIR BRAKE AND AIR SIGNAL CONNECTIONS BETWEEN ENGINE AND TENDER TO BE BARCO FLEXIBLE JOINTS.

26 FOUNDATION BRAKES TO BE BUSHED AND CASE HARDENED, SCH. BC.

For Hereafter:- See note on specn. 12.44¼ E 156 to 165. Specn Book 74. page 426. regarding stack, exhaust and oil burning arrangement. R.S.McC. 6-8-32.

——— TENDER ———

31 TENDER TANKS TO BE SO CONSTRUCTED THAT OIL TANK CAN BE REMOVED SO THAT TENDER CAN BE USED, IF DESIRED, FOR COAL BURNING LOCOMOTIVES.

32 OIL TANK TO BE BRACED TO HOLD WORKING PRESSURE OF FIVE POUNDS
OIL TANK TO HAVE ONE SAFETY VALVE SET TO 5 POUNDS (APPROVED MAKE).
OIL HEATERS TO BE OF THE CLOSED TYPE.
OIL TANK CAPACITY CHART AND MEASURING ROD TO BE MARKED IN SPANISH, IN THE METRIC SYSTEM, IN LITROS PER DECIMETER WITH A SMALL MARK PLACED CENTRALLY BETWEEN THE DECIMETER GRADUATIONS.

33 CLASSIFICATION LAMP HOLDERS AT BACK OF TENDER.

34 FRANKLIN RADIAL BUFFER BETWEEN ENGINE AND TENDER.

35 DRAWBAR TO BE SINGLE WITH SAFETY CHAINS, BETWEEN ENGINE AND TENDER

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SPECIFICATION FOR LOCOMOTIVES 12 44 ± D 242 to 251

FOR: NATIONAL RAILWAYS OF MEXICO

Specification for Type A Double Loop Superheater SPECN. #N37-282-D DATED JUNE 13TH, 1921.

BOILER TUBES 231 in number 2 o. d 19 ft 3 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.

BOILER FLUES 36 in number 5½ o. d #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18 ..... Card 14096

BOILER FLUE SETTING ½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, headed and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections ..... Card 10051

TUBE SHEET LAYOUT ..... Card 3L50845

UNITS 36 units 14 o. d #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.

UNIT PIPE SUPPORTS Of steel fastened securely on superheater pipes so as not to slide ..... Card 10773

UNIT PIPE JOINT Made in best possible manner to insure absolutely tight joints ..... Card 1092

UNIT CLAMP BOLT In accordance with Locomotive Superheater Company Material Specification No. 12-A ..... Card 1091-N

HEADER Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with ael ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. ..... AHM 4x9 Card 11120

HEADER SUPPORTS Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place ..... Card 1323

STEAM PIPE JOINT RINGS Of cast iron.

DEFLECTING PLATE To permit of easy inspection and removal of superheater units ..... Card SEE ABOVE.

DAMPER CYLINDER Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing ..... Card 4L 11436

DAMPER SHAFT COUNTERWEIGHT Painted a light color to render it easily visible by the engineer ..... Card 1067

PYROMETER Model No. ..... Pyrometer ..... Card NONE

PYROMETER ARRANGEMENT Generally in accordance with ..... Card

PYROMETER BRACKET Firmly fastened to boiler to prevent vibration ..... Card

S. H. ARRANGEMENT In accordance with ..... Card 4L 40627

TEST (FINAL) The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 2L 11518-H	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYCL. PIPE CONNECTION	Card 1L 11437	S. H. PIPE BAND	Card 1968
DAMPER CYL. PIPING DIAGRAM	Card 2L 11442	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card 1068.2	RETURN BENDS	Card 11022
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 1023
DAMPER SHAFT BEARING (G. S.)	Card 1148	DEFLECTING PLATE HANDLE	Card 1497
DAMPER SHAFT BEARING (T.S.)	Card 10386 W	DEFLECTING PLATE STUDS	Card 10802
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE CLAMP	Card 10802-A
PATENT PLATE	Card 3367 3L 83674	DAMPER RIGGING	CARD 11384-S

THE BALDWIN LOCOMOTIVE WORKS As Specn. (See sup. 1 etc)

Memorandum Spec'n 21027.

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3607 to 3626.

FOR National Railways of Mexico, Mexico.

Ry. Co's Class G-45-R.

Gen. as {A. L. Co's. photo. of Cerro de Pasco / Engine No. 5, but with one sand box.

Engine Drawing No. 106.

8-15-21 (Spec)

Gauge of Road 4' 8½" Play ⅜" except 1" for F. & B. Drivers

Wheelbase, Rigid 15' 0" Driving 15' 0" Total 23' 5"

4. Total wheelbase, eng. and tend. {Actual 58' 5" / Limited to ---

Curves 14.30 Metric Degrees. Grades 3%.

Limits, Height (See sup. 4) Width (See sup. 4)

Weight (approximate) in working order, Total 166,000 pounds.

On F. tr'k 16500 lbs., Drivers 149,500 lbs., B. tr'k --- lbs.

Tractive power 34,300 lbs. Ratio of adhesion 4.36

Work'g St'm Pres. 180 lbs., Service Freight.

38. **Fuel** Oil, of heavy grade.

7. 19. **Boiler** Steel. Thick 19/32" Bill 9484.

36. Front Tube Sheet ½" Thick

Boiler, Diam. 67" Inside. Plan Straight Top. (See sup. 21)

3. 19. 17. {Allowable st'm pres. 180 lbs. / With Factor of Safety of 4.51} Tested to {200 lbs. steam pres. / 240 lbs. water pres.

20. Longitud. seams Butt jointed, with welt strips inside and outside.

22. **Dome,** diam. 32" Pos. Central

24. **Firebox** Steel. Combustion chamb. None.

36. Firebox, length 95½" Width 75½" Depth F. 67⅜" B. 55⅝"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

25. Firedoor opening Oval 16" x 20" Crown and sides in one sheet.

Water space, Front 5" Sides, 4½" Back 4½"

Water space frame Double Riveted (See sup. 26)

28. Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O. S.

32. 28. Radial stays (Sup. 30) Sling stays front {Three rows Tate / Expansion Stays.

Button heads below crown on None central rows

Crown bars None. Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G. Seamless Steel.

Tubes No. 11 B. W. G. Charcoal Iron. (See sup. 36)

36. Tube ends Swaged for copper ferrules fire box ends.

Number {24 / 156} Diam. {2⅝" / 2" } Length 14' 6"

Heating Surface	Flues 487⁰	Combus. Chamb. ---	Total 1808⁰
	Tubes 1177⁰	Fire Box 144⁰	Fire Brick Tubes ---
Grate area 49.8⁰		Ratio to Heating Surface 1: 36.3	
Superheater 409⁰			

Fire Brick Arch, None.

31. **Grates** None.

Ash Pan, Dampers Front and back

Throttle Balance. Pos. Dome.

Dry pipe Steel. (See sup. 40)

Superheater Schmidt Type. (See sup. 41 etc)

45. **Smokebox** extension With. 44. Cleaning hole and cap None.

Spark ejector or hopper None

Netting and deflect. plates None.

Exhaust nozzles Single, Low. (See sup. 46)

Cleaning pipe, With. (See sup. 46)

Stack Cast Iron, Straight. Dia. 14"

(Spec)

Safety Valves Two Consolidated 2½" Open. (See sup. 23)

Safety valves None with relief lever, Set to 180 and 185 pounds.

23. **Whistle** One Cast Iron

Steam Gauge One Brass. (Sup. 51) Maker Ashcroft. (Spec)

Steam gauge stand Iron **Clock** None.

Water Gauge One. (See sup. 52) **Cab Lamps** Electric.

52. **Gauge Cocks** Three Back. Surface valve None

Lowest gauge cock 5" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W. (See sup. 53)

54. **Blow off Cock** Two Everlasting 2". Pos: R. and L.

55. **Cleaning Plugs** One plug above fire door.

Firebox, Corners diagonal and front.

Crown, Three each side and three back.

Waist, Two under, one front and one back.

Front tube sheet, None. Fusible plug One

One plug in under side of smoke box.

Pump None.

(Spec)

56. **Injectors** Two Nathan Non-Lifting "F". No. 9.

Injectors, Pos. Right and Left. Steam pipes Copper 1¾"

10. Pipes, Check Copper 2" Feed Copper 2½". Overflow Iron.

Check (See sup. 56) Pos. R. and L.

Steam Heat None.

Cab to have Rushton Ventilator.

Cab Steel plate. (See sup. 57 etc)

Cab to be lined with wood throughout, including roof.

Cab boards to be covered with wood.

Cab boards Steel. Nosing T-Iron, 2" x 2".

Running boards Steel Plate. Nosing T-Iron, 2" x 2".

Hand rail Iron or Steel. Located on Boiler.

59. **Back Bumper** Cast Steel Foot Plate. Back drawbar height 35"

Pilot to be U. S. R. A. design.

Pilot Steel.

7. **Front Bumper** Cast Steel. (Sup. 60) Bumper plate With.

Steps and hand holds to conform to I. C. C. Requirements.

Front Drawhead, Center above rail 33½"

Coupler M. C. B. Automatic, with extended floor pocket. (Sup. 61)

62. Signal fixtures Iron on Bumper.

63. **Headlight** One round case 18" Reflector,

Headlight, Nos. on sides With. H'd'l't step With.

Lamp shelf None. Nosing ---

64. **Bell** 92 pounds. Sand box to be B. L. W. design.

Sand Box One. Diam. 33" Body Iron Painted. Pipes Iron.

Sander Graham-White Pneumatic Double. (Spec)

Dome casing Pressed Steel Painted (See sup. 65)

66. **Boiler Jacket** #18 Soft Steel. Ptd. Bands Steel. Style 9 and 14.

67. **Boiler Lagging** Magnesia Sectional.

Back head of boiler lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

E. Powell

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3607 to 3626. Oct. 1921.

FOR National Railways of Mexico.

405 - 1/03

70. **Frames** Cast Steel, thoroughly annealed.

73. **Cylinders,** Diam. 21" Stroke 28"

St'm ports, Length 26.56" Width 1⅜" Bridges ---

Exh. ports, Length --- Width --- Valve lead 3/16"

Valve travel 7½" Steam lap 1" Exhaust clearance ---

10. Eccentric crank throw 20½" By-pass valve None.

74. **Lubr.** One Nathan five-feed No. 31 Bulls Eye. (Spec)

Cyl'r heads Cast Steel. Lubr. pipes of copper under jacket.

Cyl'r casings Steel Painted. Head covers (See sup. 75)

St'm chest casings --- Covers ---

St'm chest valves 11" diam., Piston Type.

Met. pkg. {Piston rods / Valve stems} United States; King Type. (Spec)

76. **Pistons** Heads of cast iron fitted with cast iron packing rings.

Guides Alligator, two bar type, Steel. Oil Cups Needle.

Crossheads Cast Steel, with bearings of cast iron, tinned.

78. **Wrist Pins** (Sup. 77) Rod cups For Grease.

79. **Valve Motion** Baker.

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

Power reverse gear: (See sup. 80)

9. All threads on bolts (except staybolts) to be United States Standard. All finished movable nuts of steel or of iron case hardened.

81. **Wearing Bearings** B. L. W. for Engine

Driving wheel hub liners Bronze. Vim for Tender.

82. **Drivers,** O. S. Diam. 55" Cen. diam. 48" Centers Cast Steel.

83. **Tires** O. H. Steel. Held by Shrinkage and Shoulder.

82. Tires, Flanged, Pos. All. Size 3½" x 5½"

Tires, Plain, Pos. None. Size ---

Lateral play between driving boxes and wheel hubs = (See sup. 84)

72. **Driving Boxes** Cast Steel.

85. **Journals,** Diam. {Main 9" Length 10" / Others, 8"}

Spring rigging: Equalizers of soft steel.

Springs. Make B. L. W.

86. Front engine truck frame of cast steel, carefully annealed.

88. **Front Engine Truck** Two Wheeled Radial. (See sup. 86)

To swing each side of cen. Cen. pin liners None.

89. Journals, Diam. 5½" Length 10" Boxes Cast Iron.

Wheel hub liners Bronze, on face of box next to hub of wheels.

90. Wheels, Diam. 30" Tread --- Kind Rolled Steel.

Tires None. Cen. diam. --- Size ---

Tires held by --- Wheel rims 2" thick, 5½" wide.

Back Engine Truck None Wheeled ---

To swing --- each side of cen. Cen. pin liners ---

Journals, Diam. --- Length --- Boxes ---

Wheel hub liners ---

Wheels, Diam. --- Tread --- Kind ---

Tires --- Cen. diam. --- Size ---

Tires held by ---

Brake, position On all driving and tender wheels.

Operating {Engine, sch. No. 6 ET. Westinghouse Auto. and / Parts {Eng. Tr'k sch. --- / Straight Air.

Foundation {Drivers, sch. W-2-30 American C. S. Equalized. / Parts {Eng. Tr'k. sch. ---

91. Air pump Two 9½" Pos. Both L. S.

Train connections Front and back.

Train signal, sch. ---

101. **Tender** Eight Wheeled, Drawing No. 1686. {Tender to be weighed: Yes.

Weight, with fuel and water, about 154,500 lbs.

102. **Tank** {Oil, 3500 / Water, 7000} Gallons, Bill 5704. 5705.

Tank Water bottom type.

103. Oil tank in fuel space of tender.

Tool Boxes Steel Plate, Top.

Frame Steel 12" channels with front bumper of wood and back bumper of cast steel.

Front Drawbar height 33½"

Pilot None.

Back drawhead, center above rail 33"

Coupler M. C. B. Automatic. (See sup. 106)

Trucks Andrews type. (See sup. 107)

109. Springs Elliptic, B. L. W. (See sup. 108)

Journals, Diam. 5½" Length 10"

110. Wheels, Diam. 33" Tread --- Kind Rolled Steel.

Tires None. Cen. diam. --- Size ---

Tires held by --- Wheel rims 2½" thk. x 5½" wide

Safety chains Single.

111. **Brake** Position On all wheels. Hand brake as tender.

Brake sch. No. 6-ET Westinghouse Auto. and Straight Air with 14" x 12" tender brake cylinder.

List of tools, sch. 166, except omit packing list case. (See sup. 15 & 6

Photo sch. No. 2. Inspection (See sup. 6)

To be weighed Yes. Material specifications (See sup. 5)

Certificate of boiler test Three copies B. L. W. form 1036.

Junior laws to None. Shipment On own wheels. (See sup. 18)

Brass shop finish, No. 1.

Machine shop finish D-165.

B. L. W.

Patents None.

Property plates B. L. W., for engine and tender.

Painting, style --- Olive Green, no striping.

Lettering etc. to be Ry. Co's. Standard in Aluminum Leaf.

Classification mark on Cab Sides, Class G-45-R

Mark on tank sides, No. de M.

Mark on back of tank {Capacidad / Agua 26500 Litros / Aceite 13250 Litros}

Heat Nos. Pos. Road Nos. Figures None.

3. **T. No. Plate.** 811 to 830

Sand box.

Cab Sides.

Back of tender frame.

Actual Dimensions of Loco. Extreme height over all 14' 8½"

Extreme Width. Cab boards 10' 5" Cylinders or valve motion 9' 8"

Length outside face front bumper of engine to face of tender wedge 35' 10½"

Length face of tender wedge to outside face back bumper of tender 28' 8⅞"

Total length outside face front bumper of engine to outside face back bumper of tender 64' 7⅛"

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3607 TO 3626

FOR NATIONAL RAILWAYS OF MEXICO

P

1 LOCOMOTIVES TO BE BUILT AS AMERICAN LOCO. CO'S. SPECN. A-10731-B DATED JULY 12, 1921, WITH APPENDIX SHEETS NOS. 1 TO 21.

2 B. L. W. STANDARD PRACTICES TO BE FOLLOWED, EXCEPT WHERE OTHERWISE SPECIFIED.

3 NUMBER PLATE, BUILDERS PLATE, PATENT PLATES AND TEST PLATE TO BE MADE OF B. L. W. REGULAR MATERIAL, AND TYPE.

4 CLEARANCE AND WHEELBASE TO BE IN ACCORDANCE WITH DIAGRAM 991-S-25360, WHICH SHOWS CLEARANCE WITHIN THE LIMITATIONS GIVEN IN RYS. GABARIT MSN 334, I. E., B. L. W. TRACING 45604.

5 THE PHYSICAL AND CHEMICAL PROPERTIES OF MATERIALS USED IN THE LOCOS. TO BE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE AMERICAN SOCIETY FOR TESTING MATERIALS AS FOLLOWS:-

——STEEL——

* A 10-16 STRUCTURAL STEEL FOR LOCOMOTIVES
A 18-18 CLASS A FORGINGS TO BE WELDED OR CASE HARDENED
A 20-16 CARBON STEEL FORGNGS. FOR LOCOMOTIVES
A 21-18 CARBON STEEL TENDER AXLES
A 25-16 STEEL TIRES
* A 27-16 STEEL CASTINGS, CLASS B MEDIUM GRADE (SPECIAL REQUIREMENTS FOR CASTINGS FOR RAILWAY ROLLING STOCK).
* A-28-18 LAP WELDED AND SEAMLESS STEEL BOILER TUBES, BOILER FLUES AND SUPERHEATER PIPES, SAFE ENDS, AND ARCH TUBES FOR LOCOMOTIVES.
A 30-18 BOILER AND FIRE BOX STEEL
A 57-16 WROUGHT SOLID CARBON STEEL WHEELS FOR STEAM RAILWAY SERVICE.
A 61-16 HELICAL SPRINGS FOR RAILWAYS
A 62-16 ELLIPTIC SPRINGS FOR RAILWAYS

——WROUGHT IRON——

A 38-18 LAP WELDED, CHARCOAL IRON BOILER TUBES, BOILER FLUES, SAFE ENDS, AND ARCH TUBES FOR LOCOMOTIVES
A 39-18 STAYBOLT IRON

——CAST IRON——

A 45-14 LOCOMOTIVE CYLINDERS (CAST IRON)
A 48-18 GRAY IRON CASTINGS

* THESE SPECIFICATIONS ARE TO INCLUDE THE MODIFICATIONS IN SULPHUR AND PHOSPHORUS AND MANGANESE LIMITS RECOMMENDED BY THE SOCIETY ON ACCOUNT OF THE WAR AND WILL APPLY UNTIL THE LIMITS SHOWN IN THE SPECIFICATIONS ARE RESTORED BY THE SOCIETY.

6 MATERIALS TO BE INSPECTED BY THE B. L. W.
CONSTRUCTION OF LOCOS. AT THE PLANTS TO BE INSPECTED BY R. W. HUNT & COMPANY.

7 LOCOS. TO BE BUILT IN ACCORDANCE WITH I. C. C. REQUIREMENTS.

8 PRINCIPAL PARTS OF ENGINE FITTED TO GAUGES AND TEMPLATES, AND INTERCHANGEABLE.

9 BOLTS AND NUTS: ALL BOLT THREADS U. S. STANDARD, EXCEPT WHERE FINER THREADS ARE NECESSARY.
ALL FINISHED REMOVABLE NUTS CASE HARDENED.
FITTINGS MANUFACTURED OUTSIDE TO HAVE MAKERS' STANDARD THREADS.

10 ROLLED MECHANICAL JOINTS FOR MISCELLANEOUS COPPER PIPE CONNECTIONS NOT TO BE USED.

15 TWO TRAVERSING JACKS WITH RATCHET HEAD AND LEVERS AS B.L.W. DRAWING NO. 168, MADE BY DUFF MANUFACTURING CO.

16 TWO JOHNSON-TYPE WRECKING FROGS SUITABLE FOR 75 POUNDS RAIL.

17 SAND SCOOP AS ALCO PRINT 932-S-9333 ~~TO BE PROVIDED.~~
~~ALL 20 SCOOPS TO BE PUT INTO ONE OF THE ENGINES YET TO GO FORWARD AND ADVISE MR. WM. KELLY ON WHICH ENGINE SCOOPS ARE PLACED, SO HE CAN ADVISE THE ENGINEER TO DISTRIBUTE ONE SCOOP TO EACH ENGINE.~~

18 FIVE GALLONS LOCOLINE ENGINE OIL SPECN. "P".
FIVE GALLONS LOCOLINE VALVE OIL, SPECN. "R-2".

19 BOILER TO BE CAPABLE OF CARRYING WITH A FACTOR OF SAFETY OF 4½, A WORKING PRESSURE OF 180 POUNDS PER SQUARE INCH.
BOILER TO BE TESTED IN ACCORDANCE WITH THE B. L. W. STANDARD PRESSURES, I. E., 200 LBS STEAM AND 240 LBS. WATER.

20 BOILER PLATES TO BE PLANED AT EDGES AND CAULKED WITH ROUND-NOSE TOOL.
RIVET HOLES TO BE REAMED AFTER ASSEMBLING TO INSURE UNIFORM HOLES, AND TO BE SLIGHTLY COUNTERSUNK UNDER HEADS OF RIVETS.
RIVETS DRIVEN BY HYDRAULIC OR PNEUMATIC PRESSURE WHEREVER POSSIBLE.

21 BOILER TO HAVE SLOPING BACK HEAD.

22 DOME TO BE WELL SECURED TO BOILER, WITH SHEET THOROUGHLY REINFORCED AT OPENING.
DOME CAP OF PRESSED STEEL 1½" THICK.

23 AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE.

24 FIRE BOX TUBE SHEET SEAMS TO BE WELDED ON THE FIRE SIDE ABOVE FIRE BRICK ONLY.

25 FIRE DOOR TO BE AS U. S. R. A. DRAWINGS.

26 MUD RING TO BE OF CAST STEEL.

28 ALL RIGID STAYBOLTS, INCLUDING RADIAL STAYS, TO BE MADE OF READING IRON CO'S. STAYBOLT IRON, FOR THESE ENGINES, EXCEPT HOLLOW STAYS TO BE MADE OF ROME HOLLOW IRON.
TATE FLEXIBLE STAYS TO BE MADE OF BURDEN IRON, OF THE SAME QUALITY AS ROME SUPERIOR IRON.

29 TATE FLEXIBLE STAYS IN BREAKING ZONE, LOCATED AS FOLLOWS:-

THROAT -	72
BACKHEAD -	65
SIDES -	242
TOTAL -	379

30 BOILER CROWN STAYS TO BE ⅞" IN BODY, 1-1/32" SMALL END AT BOTTOM, WITH TAPER OF 2" IN 12" AND HEAD RIVETED OVER, TOP TO BE 1" STRAIGHT. (SEE SUP. 28)

31 BOILER TO HAVE U. S. R. A. BOILER BRACES.

32 HOLLOW STAYBOLTS TO BE ARRANGED BACK OF FIRE BRICK AND OTHER PARTS IN ACCORDANCE WITH I. C. C. LAWS. (SEE SUP. 28)

36 CHARCOAL IRON BOILER TUBES FROM PARKESBURG IRON COMPANY.
TUBES TO BE SET WITH ¾" SPACES.
HOLES IN FRONT AND BACK TUBE SHEETS FOR TUBES AND FLUES ARE TO BE AS FOLLOWS:-
FLUES, FRONT END 5-15/32" AND TUBES FRONT END 2-1/32"
FLUES, BACK END 4⅝" AND TUBES BACK END 1-63/64"
COPPER FERRULES TO BE NO. 16 THICK.
FLUES AND TUBES TO BE SET IN ACCORDANCE WITH B. L. W. DRAWINGS NOS. 238 AND 236.
ALL TUBES AND FLUES TO BE WELDED TO FIRE BOX TUBE SHEET.

37 FIRE BRICK TO BE APPLIED TO LOCOS. BEFORE SHIPMENT.

38 OIL BURNER TO BE VON-BODEN-INGLES 3½" BURNER WITH ½" STEAM PIPE CONNECTIONS TOP AND BOTTOM. BOILER WILL BE RECEIVED TAPPED FOR 1¼" OIL CONNECTION.
OIL HEATER ON ENGINE TO BE LARGE HEATER TYPE.
OIL REGULATOR ON BACK HEAD TO HAVE SAME RIGGING AS FOR THE U. S. R. A. ENGINES, WITH A SLIGHT MODIFICATION IN THE BRACKET CONNECTION TO BOILER.
OIL AUTOMATIC CUT-OUT TO BE IN ACCORDANCE WITH A. L. CO'S. DRAWING 612-S-2990.
CONNECTIONS BETWEEN ENGINE AND TENDER FOR OIL SUPPLY LINE TO BE BARCO FLEXIBLE JOINTS. (SEE SUP. 112)
CONNECTIONS BETWEEN ENGINE AND TENDER FOR OIL STEAM HEAT LINE TO BE BARCO FLEXIBLE JOINTS. (SEE SUP. 112)

39 FIRE PAN OF STEEL PLATE. (SEE SUP. 37)
FIRE PAN DESIGN TO BE WHAT IS KNOWN AS A FLAT BOTTOM PAN AND NOT THE ROUND BOTTOM PAN.

40 DRY PIPE TO BE STANDARD PIPE, 6" INSIDE DIAMETER.

41 SUPERHEATER AS THE SUPERHEATER CO'S. SPECN. O-16532, DATED 7-15-21 (COPY ATTACHED).
SUPERHEATER TO BE SUPERHEATER CO'S. FIRE-TUBE TYPE, WITH OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBER.
ROYALTY ON SUPERHEATER PAYABLE BY THE B. L. W.

42 PATENT PLATES (HEREWITH) FROM THE SUPERHEATER CO. COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

43 STEAM PIPES TO HAVE SAME ARRANGEMENT OF STUFFING BOX AS FOR THE U. S. R. A. ENGINES.

44 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

45 SMOKE BOX FRONT AND DOOR OF PRESSED STEEL, CAREFULLY FITTED.

46 EXHAUST PIPE SAME AS FOR BALDWIN 2-8-2 TYPE LOCOS.
CLEANING PIPE SAME AS FOR BALDWIN 2-8-2 TYPE LOCOS.

For Hereafter- See note on Specn. 13.44¼ E 156 to 165. Book No. 74, page 426, regarding Stack, exhaust and Oil Burning arrangement. R.S.McC. 6-8-32.

51 STEAM GAUGE TO HAVE 6½" DIAL, GRADUATED TO 400 POUNDS.
DIAL TO BE MAKER'S STANDARD.

52 WATER GAUGE TO BE NATHAN REFLEX NO. 4, SAFETY TYPE.
GAUGE COCKS TO BE O'MALLEY-BEARE PERFECTION.

53 BLOWER VALVE TO BE 1½" DIAM. PLACED IN TURRET WITH IRON PIPE CONNECTION.

54 BLOW-OFF COCKS TO HAVE FLANGE CONNECTION TO BOILER, MANUFACTURER'S PRINT C-40-D-2.

55 WASHOUT PLUGS TO HAVE PRESSED STEEL COLLARS IN JACKET.

56 INJECTOR STEAM VALVE TO BE NATHAN, SCREW-TYPE.
INJECTORS TO HAVE INTERMEDIATE VALVES AND CAB STANDS.
INJECTOR CHECK TO BE NATHAN SIDE INLET, 1918 TYPE, U.S.R.A. WITH NUT AND SLEEVE CONNECTION (INSTEAD OF FLANGED).
INJECTOR CHECKS TO HAVE STOP VALVES.
FEED PIPE STRAINER OF MALLEABLE IRON, SAME DESIGN AS FOR 12 44 ¼ E 127 ETC.

57 CAB TURRET TO BE OF CAST STEEL.
MISCELLANEOUS GLOBE AND ANGLE VALVES SAME AS U. S. R. A. ENGINES WITH BRAZED COPPER PIPES WHERE COPPER IS USED. (SUP. 10)

58 CAB TO BE MADE OF NO. 10 STEEL PLATE, THOROUGHLY BRACED AND SECURED TO BOILER AND RUNNING BOARDS, FURNISHED WITH SUITABLE SLIDING WINDOWS, AND WITH CONVENIENT TOOL BOXES, SEATS, CUSHIONS AND ARM RESTS FOR ENGINEER AND FIREMAN.
CAB SASH AND GLASS TO BE IN ACCORDANCE WITH B. L. W. STANDARD SIZES.. CAB GLASS MUST BE EQUAL TO QUALITY AND THICKNESS FURNISHED BY ALCO, I. E., AMERICAN DOUBLE "A".
CAB WINDOWS 3/16" AMERICAN POLISHED GLASS.
CAB SEATS TO BE B. L. W. DESIGN.
ARM RESTS TO BE MADE TO SUIT CAB.
CAB APRON HINGE TO BE ORDINARY EXTRA HEAVY HINGE.

59 RADIAL BUFFER FROM FRANKLIN RAILWAY SUPPLY CO.
RADIAL BUFFER, WEDGE TYPE, BETWEEN ENGINE AND TENDER.
DRAWBAR TO BE SINGLE, WITH SAFETY CHAINS, BETWEEN ENGINE AND TENDER.

60 FRONT BUMPER TO BE U. S. R. A. DESIGN, LOCATED 47" FROM TOP OF BUMPER TO TOP OF RAIL.

61 ENGINE COUPLERS TO BE A. R. A. WITH 6" x 8" SHORT SHANK AND WITH 11" SOLID FACE KNUCKLE AND ARRANGED FOR 3" DRAW PIN.
COUPLER FROM AMERICAN STEEL FOUNDRIES, WITH NATIONAL MALLEABLE CASTING CO'S. EXTENDED FLOOR POCKET.

62 CLASSIFICATION LAMP HOLDERS ON SIDES OF SMOKE BOX.

63 HEADLIGHT EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHT.
ELECTRIC CONNECTIONS AND WIRING TO BE IN ACCORDANCE WITH A. L. CO'S. DRAWINGS 743-S-93450 AND 743-S-93351.
HEADLIGHT TO BE LOCATED ON TOP OF SMOKE BOX SAME AS B. L. W. ENGINES.

64 BELL TO BE AS U. S. R. A. SHEET 2511, WITHOUT BELL RINGER.

65 DOME CASING TO BE SAME AS FOR U.S.R.A. 462-A TYPE ENGINES.

66 JACKET CLAMPS TO BE B. L. W. STANDARD.

67 DOME TO BE LAGGED WITH SECTIONAL MAGNESIA BLOCKS FOR 10 36 E 3620 AND AFTER.

SPECIFICATION FOR LOCOMOTIVES : 10 36 E 3607 to 3626

FOR : NATIONAL RAILWAYS OF MEXICO
Specification for Type A Double Loop Superheater. #0-16532 DATED JULY 15, 1921.

BOILER TUBES	156 in number 2 o.d 14 ft 6 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	24 in number 5" o.d #9 BWG of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card	1106-S
BOILER FLUE SETTING	1/8 in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, headed and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card	10051
TUBE SHEET LAYOUT	Card	5668
UNITS	24 units 1½" o.d #9 BWG Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card	10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card	1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A Card	1064-M
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card	AHM 3x8 10560-A
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card	1323
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units. Card	SEE ARRGT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card	4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card	1067
PYROMETER	Model No. Pyrometer. Card	NONE
PYROMETER ARRANGEMENT	Generally in accordance with. Card	
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration. Card	
S. H. ARRANGEMENT	In accordance with. Card	4L-40837
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 2L-11518-P	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 1.1115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 1.1114	S. H. PIPE END	Card 1344
DAMPER CYCL. PIPE CONNECTION	Card 1L-11437	S. H. PIPE BAND	Card 1988
DAMPER CYL. PIPING DIAGRAM	Card 2L-11452	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card 1068-M	RETURN BENDS	Card 11022
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (O. S.)	Card 1148	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT BEARING (I. S.)	Card 10386-F	DEFLECTING PLATE STUDS	Card 10809
DAMPER SHAFT LINK	Card 1.1177-A	DEFLECTING PLATE CLAMP	Card 10809-A
PATENT PLATE	Card 3L-3367-L		
DAMPER RIGGING	Card 2L-11496-D		

SPECIFICATION FOR LOCOMOTIVES 10 36 E 3607 TO 3626
FOR NATIONAL RAILWAYS OF MEXICO
P

70 FRAMES TO HAVE SINGLE FORWARD SECTION, WITH LUGS FOR HOLDING CYLINDERS.
FRAMES TO BE THOROUGHLY BRACED TOGETHER AND TO BOILER BY SUITABLE CASTINGS, BRACES, EXPANSION PLATES AND PADS.

71 PEDESTAL CAPS TO BE LUGGED AND BOLTED TO BOTTOM OF PEDESTAL.

72 PEDESTAL SHOES AND WEDGES OF CAST IRON.
SHOE AND WEDGE SETTING AS PRINT.

73 CYLINDERS OF CLOSE GRAINED IRON AS HARD AS CAN BE WORKED.
CYLINDERS CAST WITH HALF SADDLE ATTACHED, SECURED TOGETHER IN A SUBSTANTIAL MANNER AND ACCURATELY BOLTED AND KEYED TO FRAMES.

74 CYLINDERS TO HAVE GRAPHITE LUBRICATORS, I. E., TWO GRAPHITE LUBRICATING CUPS FOR AMORPHOUS DRY GRAPHITE, FROM THE UNITED STATES GRAPHITE COMPANY. SHANKS TO BE THREADED ¾" PIPE THREAD.

75 CYLINDER HEAD COVERS OF PRESSED STEEL, ⅛" THICK, PAINTED.

76 GUIDES TO BE SECURELY BOLTED TO CYLINDER HEADS AND TO RIGID GUIDE YOKE EXTENDING ACROSS FRAMES.

77 CRANK PINS OF HAMMERED OPEN HEARTH STEEL.

78 CONNECTING RODS OF HAMMERED OPEN HEARTH STEEL, FITTED WITH ADJUSTABLE BRONZE BEARINGS.
MAIN ROD TO HAVE SOLID FRONT END AND STRAP BACK END.
PARALLEL RODS OF HAMMERED OPEN HEARTH STEEL WITH BRONZE BUSHINGS.

79 VALVE GEAR TO BE PURCHASED FROM THE PILLIOD COMPANY.
VALVE MOTION DETAIL PARTS OF SOFT STEEL, WITH CASE HARDENED WEARING SURFACES. BUSHINGS OF BRONZE OR SOFT STEEL CASE HARDENED.

80 POWER REVERSE GEAR TO BE RADONNET, COVERED ON EXTRA ORDERS 10396 DATED 9-2-21 FOR 10 36 E 3606 TO 3616, AND EXTRA ORDER No. 10439 DATED 9-2-21 FOR 10 36 E 3617 TO 3626.

81 ALL BEARINGS ON ENGINE PROVIDED WITH SUITABLE MEANS FOR THEIR PROPER LUBRICATION.

82 FLANGE LUBRICATOR TO BE DETROIT FOUR-FEED, AND TO BE PIPED TO No. 3 AND No. 6 WHEELS.

83 DRIVING TIRES AND WHEELS FROM STANDARD STEEL WORKS.

84 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS - 5/16" TOTAL.

85 AXLES OF HAMMERED OPEN HEARTH STEEL.

86 FRONT ENGINE TRUCK TO BE MODIFIED TO AVOID PLAYER PATENT.

87 ENGINE TRUCK BOXES TO WORK IN SUITABLE PEDESTALS WITH APPROVED ARRANGEMENT OF EQUALIZING BEAMS AND SPRINGS.

88 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS ¼" TOTAL.

89 ENGINE TRUCK AXLES OF HAMMERED OPEN HEARTH STEEL.

90 ROLLED STEEL WHEELS FROM STANDARD STEEL WORKS.

91 MAIN AIR RESERVOIRS TO HAVE A CAPACITY OF NOT LESS THAN 45,000 CUBIC INCHES.

92 AIR PUMP STEAM PIPE TO BE 1¼" IRON PIPE, AND TO BE LOCATED OUTSIDE OF JACKET.
AIR PUMP TO HAVE WESTINGHOUSE No. 54 STRAINER.

93 BRAKE PIPE FITTINGS TO BE CRANE.
AIR BRAKE CONNECTIONS BETWEEN ENGINE AND TENDER TO BE BARCO FLEXIBLE JOINTS. (SEE SUP. 112)

94 DOHNER COMPRESSION FITTINGS TO BE USED ON ALL BRAKE COPPER PIPES ⅜" DIAM. AND ½" DIAM., AND FOR STEAM GAUGE PIPES ⅜" DIAM.
NOT TO BE USED ON OIL PIPES.

TENDER

101 TENDER, EXCEPT CAPACITY, TO BE SAME AS BALDWIN 2-8-2 TYPE LOCOS

102 TANK TO BE MADE OF STEEL PLATES STRONGLY RIVETED TOGETHER, WITH ANGLE IRON CORNERS, THOROUGHLY BRACED AND STAYED, AND WELL SECURED TO TENDER FRAME.
TANK TO BE SO CONSTRUCTED THAT THE OIL TANK CAN BE REMOVED, SO THAT TENDERS CAN BE USED IF SO DESIRED FOR COAL BURNING ENGINES.

103 OIL TANKS TO BE BRACED TO HOLD WORKING PRESSURE OF 5 POUNDS.
OIL TANK TO HAVE ONE SAFETY VALVE SET TO 5 POUNDS (APPROVED MAKE).
OIL TANK FILLING HOLE TO BE B. L. W. DESIGN.
OIL HEATER TO BE OF THE CLOSED TYPE.

104 OIL TANK CAPACITY CHART AND MEASURING ROD TO BE MARKED IN SPANISH, IN THE METRIC SYSTEM, IN LITROS PER DECIMETER, WITH A SMALL MARK PLACED CENTRALLY BETWEEN THE DECIMETER GRADUATIONS

105 CLASSIFICATION LAMP HOLDERS ON REAR OF TENDER.

106 TENDER COUPLER TO BE A. R. A. WITH 5" x 8" SHANK AND WITH 11" SOLID FACE KNUCKLE, FROM THE AMERICAN STEEL FOUNDRIES WITH SHANK ARRANGED WITH KEY CONNECTION FOR DRAFT GEAR.
DRAFT GEAR TO BE BRADFORD ROCKER TYPE, WITH FARLOW ATTACHMENTS.

107 TENDER TRUCK SIDE FRAMES OF CAST STEEL, FROM PITTSBURGH STEEL FOUNDRY COMPANY, WITH HEAVY BOLSTERS OF CAST STEEL.

108 TENDER SPRINGS TO BE OF SAME CAPACITY AS FOR TENDERS OF MIKADO ENGINES.

109 TENDER TRUCK BOXES TO BE SYMINGTON, AS SHOWN ON MANUFACTURER'S DRAWING M-831-A, - FROM STOCK.

110 ROLLED STEEL WORKS FROM STANDARD STEEL WORKS.

111 TENDER BRAKE BEAMS TO BE DAVIS SOLID TRUSS BRAKE BEAM, A.R.A. No. 3, AS SHOWN ON DAVIS BRAKE BEAM CO'S. PRINT No. 736.

112 METALLIC JOINTS BETWEEN ENGINE AND TENDER TO BE SAME DESIGN AS FOR U. S. R. A. ENGINES (SEE SUP. 38 AND 93)

THE BALDWIN LOCOMOTIVE WORKS As Specn. F-130.

Memorandum Spec'n 19043-A

SPECIFICATION FOR LOCOMOTIVES 12 3½ ¢ E 50 to 54.

FOR National Railways of Mexico.

HNB.

9-23-20

Ry. Co's Class K-10

Gen. as Photo. 5175. {Except omit pilot back of tender.

Engine Drawing No. 21.

Gauge of Road 4' 8½" Play ⅜"

Wheelbase, Rigid 13' 1" Driving 13' 1" Total 27' 1"

Total wheelbase, eng. and tend. {Actual 59' 7½" / Limited to ---

Curves --- Grades: (See sup. 1)

Limits, Height --- Width ---

Weight (approximate) in working order, Total 180,000 pounds.

On F. tr'k 16,000 lbs., Drivers 144,000 lbs., B. tr'k 20,000 lbs.

Weight of engine empty, about 159,050 pounds.

Tractive power 35,700 lbs., Ratio of adhesion 4.04.

Work'g St'm Pres. 180 lbs., Service Freight.

Fuel Oil. (See sup. 5)

Boiler Steel. Thick ¾" Bill 9310.

Front Tube Sheet ½" Thick.

Boiler, Diam. 74" Plan Straight top.

Allowable st'm pres. 200 lbs. **Tested to** 220 lbs. steam pres.

With Factor of Safety of 4.59 267 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips.

Dome, diam. 33" Pos. Forward of fire box.

Main dome, one-piece type. Auxiliary dome, None.

Firebox Steel. Combustion chamb. None.

Firebox, length 90-3/16" Width 66" Depth F. 68¼" B. 66¼"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back 5/16"

Firedoor opening Oval, 13" x 18". Crown and sides in one sheet.

Water space, Front 4" Sides 3½" Back 3½"

Water space frame Single. Riveted

Water space stays ⅞" diam., with 3/16" holes 16" deep from O.S.

Radial stays 1" diam. Sling stays front {Three rows B. L. W. / Expansion stays.

Button heads below crown on Eight central rows

Crown bars None. Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G. Steel. For 50 to 54 only. No. 12 for hereafter.

Tubes No. 11 B.W.G. Charcoal iron or steel, (B.L.W. option).

Tube ends Swaged for copper ferrules, fire box ends.

Number {28 / 199 Diam. {2⅝" / 2" Length 16' 3"

Heating Surface Flues 637 sq. ft. Combus. Chamb. --- Total 2475 sq. ft.

Tubes 1684 sq. ft. Fire Box 154 sq. ft. Fire Brick Tubes ---

Grate area 41.3 sq. ft. Ratio to Heating Surface 1: 60.

Superheater 530 sq. ft.

Fire Brick Arch, None.

Fire box lined with fire brick, for oil burning.

Fire brick pavement in pan.

Grates None.

Ash Pan, Dampers Front and back.

Throttle to have auxiliary drifting valve.

Throttle Balance. Pos. Dome.

Dry pipe Steel.

Superheater Schmidty type, (See sup. 6)

Smokebox extension With. Cleaning hole and cap None.

Spark ejector or hopper None.

Baffle and deflect. plates With.

Superheater Header

Exhaust nozzles Double Lok.

Adjustable cleaning pipe : With.

Stack Straight. Dia. 18"

Safety Valves Two Coale 3" Open. (Not Spec.)

Safety valves None with relief lever, Set to 180 pounds.

Whistle One B. L. W. Plain.

Steam Gauge One Brass 7" Maker: Ashcroft. (Not Spec.)

Steam gauge stand Brass. **Clock** None.

Water Gauge One B.L.W. Ironclad **Cab Lamps** Electric.

Gauge Cocks Three, back. Surface valve None.

Lowest gauge cock 3" above highest part of crown

Lubricator steam valve Without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock One Johnstone, Pos: Front.

Cleaning Plugs One plug above fire door.

Firebox, Corners diagonal sides and back.

Crown, Two each side and four back.

Waist, One under front.

Front tube sheet, Two Fusible plug One.

Pressed steel collars riveted to jacket around cleaning holes.

Pump None.

Injectors (Spec.) Two Friedman (See sup. 8) No. (See sup. 8)

Injectors, Pos. (See sup. 8) Steam pipes Copper.

Pipes, Check Copper. Feed Copper. Overflow Iron.

Check B. L. W. Pos. R. and L.

Steam Heat None.

Cab Steel. Crystal plate glass cab windows.

Cab boards Steel. Nosing T-Iron.

Running boards Steel. Nosing T-Iron.

Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 31"

Pilot Wood.

Front Bumper Oak. Bumper plate With.

Steps Hand holds, etc., to conform to I. C. C. requirements.

Front Drawhead, Center above rail 34"

Coupler Sharon M. C. B. Auto., Standard size, with National floor pocket.

Signal fixtures Iron on bumper.

Headlight Two round case 18" Reflector.

Headlight, Nos. on sides With. H'dl't step With.

Lamp shelf None. Nosing ---

Bell 92 pounds.

Sand Box Two Diam. 31" Body Iron painted. Pipes Iron.

Sander Leach air, trap A-1, in each box, to sand front of front and back of back drivers.

Dome casing Iron painted.

Boiler Jacket #18 Soft steel ptd. Bands Iron. Style 9 and 14.

Boiler Lagging Magnesia sectional.

Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

H. V. McNeil

SPECIFICATION FOR LOCOMOTIVES 12 3½ ¢ E 50 to 54. Dec. 1921.

FOR National Railways of Mexico.

409

411

Frames Cast steel.

Cylinders, Diam. 20" Stroke 28"

St'm ports, Length 27.9" Width 1⅞" Bridges ---

Exh. ports, Length --- Width --- Valve lead 3/16"

Valve travel 6" Steam lap 1" Exhaust clearance ---

Eccentric crank throw 22" By-pass valve None.

S. F. Lubr. Nathan triple No. 9 Bull's Eye. (Spec.)

Cyl'r heads Cast iron. Lubr. pipes of copper O.S. of jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

St'm chest casings --- Covers ---

St'm chest valves 12" diam., Piston type.

Met. pkg. {Piston rods / Valve stems United States, King type (Spec.)

Piston rods to be keyed to crossheads.

Pistons Heads of cast iron, rings of cast iron sprung in.

Guides Laird type, steel. Oil cups Needle.

Crossheads Cast steel, with bearings of cast iron, tinned.

Wrist Pins Steel. Rod cups Plunger.

Parallel rods to have solid ends.

Valve Motion Southern. (See sup. 3. 10)

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Wearing Bearings B. L. W.

Driving wheel hub liners Brass, on main wheels only.

Drivers, O. S. Diam. 48" Cen. diam. 42"

Wheel centers;-main cast steel, others, cast iron.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. Front and back. Size 3" x 5½"

Tires, Plain, Pos. Intermediate. Size 3" x 6½"

Lateral play between driving boxes and wheel hubs = 3/16" total.

Driving Boxes Steeled cast iron.

Journals, Diam. 9" Length 10"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing.

To swing 2⅝" each side of cen., Cen. pin liners None.

Journals, Diam. 6" Length 10" Boxes Cast iron.

Wheel hub liners None.

Wheels, Diam. 28" Tread --- Kind Cast iron spoke centers.

Tires Steel. Cen. diam. 23" Size 2½" x 5½"

Tires held by Shrinkage and shoulder.

Back Engine Truck Two Wheeled Rushton radial.

To swing 2¼" each side of cen., Cen. pin liners None.

Journals, Diam. 6" Length 10" Boxes Cast iron.

Wheel hub liners None.

Wheels, Diam. 36" Tread --- Kind Cast iron spoke centers.

Tires Steel. Cen. diam. 31" Size 2½" x 5½"

Tires held by Shrinkage and shoulder.

Brake, position On all driving and tender wheels.

Operating Engine, sch. No. 6 ET. Westg. combined auto. and

Parts Eng. Tr'k, sch. --- straight air.

Foundation Drivers, sch. WN-2 American O. S. equalized.

Parts Eng. Tr'k, sch. ---

Air pump One 9½" Pos. Left side.

Train connections Front and back.

Train signal, sch. None.

Air reservoirs to have hydrostatic test of 210 pounds.

Tender Eight Wheeled, Drawing No. 1652.

Weight, with fuel and water, about: 136,000 lbs. {Weight empty about 55,000 lbs.

Oil, 3000 / Water, 8000 Gallons. Bill 5997 / 5993 {Tender to be weighed: Yes.

Tank "U" shape, straight top. Tank cock and hose, with.

Tool Boxes Steel, top.

Tender floor of steel.

Frame Steel, 12" channels, with bumpers of steel plate.

Front Drawbar height 30½"

Pilot None.

Back drawhead, center above rail 34"

Coupler Sharon M. C. B. Auto. Standard size, with National floor pocket.

Steps Hand holds, etc., to conform to I. C. C. requirements.

Trucks Arch bar type with bolsters of cast steel.

Springs Elliptic, B. L. W. make

Journals, Diam. 5½" Length 10"

Wheels, Diam. 33" Tread --- Kind Cast iron spoke centers.

Tires Steel. Cen. diam. 28" Size 2½" x 5½"

Tires held by Shrinkage and shoulder.

Safety chains Single.

Brake Position On all wheels.

Brake sch. No. 6 ET. Westg. ~~6DH1450~~ auto. and straight air, with 12" x 12" tender brake cylinder.

List of tools, sch. 31. Two traversing jacks.

Photo sch. No. 2. Inspection B. L. W. (See sup. 2 etc)

To be weighed Yes. Material specs B. L. W.

Certificate of boiler test Three copies B. L. W. form 1036.

Junior laws to 12-17-20. Shipment On own wheels.

Brass shop finish, No. 1.

Machine shop finish D-165

Patents {B. L. W. / None.

Property plates None.

Painting, style—Olive green, no striping.

Lettering to be as print dated June 21, 1919 (herewith).

Classification mark on cab sides: K-10

Mark on tank sides: N. de M.

Mark on back of tank {Capacidad / Agua 30280 Litros. / Aceite 11355 Litros.

Road Nos. Pos. Road Nos Name None.

F. No. Plate. 906 to 910

Cab sides.

Back of tender frame.

Actual Dimensions of Loco. Extreme height over all 14' 6½"

Extreme Width: Cab boards 10' 3" Cylinders or valve motion 9' 10⅝"

Length outside face front bumper of engine to face of tender wedge = 36' 2½"

Length face of tender wedge to outside face back bumper of tender = 28' 11½"

Total length outside face front bumper of engine to outside face back bumper of tender = 65' 2"

SPECIFICATION FOR LOCOMOTIVES: 12 34 & E 50 to 54.

FOR: NATIONAL RAILWAYS OF MEXICO.

HNW.

1 LOCOMOTIVE ESTIMATED TO HAUL 775 TONS (OF 2000 POUNDS) UP A STRAIGHT GRADE OF 1½, WITH FRICTIONAL RESISTANCE NOT EXCEEDING 8 POUNDS PER TON.

2 LOCOMOTIVES TO BE INSPECTED BY MR. GREENOUGH BEFORE LEAVING THESE WORKS.

3 MR. H. P. STRAYER, SECRETARY SOUTHERN VALVE GEAR COMPANY, KNOXVILLE, TENN., TO BE ADVISED BY WIRE WHEN REPRESENTATIVES SHOULD BE HERE TO LOOK OVER THE VALVE MOTION OF THESE ENGINES.

4 FIRE BOX END OF ALL TUBES TO BE WELDED AND BACK TUBE SHEET SEAMS TO BE WELDED ABOVE FIRE BRICK, IN ACCORDANCE WITH ARRANGEMENTS MADE WITH MR. SYKES AND MR. WILLE. THIS WORK COVERED BY EXTRA ORDER NO. 7196, DATED MARCH 25TH, 1921, FOR WHICH NO CHARGE IS TO BE MADE.

5 OIL BURNING ARRANGEMENT B. L. W. STANDARD, WITH BURNER PLACED IN FRONT END OF FIRE BOX. ROYALTY, IF ANY, PAYABLE BY B.L.W.

6 SUPERHEATER AS THE LOCOMOTIVE SUPERHEATER CO'S SPECN. NO. O-12410, DATED DECEMBER 13TH, 1920. (COPY ATTACHED). SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS. ROYALTY PAYABLE BY THE B. L. W.

7 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

8 INJECTORS, FRIEDMAN, NON-LIFTING, NO. 10, ON RIGHT SIDE, NO. 9 ON LEFT SIDE.
INJECTORS TO BE VERTICAL TYPE, WITH LAZY COCK KNOWN AS TYPE WF, MANUFACTURED BY NATHAN MANUFACTURING COMPANY.

9 HEADLIGHT AND EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHTS.

10 ROYALTY ON SOUTHERN VALVE MOTION PAYABLE BY THE B. L. W.

11 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOX AND WHEEL HUB, ¼" TOTAL.

12 LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOX AND WHEEL HUBS, ¼" TOTAL.

TENDER

21 TANK TO BE EQUIPPED WITH PIPE AND 3" WIRED HOSE 48" LONG FOR CONNECTING TO WATER CAR AT THE REAR WHEN NECESSARY. SAME TO BE PLACED ON LEFT HAND SIDE LENGTHWISE ON THE FOOT-BOARD OF THE TANK ON THE OUTSIDE.

22 TENDER TO HAVE M. C. B. JOURNAL BOXES.
TENDER JOURNAL BOXES TO HAVE HARRISON DUST GUARDS, (FOR 50 TO 54 ONLY). (TO USE STOCK)

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SPECIFICATION FOR LOCOMOTIVES 12 34 & E 50 TO 54

FOR NATIONAL RAILWAYS OF MEXICO.

Specification for Type A Double Loop Superheater SPECN. #O-12410 DATED DEC. 13TH, 1920.

BOILER TUBES	199 in number 2 o. d. 16 ft. 3 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	28 in number 5½ o. d #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card 1906-G
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and pressered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Pressor to have at least 12 sections. Card 1136
TUBE SHEET LAYOUT	Card 5224
UNITS	28 units 1½ o. d #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in. Card 10773
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card 1043
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card 10695
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A. Card 1999-A
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. Card 1323
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card 10018
STEAM PIPE JOINT RINGS	Of cast iron. Card 1322
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units Card 1067
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card NONE
PYROMETER	Model No. Pyrometer Card
PYROMETER ARRANGEMENT	Generally in accordance with Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration Card 4209
S. H. ARRANGEMENT	In accordance with
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 11318	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPING DIAGRAM	Card 2L-11442	S. H. PIPE HAND	Card 1968
DAMPER CYL. CONN.	Card 1L-11437	SPACING OF HANDS & SUPPORTS	Card 10759
DAMPER SHAFT	Card 1068	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT ARM	Card 1065	RETURN BENDS	Card 11022
DAMPER SHAFT BEARING (O. S.)	Card 1148	LUBRICATOR CONNECTION	Card 3023
DAMPER SHAFT BEARING (I. S.)	Card 1275-G	DEFLECTING PLATE HANDLE	Card 1487
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE STUDS	Card 10809
PATENT PLATE	Card 3272	DEFLECTING PLATE CLAMP	Card 10809-A

THE BALDWIN LOCOMOTIVE WORKS As Specn. C-7099.

Memorandum Spec'n 21024

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ E 127 to 134.

Ry. Co's Class K-11.

Gen. as Photo. 6916. {Except to have Young Valve Gear.

Engine Drawing No. 9.

FOR National Railways of Mexico.

HNW. Mexico. 7-6-21.

Gauge of Road 4' 8½" Play ¾", except 1" for F&B Drivers.

Wheelbase, Rigid 15' 0" Driving 15' 0" Total 33' 7"

Total wheelbase, eng. and tend. {Actual 66' 9½" / Limited to ----

Curves 14.30 metric degrees.

Grades, 3%.

Limits, Height (See sup. 3) Width (See sup. 3)

Weight (approximate) in working order, Total 270,000 pounds.

On F. tr'k 20,000 lbs. Drivers 210,000 lbs., B. tr'k 40,000 lbs.

Tractive power 53,000 lbs., Ratio of adhesion 3.96

Work'g St'm Pres. 190 lbs., Service Freight.

Fuel Oil, (See sup. 9)

Boiler Steel. Thick ¾" & 13/16" Bill 9437.

Front Tube Sheet ½" Thick

Boiler, Diam. 76" Plan Extended wagon top.

{Allowable st'm pres. 190 lbs. / With Factor of Safety of 5.02 — **Tested to** 210 lbs. steam pres. / 254 lbs. water pres.

Longitud. seams Butt jointed, with double covering strips.

Dome, diam. 32" Pos. Forward of fire box.

Firebox Steel. Combustion chamb. None.

Firebox, length 114⅛" Width 84¼" Depth F. 84½" B. 66"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening Oval, 16" x 20"

Water space, Front 5" Sides 5" Back 5"

Water space frame Double Riveted

Water space stays ⅞" diam. with 3/16" holes 1¼" deep from O.S.

Tate Flexible Stays in breaking zone. {Three rows B. L. W.

Radial stays 1" diam. Sling stays front → {Expansion stays.

Button heads below crown on None. central rows

Crown bars None. Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G Seamless steel.

Tubes No. 11 B. W. G. Parkesburg Charcoal Iron.

Tube ends, Swaged for copper ferrules, fire box ends.

Number {36 / 231 — Diam. {2" / 2¼" — Length 19' 3"

Tubes and flues to be fluted to fire box tube sheet.

Heating Surface: Flues 971⁰ Combus. Chamb. --- Total 3517⁰

Tubes 2318⁰ Fire Box 228⁰ Fire Brick Tubes ---

Grate area 66.6⁰ Ratio to Heating Surface 1: 52.8

Superheater 828⁰

Fire Brick Arch, None.

Fire box lined with fire brick, for oil burning.

Fire brick pavement in pan.

Grates None.

Ash Pan, Dampers Front and back.

Throttle Chambers Balance. Pos. Dome.

Dry pipe Steel or Iron. Dry pipe to have support.

Superheater Schmidt type, (See sup. 10. 11)

Smokebox extenstion None. Cleaning hole and cap None.

Spark ejector or hopper None.

Superheater deflect. plates With.

Exhaust nozzles Single, Low.

Cleaning pipe, With.

Stack Cast iron, straight. Dia. 18"

Safety Valves Two Consolidated 3" Open. (Spec.)

Safety valves None with relief lever, Set to 190 pounds.

Whistle B. L. W. Plain.

Steam Gauge One Brass 7" Maker: Ashcroft. (Spec.)

Steam gauge stand Cast iron. **Clock** None.

Water Gauge One Reflex **Cab Lamps** Electric.

Gauge Cocks Three back. Surface valve None.

Lowest gauge cock 4½" above highest part of crown

Lubricator steam valve without separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock Two Everlasting, Pos: One each side of fire box.

Cleaning Plugs One plug above fire door.

Firebox, Corners diagonal, sides and back.

Crown, Three each side and four back.

Waist, One under front and one under back.

Front tube sheet, None. Fusible plug One.

Pressed steel collars riveted to jacket around cleaning holes.

Pump None.

(Spec.) Injector starting valves to be Nathan Screw-type, No. 144.

Injectors Two Nathan type MF Non-Lifting No. 12.

Injectors, Pos. Right and left. Steam pipes Copper.

Pipes, Check Copper. Feed Copper. Overflow Iron.

Check Nathan, with stop valves. Pos. Right and left.

Injector checks to be Nathan 1918 Special.

Steam Heat None.

Cab Steel, lined with wood throughout, including roof.

Crystal plate glass cab windows.

Cab boards to be covered with wood.

Cab boards Steel. Nosing T-Iron.

Running boards Steel. Nosing T-Iron.

Hand rail Iron. Located on Boiler.

Back Bumper Bar steel. Back drawbar height 35"

Franklin Radial buffer between engine and tender.

Drawbar to be single, with safety chains, between eng. and tend.

Pilot of steel section.

Front Bumper Cast steel, Bumper plate With.

Steps and hand holds, to conform to I. C. C. requirements.

Front Drawhead, Center above rail I.C.C. Standard, I.E., 33½"

Coupler M. C. B. Automatic from American Steel Foundries, with extended floor pocket from National Malleable Castings Co.

Signal fixtures Iron on bumper.

Headlight and equipment to be Pyle National Electric, type K-2, with incandescent headlights.

Headlight One round case 18" Reflector,

Headlight, Nos. on sides With. H'd'l't step With.

Lamp shelf None. Nosing ---

Bell 92 pounds.

(Spec.) **Sand Box** One Diam. 33" Body Iron painted. Pipes Iron.

Sander Graham White air, double, to sand front and rear.

Dome casing Iron painted.

Boiler Jacket #18 Soft steel ptd. Bands Iron. Style 9 and 14.

Boiler Lagging Magnesia sectional.

Back head of boiler to be lagged and jacketed.

THE BALDWIN LOCOMOTIVE WORKS

E. O. Elliott Sept. 1921.

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ E 127 to 134.

FOR National Railways of Mexico.

HNW.

413 415

Frames Cast steel, with separate slab section at rear.

Cylinders, Diam. 25" Stroke 30"

St'm ports, Length 33" Width 1-11/16" Bridges ----

Exh. ports, Length --- Width ---- Valve lead ¼"

Valve travel 9" Steam lap 1⅛" Exhaust clearance 1/16"

Eccentric crank throw --- By-pass valve None.

F. Lubr. Nathan five feed No. 31 Bull's Eye. (Spec.)

Cyl'r heads Cast steel, Lubr. pipes of copper under jacket.

Cyl'r casings Iron painted. Head covers Steel painted.

St'm chest casings ---- Covers ----

St'm chest valves 14" diam., Piston type.

Met. pkg. {Piston rods / Valve stems} United States, King type. (Spec.)

Piston rods to be keyed to crossheads.

Pistons Heads of cast steel, rings of cast iron sprung in.

Guides Alligator type, steel. Oil cups Needle.

Crossheads Cast steel, with bearings of cast iron, tinned.

Wrist Pins Steel. Rod cups Plunger.

Parallel rods to have solid ends.

Valve Motion Young. (See sup. 14 etc)

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

Reverse Gear: (See sup. 16)

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

Five gallons Locoline engine oil, specification "P".

Five gallons Locoline valve oil, specification "R-2"

Wearing Bearings "Vim"

Driving wheel hub liners Bronze.

Drivers, O. S. Diam. 57" Cen. diam. 50", centers cast steel.

Driving tires from Standard Steel Works.

Tires Steel. Held by Shrinkage and shoulder.

Tires, Flanged, Pos. All. Size 3½" x 5½"

Tires, Plain, Pos. None. Size ----

Lateral play between driving boxes and wheel hubs = (See sup. 18)

Driving Boxes Cast steel.

Journals, Diam. {Main, 10½" Length 12" / Others, 9½"

Springs. Make B. L. W.

Front Engine Truck Two Wheeled Swing bolster, center bearing.

To swing 5 5/16" each side of cen. Cen. pin liners None.

Journals, Diam. 6" Length 12" Boxes Cast iron.

Wheel hub liners Bronze, on face of box next to hub of wheel.

Wheels, Diam. 33" Tread --- Kind {Rolled steel, from / Standard Steel Works.

Tires None. Cen. diam. --- Size ---

Tires held by --- Wheel rims, 2½" thick x 5½" wide.

Back Engine Truck Two Wheeled Hodges type, (See sup. 20)

To swing 5⅛" each side of cen.. Cen. pin liners None

Journals, Diam. 8" Length 14" Boxes Cast steel.

Wheel hub liners Bronze.

Wheels, Diam. 40" Tread --- Kind Cast steel, spoke center.

Tires Steel. Cen. diam. 34" Size 3" x 5½"

Tires held by Shrinkage and shoulder.

Back truck tires from Standard Steel Works.

Brake, position On all driving and tender wheels.

Operating Parts {Engine, sch. No. 6 ET. Westg. Combined auto. and / Eng. Tr'k, sch. ---- } straight air.

Foundation Parts {Drivers, sch. WN-3-BC, American outside equalized. / Eng. Tr'k, sch. ----

Air pump Two 11" Pos. Both left side.

Train connections Front and back.

Train signal, sch. None.

Tender Eight Wheeled, Drawing No. 1675 {Tender to be weighed: Yes.

Weight, with fuel and water, about 169,000 lbs.

Tank {Oil, 3500 5691 / Water, 8500 Gallons, Bill 5682

Tank water bottom type, with straight top.

Tool Boxes Steel, top.

Frame Steel, 12" channels, with front bumper of wood and back bumper of cast steel.

Front Drawbar height 33¾"

Pilot None.

Back drawhead, center above rail I. C. C. Standard, I.E., 33"

Coupler M. C. B Auto. from American Steel Foundries Co., with Bradford Draft Gear with Farlow attachment.

Steps and hand holds to conform to I. C. C. requirements.

Trucks Andrews cast steel side frames; Bolsters of cast steel.

Springs Elliptic, B. L. W. make

Journals, Diam. 5½" Length 10"

Wheels, Diam 33" Tread ---- Kind {Rolled Steel, from / Standard Steel Works.

Tires None. Cen. diam. --- Size ---

Tires held by --- Wheel rims 2½" thick x 5½" wide.

Safety chains Single.

Brake Position On all wheels.

Brake sch. No. 6 ET. Westg. Auto. and straight air, with 14" x 12" tender brake cylinder.

* Photograph back head of boiler to show location of cab fittings.

List of tools, sch. 166, except omit packing list case, (See sup. 4)

* Photo sch. No. 2. Inspection (See sup. 2)

To be weighed Yes. Material specns (See sup. 1)

Certificate of boiler test Three copies B. L. W. form 1036

Junior laws to 7-6-21. Shipment On own wheels.

Brass shop finish, No. 1.

Machine shop finish D-165.

Patents B. L. W. {Rear truck, 1060499, Pato. April 20, 1913, Brass plate.

Property plates B. L. W., for engine and tender.

Marking, etc., to be same as for 12 34 ½ E 50 to 54.

Painting, style --- Olive green and no striping.

Lettering to be Ry. Co's standard, in aluminum leaf.

Classification mark on cab sides. K-11

Mark on tank sides: N. de M.

Mark on back of tank: {Capacidad / Agua 32175 Litros. / Aceite 13250 Litros.

Road Nos. Pos. Road Nos. 911 to 918. Name None.

F. No. Plate.

Sand box.

Cab sides.

Back of tender frame.

Actual Dimensions of Loco. Extreme height over all 15' 1½"

Extreme Width: Cab boards 10' 5" ; Cylinders ~~or valve motion~~ = 10' 2⅝"

Length outside face front bumper of engine to face of tender wedge = 44' 5"

Length face of tender wedge to outside face back bumper of tender = 28' 9½"

Total length outside face front bumper of engine to outside face back bumper of tender = 73' 2½"

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ E 127 TO 134

FOR: NATIONAL RAILWAYS OF MEXICO

Specification for Type A Double Loop Superheater SPECN. #N37-282-D DATED JUNE 13TH, 1921.

BOILER TUBES	231 in number 2 o.d 19 ft 3 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.
BOILER FLUES	36 in number 5½ o.d #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18. Card 1109-S
BOILER FLUE SETTING	½ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prossered except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections. Card 10051
TUBE SHEET LAYOUT	Card 3L-5085
UNITS	36 units 12 o.d #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 800 lb. per sq. in.
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide. Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints. Card 1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A. Card 1064-N
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls. AHM 4x9 Card 1112D
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place. Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units. Card SEE ARMOT.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing. Card 4L-11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer. Card 1067
PYROMETER	Model No. Pyrometer. Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with. Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration. Card
S. H. ARRANGEMENT	In accordance with. Card 4L-40827
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.

DAMPER	Card 2L-11518-H	**S. H. UNIT BOLT WASHER**	Card 1071
DAMPER CYL. ARM	Card 1074	**S. H. UNIT CLAMP**	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	**S. H. UNIT CLAMP WASHER**	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	**S. H. PIPE END**	Card 1344
DAMPER CYCL. PIPE CONNECTION	Card 4L-11437	**S. H. PIPE BAND**	Card 1063
DAMPER CYL. PIPING DIAGRAM	Card 2-1142	**SPACING OF BANDS & SUPPORTS**	Card 10779
DAMPER CYL. SUPPORT	Card	**TYPE OF RETURN BENDS**	FORGED
DAMPER SHAFT	Card 1068-Z	**RETURN BENDS**	Card 11022
DAMPER SHAFT ARM	Card 1065	**LUBRICATOR CONNECTION**	Card 3021
DAMPER SHAFT BEARING (O. S.)	Card 1148	**DEFLECTING PLATE HANDLE**	Card 1437
DAMPER SHAFT BEARING (I.S.)	Card 10306-W	**DEFLECTING PLATE STUDS**	Card 10809
DAMPER SHAFT LINK	Card 1070	**DEFLECTING PLATE CLAMP**	Card 10809-A
PATENT PLATE	Card ~~3367~~ 3L-3367-L		
DAMPER BLOCKING	Card 1138-S		

SPECIFICATION FOR LOCOMOTIVES:- 12 44 ½ E 127 TO 134.

FOR:- NATIONAL RAILWAYS OF MEXICO.

HNW.

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1. THE PHYSICAL AND CHEMICAL PROPERTIES OF MATERIALS USED IN THE LOCOMOTIVES TO BE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE AMERICAN SOCIETY FOR TESTING MATERIALS, AS FOLLOWS:-

——STEEL——

- ⊛ A 10-16 STRUCTURAL STEEL FOR LOCOMOTIVES.
- A 18-18 CLASS A FORGINGS TO BE WELDED OR CASE HARDENED.
- A 20-16 CARBON STEEL FORGINGS FOR LOCOMOTIVES.
- A-21-18 CARBON STEEL TENDER AXLES.
- A 26-16 STEEL TIRES.
- ⊛ A 27-16 STEEL CASTINGS, CLASS B MEDIUM GRADE (SPECIAL REQUIREMENTS FOR CASTINGS FOR RAILWAY ROLLING STOCK.)
- ⊛ A 28-18 LAP WELDED AND SEAMLESS STEEL BOILER TUBES, BOILER FLUES AND SUPERHEATER PIPES, SAFE ENDS, AND ARCH TUBES FOR LOCOMOTIVES.
- A 30-18 BOILER AND FIRE BOX STEEL.
- A 57-16 WROUGHT SOLID CARBON STEEL WHEELS FOR STEAM RAILWAY SERVICE.
- A 61-16 HELICAL SPRINGS FOR RAILWAYS.
- A 62-16 ELLIPTIC SPRINGS FOR RAILWAYS.

——— WROUGHT IRON ———

- A 38-18 LAP WELDED, CHARCOAL IRON BOILER TUBES, BOILER FLUES, SAFE ENDS, AND ARCH TUBES FOR LOCOMOTIVES.
- A 39-18 STAYBOLT IRON.

——— CAST IRON ———

- A 45-14 LOCOMOTIVE CYLINDERS, (CAST IRON).
- A 48-18 GRAY IRON CASTINGS.

⊛ THESE SPECIFICATIONS ARE TO INCLUDE THE MODIFICATIONS IN SULPHUR AND PHOSPHORUS AND MANGANESE LIMITS RECOMMENDED BY THE SOCIETY ON ACCOUNT OF THE WAR, AND WILL APPLY UNTIL THE LIMITS SHOWN IN THE SPECIFICATIONS ARE RESTORED BY THE SOCIETY.

2. MATERIALS TO BE INSPECTED BY THE B. L. W.
CONSTRUCTION OF LOCO. TO BE INSPECTED BY R.W. HUNT & CO.

3. LIMITS OF HEIGHT AND WIDTH AS RY. CO'S GABARIT, I.E., B.L.W. TRACING 45256.

4. TOOL EQUIPMENT TO INCLUDE TWO RERAILING FROGS, JOHNSON TYPE, FOR 75 POUND RAILS.
TWO TRAVERSING JACKS.

5. BOILER: OUTSIDE DIAM OF LARGEST COURSE TO BE 86".
BOILER TO HAVE SLOPING BACK HEAD AND THROAT.

6. MAIN DOME TO BE ONE PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE LOCATED OVER FIRE BOX.

7. FIRE BOX TO BE ESPECIALLY DESIGNED FOR OIL BURNING WITH FLUSH CROWN BOLTS.
FIRE BOX CROWN AND SIDES IN ONE SHEET.
FIRE BOX TUBE SHEET SEAM TO BE WELDED ON THE FIRE SIDE ABOVE THE FIRE BRICK ONLY.

8. ALL STAYBOLTS OF ROME SUPERIOR IRON.
RIGID SOLID STAYBOLTS IN BACK HEAD ONLY TO BE EWALD IRON, 15/16" DIAM., (ACCOUNT SHOP MISTAKE.)
FLEXIBLE STAYS OF ULSTER IRON (ON ACCOUNT OF TIME) FOR 12 44 ½ E 130 TO 134 ONLY.

9. OIL BURNING ARRANGEMENT TO BE B. L. W. STANDARD WITH VONBODEN INGLES BURNER IN FRONT END OF FIRE BOX.
OIL BURNING CONNECTIONS BETWEEN ENGINE AND TENDER FOR OIL AND STEAM TO BE BARCO FLEXIBLE JOINTS.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.

10. SUPERHEATER TO BE AS THE SUPERHEATER CO'S SPECN. NO. N37-282-D DATED JUNE 13TH, 1921, (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
SUPERHEATER HEADERS TO BE MADE AT B. L. W.
ROYALTY PAYABLE BY THE B. L. W.

11. PATENT PLATES (HEREWITH) FROM THE SUPERHEATER COMPANY, COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

12. HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

13. CYLINDERS TO HAVE U.S. GRAPHITE LUBRICATOR.
DRY GRAPHITE AMORPHOUS.

14. YOUNG VALVE GEAR TO BE MADE AND APPLIED BY THE B. L. W.
ROYALTY PAYABLE BY THE B. L. W.
STOPS FOR REVERSE SHAFT TO BE APPLIED ON THE REVERSE LINK BEARING.

15. PATENT PLATES (2 PLATES PER ENGINE HEREWITH) NOS. 384 TO 391, COVERING YOUNG VALVE GEAR, TO BE APPLIED TO REVERSE LINK BEARING EACH SIDE OF ENGINE.

16. RAGGONET POWER REVERSE GEAR, TYEP "B" COVERED BY EXTRA ORDER NO. 9512, DATED 7-19-21.

17. DETROIT FLANGE LUBRICATOR FOR FRONT AND REAR DRIVERS.

18. LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

19. LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

20. BACK ENGINE TRUCK TO HAVE SWING LINK WITH SIDE BEARING.

21. LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEELS HUBS ¼" TOTAL. THERE WILL BE NO LATERAL PLAY IN BACK ENGINE TRUCK BOX PEDESTAL FITS.

22. AIR PUMP TO HAVE WESTINGHOUSE NO. 54 STRAINER.

23. MAIN AIR RESERVOIR WITH A TOTAL CAPACITY OF AT LEAST 60,000 CUBIC INCHES.
AIR RESERVOIRS TO HAVE HYDROSTATIC TEST OF 210 POUNDS.
BRAKE PIPE FITTINGS TO BE WESTINGHOUSE.
AIR BRAKE CONNECTIONS BETWEEN ENGINE AND TENDER TO BE McLAUGHLIN FLEXIBLE JOINTS.

24. FOUNDATION BRAKES TO BE BUSHED AND CASE HARDENED, SCH. BC.

——TENDER.——

26. TENDER TANKS TO BE SO CONSTRUCTED THAT OIL CANK CAN BE REMOVED SO THAT TENDER CAN BE USED, IF DESIRED, FOR COAL BURNING LOCO.

27. FRANKLIN RADIAL BUFFER BETWEEN ENGINE AND TENDER.
DRAWBAR TO BE SINGLE WITH SAFETY CHAINS, BETWEEN ENG. AND TEND.

FOR HEREAFTER:- CLASSIFICATION LAMP HOLDERS TOBE PROVIDED AT SIDES OF SMOKE BOX.

FOR HEREAFTER:- CLASSIFICATION LAMP HOLDERS TO BE PROVIDED AT BACK OF TENDER.

FOR HEREAFTER:- OIL TANK CAPACITY CHART AND MEASURING ROD TO BE MARKED IN SPANISH, IN THE METRIC SYSTEM, IN LITROS PER DECIMETER WITH A SMALL MARK PLACED CENTRALLY BETWEEN THE DECIMETER GRADUATIONS.

For Hereafter- See note on Specn 12-44¼ E 156 to 165, Books no. 7H, page 426, regarding Stacks, exhaust and oil burning arrangement. R. S. McC., 6-8-32.

THE BALDWIN LOCOMOTIVE WORKS DUP. 12 4½ ± E 13½ WITH SAME EXTRAS, EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 21024

SPECIFICATION FOR LOCOMOTIVES 12 4½ ± E 135 TO 141 — Ry. Co's Class K-11

FOR NATIONAL RAILWAYS OF MEXICO, MEXICO. — Gen. as PHOTO. 8059 — Engine Drawing No. 9

3-15-21

Gauge of Road 4' 8½" — Play ⅜" EXCEPT 1" FOR F. & B. DRIVERS

Wheelbase, Rigid 15' 0" — Driving 15' 0" — Total 33' 7"

Total wheelbase, eng. and tend. (Actual 66' 9½" / Limited to ---)

Curves 14.30 METRIC DEGREES — GRADES 3%

Limits, Height (SEE SUP. 3) — Width (SEE SUP. 3)

Weight (approximate) in working order, Total 270,000 POUNDS

On F. tr'k 20,000 lbs., Drivers 210,000 lbs., B. tr'k 40,000 lbs.

Tractive power 53,000 lbs., Ratio of adhesion 3.96

Work'g St'm Pres. 190 lbs., Service FREIGHT

Fuel OIL (SEE SUP. 9)

Boiler STEEL — Thick ¾" & 13/16" Bill 9437

Front Tube Sheet ½" Thick

Boiler, Diam. 76" — Plan EXTENDED WAGON TOP

Allowable st'm pres. 190 lbs. — **Tested to** 210 lbs. steam pres.

With Factor of Safety of 5.02 — 254 lbs. water pres.

Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS

Dome, diam. 32" — Pos. FORWARD OF FIRE BOX.

Firebox STEEL — Combustion chamb. NONE

Firebox, length 111⅛" — Width 84⅛" — Depth F. 84⅛" B. 66"

Firebox, Tube ½" — Crown ⅜" — Sides ⅜" — Back ⅜"

Firedoor opening OVAL 16" x 20"

Water space, Front 5" — Sides 5" — Back 5"

Water space frame DOUBLE — Riveted

Water space stays ⅜" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O. S.

TATE FLEXIBLE STAYS IN BREAKING ZONE

Radial stays 1" DIAM. — Sling stays front (THREE ROWS B. L. W. EXPANSION STAYS)

Button heads below crown on NONE — central rows

Crown bars NONE — Placed --- above crown

Crown bolts ---

Flues No. 9 B. W. G. SEAMLESS STEEL

Tubes No. 11 B.W.G. PARKESBURG CHARCOAL IRON

Tube ends SWAGED FOR COPPER FERRULES FIRE BOX ENDS.

Number 36 / 231 — Diam. 5⅜" / 2" — Length 19' 3"

TUBES AND FLUES TO BE WELDED TO FIRE BOX TUBE SHEET.

Heating Surface — Flues 971⁵ — Combus. Chamb. --- — Total 3517⁵

Tubes 2318⁵ — Fire Box 228⁵ — Fire Brick Tubes ---

Grate area 66.6⁵ — Ratio to Heating Surface 1: 52.8

Superheater 828⁵

Fire Brick ARCH, NONE

FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN

Grates NONE

Ash Pan, Dampers FRONT AND BACK

Throttle CHAMBERS BALANCE — Pos. DOME

Dry pipe STEEL OR IRON — DRY PIPE TO HAVE SUPPORT.

Superheater SCHMIDT TYPE (SEE SUP. 10. 11 &8)

Smokebox extension NONE — Cleaning hole and cap NONE

Spark ejector or hopper NONE

SUPERHEATER Baffling and deflect. plates WITH

Exhaust nozzles SINGLE, LOW

CLEARING PIPE, WITH

Stack CAST IRON, STRAIGHT — Dia. 18"

Safety Valves TWO CONSOLIDATED 3" OPEN. (Spec.)

Safety valves NONE with relief lever, Set to 190 POUNDS

Whistle ONE B. L. W. PLAIN

Steam Gauge ONE BRASS 7" — MAKER: ASHCROFT (Spec.)

Steam gauge stand CAST IRON — **Clock** NONE

Water Gauge ONE REFLEX — **Cab Lamps** ELECTRIC

Gauge Cocks THREE BACK — Surface valve NONE

Lowest gauge cock ½" above highest part of crown

Lubricator steam valve WITHOUT separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock TWO EVERLASTING Pos: ONE EACH SIDE OF FIRE BOX

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS DIAGONAL, SIDES AND BACK

Crown, THREE EACH SIDE AND FOUR BACK

Waist, ONE UNDER FRONT AND ONE UNDER BACK.

Front tube sheet, NONE — Fusible plug ONE

PRESSED STEEL COLLARS RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE

(Spec.) **Injectors** TWO NATHAN TYPE MF NON-LIFTING No. 12

INJECTOR STARTING VALVES TO BE NATHAN SCREW TYPE No. 1½.

Injectors, Pos. RIGHT AND LEFT — Steam pipes COPPER

Pipes, Check COPPER — Feed COPPER — Overflow IRON

Check NATHAN, WITH STOP VALVES — Pos. RIGHT AND LEFT

INJECTOR CHECKS TO BE NATHAN 1918 SPECIAL.

Steam Heat NONE

Cab STEEL, LINED WITH WOOD THROUGHOUT, INCLUDING ROOF.

CAB BOARDS TO BE COVERED WITH WOOD.

Cab boards STEEL — Nosing T-IRON

Running boards STEEL — Nosing T-IRON

Hand rail IRON — Located on BOILER

Back Bumper BAR STEEL — Back drawbar height 35"

FRANKLIN RADIAL BUFFER BETWEEN ENGINE AND TENDER.

DRAWBAR TO BE SINGLE, WITH SAFETY CHAINS, BETWEEN ENG. AND TENDER.

Pilot OF STEEL SECTION

Front Bumper CAST STEEL — Bumper plate WITH

Steps AND HAND HOLDS TO CONFORM TO I. C. C. REQUIREMENTS.

Front Drawhead, Center above rail I.C.C. STANDARD, I.E., 33½"

Coupler M.C.B. AUTOMATIC FROM AMERICAN STEEL FOUNDRIES, WITH EXTENDED FLOOR POCKET FROM NATIONAL MALLEABLE CASTINGS CO.

Signal fixtures IRON ON BUMPER

HEADLIGHT AND EQUIPMENT TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHTS.

Headlight ONE ROUND GAGE 18" — Reflector,

Headlight, Nos. on sides WITH — H'd'l't step WITH

Lamp shelf NONE — Nosing ---

Bell 92 POUNDS

Sand Box ONE Diam. 33" — Body IRON PAINTED — Pipes IRON

Sander GRAHAM WHITE AIR, DOUBLE, TO SAND FRONT AND REAR. (Spec.)

Dome casing IRON PAINTED

Boiler Jacket #18 SOFT STEEL PTD. — Bands IRON — Style 9 AND 14

Boiler Lagging MAGNESIA SECTIONAL

BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

E.O. Elliott — Nov 1921.

SPECIFICATION FOR LOCOMOTIVES 12 4½ ± E 135 TO 141

FOR NATIONAL RAILWAYS OF MEXICO

P

Frames CAST STEEL, WITH SEPARATE SLAB SECTION AT REAR.

Cylinders, Diam. 25" — Stroke 30"

St'm ports, Length 33" — Width 1-11/16" — Bridges ---

Exh. ports, Length --- — Width --- — Valve lead ¼"

Valve travel 9" — Steam lap 1⅛" — Exhaust clearance 1/16"

Eccentric crank throw --- — By-pass valve NONE

S. F. Lubr. NATHAN FIVE FEED No. 31 BULLS EYE (Spec.)

Cyl'r heads CAST STEEL. — LUBR. PIPES OF COPPER UNDER JACKET.

Cyl'r casings IRON PAINTED — Head covers STEEL PAINTED

St'm chest casings --- — Covers ---

St'm chest valves 14" DIAM., PISTON TYPE.

Met. pkg. (PISTON RODS / VALVE STEMS) UNITED STATES, KING TYPE (Spec.)

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST STEEL, RINGS OF CAST IRON SPRUNG IN.

Guides ALLIGATOR TYPE, STEEL — Oil cups NEEDLE

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL — Rod cups FOR GREASE

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion YOUNG (SEE SUP. 17 ETC)

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

REVERSE GEAR: (SEE SUP. 19)

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

FIVE GALLONS LOCOLINE ENGINE OIL, SPECN. "B"

FIVE GALLONS LOCOLINE VALVE OIL, SPECN. "A-2"

Wearing Bearings "VIM"

Driving wheel hub liners BRONZE

Drivers, O. S. Diam. 57" — Cen. diam. 50" CENTERS CAST STEEL

DRIVING TIRES FROM STANDARD STEEL WORKS

Tires STEEL — Held by SHRINKAGE AND SHOULDER

Tires, Flanged, Pos. ALL — Size 3½" x 5½"

Tires, Plain, Pos. NONE — Size ---

Lateral play between driving boxes and wheel hubs = (SEE SUP. 21)

Driving Boxes CAST STEEL

Journals, Diam. MAIN 10½" / OTHERS 9½" — Length 12"

Springs. Make B. L. W.

Front Engine Truck TWO — Wheeled SWING BOLSTER, CENTER BEARING

To swing 5 5/16" each side of cen., Cen. pin liners NONE

Journals, Diam. 6" — Length 12" — Boxes CAST IRON

Wheel hub liners BRONZE, ON FACE, OF BOX NEXT TO HUB OF WHEEL

Wheels, Diam. 33" — Tread --- — Kind (ROLLED STEEL FROM STANDARD STEEL WORKS)

Tires NONE — Cen. diam. --- — Size ---

Tires held by --- — WHEEL RIMS 2½" THICK x 5½" WIDE.

Back Engine Truck TWO — Wheeled HODGES TYPE (SEE SUP. 23)

To swing 5½" each side of cen., Cen. pin liners NONE

Journals, Diam. 8" — Length 14" — Boxes CAST STEEL

Wheel hub liners BRONZE

Wheels, Diam. 40" — Tread --- — Kind CAST STEEL SPOKE CENTER

Tires STEEL — Cen. diam. 34" — Size 3" x 5½"

Tires held by SHRINKAGE AND SHOULDER

BACK TRUCK TIRES FROM STANDARD STEEL WORKS

Brake, position ON ALL DRIVING AND TENDER WHEELS

Operating Parts — Engine, sch. No. 6-ET WESTG. COMBINED AUTO. AND STRAIGHT AIR — Eng. Tr'k, sch. ---

Foundation Parts — Drivers, sch. WH-3-BC AMERICAN OUTSIDE EQUALIZED. — Eng. Tr'k, sch. ---

Air pump TWO 11" Pos. BOTH LEFT SIDE

Train connections FRONT AND BACK

Train signal, sch. NONE

Tender EIGHT Wheeled, Drawing No. 1675 — TENDER TO BE WEIGHED: No

Weight, with fuel and water, about 169,000 POUNDS

Tank OIL 3500 — 5691 / WATER 8500 — Gallons, Bill 5682

TANK WATER BOTTOM TYPE, WITH STRAIGHT TOP.

Tool Boxes STEEL, TOP

Frame STEEL, 12" CHANNELS, WITH FRONT BUMPER OF WOOD AND BACK BUMPER OF CAST STEEL

Front Drawbar height 33½"

Pilot NONE

Back drawhead, center above rail I.C.C. STANDARD I. E., 33"

Coupler M. C. B. AUTO. FROM AMERICAN STEEL FOUNDRIES CO., WITH BRADFORD DRAFT GEAR WITH FARLOW ATTACHMENTS.

Steps AND HAND HOLDS TO CONFORM TO I. C. C. REQUIREMENTS.

Trucks ANDREWS CAST STEEL SIDE FRAMES: BOLSTERS OF CAST STEEL

Springs ELLIPTIC, B. L. W. MAKE

Journals, Diam. 5½" — Length 10"

Wheels, Diam. 33" — Tread --- — Kind (ROLLED STEEL FROM STANDARD STEEL WORKS)

Tires NONE — Cen. diam. ---

Tires held by --- — WHEEL RIMS 2½" THICK x 5½" WIDE

Brake Position ON ALL WHEELS

Brake sch. No. 6-ET WESTG. AUTO. AND STRAIGHT AIR, WITH 14" x 12" TENDER BRAKE CYDINDER.

List of tools, sch. #166, EXCEPT OMIT PACKING LIST CASE (SEE SUP. 4)

Photo sch. NONE — Inspection (SEE SUP. 2)

To be weighed NO — Material spec'ns (SEE SUP. 1)

Certificate of boiler test THREE COPIES B. L. W. FORM 1036

Junior laws to 7-6-21 — Shipment ON OWN WHEELS

Brass shop finish, No 1

Machine shop finish D-165

B. L. W., REAR TRUCK, 1060499, PATD. APRIL 20, 1913 (BRASS PLATE)

Patents SPRING CLIP, 1013774, PATD. JAN. 3, 1912 (CAST ON)

Property plates B. L. W., FOR ENGINE AND TENDER

MARKING ETC. TO BE SAME AS FOR 12 3½ ± E 50 TO 54.

Painting, style --- OLIVE GREEN, NO STRIPING

LETTERING TO BE RY. CO'S. STANDARD, IN ALUMINUM LEAF.

CLASSIFICATION MARK ON CAB SIDES: CLASE K-11

Mark on TANK SIDES N. DE M.

MARK ON BACK OF TANK CAPACIDAD / AGUA 32175 LITROS. / ACEITE 13250 LITROS.

Road Nos. Pos. — Road Nos. — Name NONE

F. NO. PLATE — 926 TO 932

SAND BOX

CAB SIDES

BACK OF TENDER FRAME

Actual Dimensions of Loco. Extreme height over all 15' 1½"

Extreme Width: Cab boards 10' 5" ; Cylinders or valve motion = 10' 2⅝"

Length outside face front bumper of engine to face of tender wedge = 44' 5"

Length face of tender wedge to outside face back bumper of tender = 28' 9½"

Total length outside face front bumper of engine to outside face back bumper of tender = 73' 2½"

SPECIFICATION FOR LOCOMOTIVES 12 44½ E 135 TO 141

FOR NATIONAL RAILWAYS OF MEXICO

P

1 THE PHYSICAL AND CHEMICAL PROPERTIES OF MATERIALS USED IN THE LOCOMOTIVES TO BE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE AMERICAN SOCIETY FOR TESTING MATERIALS, AS FOLLOWS:-

——STEEL——

* A-10-16 STRUCTURAL STEEL FOR LOCOMOTIVES
A-18-18 CLASS A FORGINGS TO BE WELDED OR CASE HARDENED.
A-20-16 CARBON STEEL FORGINGS FOR LOCOMOTIVES
A-21-18 CARBON STEEL TENDER AXLES.
A-26-16 STEEL TIRES
* A-27-16 STEEL CASTINGS, CLASS B MEDIUM GRADE (SPECIAL REQUIREMENTS FOR CASTINGS FOR RAILWAY ROLLING STOCK)
* A-28-18 LAP WELDED AND SEAMLESS STEEL BOILER TUBES, BOILER FLUES AND SUPERHEATER PIPES, SAFE ENDS AND ARCH TUBES FOR LOCOMOTIVES.
A-30-18 BOILER AND FIRE BOX STEEL
A-57-16 WROUGHT SOLID CARBON STEEL WHEELS FOR STEAM RAILWAY SERVICE.
A-61-16 HELICAL SPRINGS FOR RAILWAYS
A-62-16 ELLIPTIC SPRINGS FOR RAILWAYS.

—— WROUGHT IRON ——

A-38-18 LAP WELDED CHARCOAL IRON BOILER TUBES, BOILER FLUES, SAFE ENDS AND ARCH TUBES FOR LOCOMOTIVES
A-39-18 STAYBOLT IRON

—— CAST IRON ——

A-45-14 LOCOMOTIVE CYLINDERS (CAST IRON)
A-48-18 GRAY IRON CASTINGS

*THESE SPECIFICATIONS ARE TO INCLUDE THE MODIFICATION IN SULPHUR AND PHOSPHORUS AND MANGANESE LIMITS RECOMMENDED BY THE SOCIETY ON ACCOUNT OF THE WAR AND WILL APPLY UNTIL THE LIMITS SHOWN IN THE SPECIFICATIONS ARE RESTORED BY THE SOCIETY.

2 MATERIALS TO BE INSPECTED BY THE B. L. W.
CONSTRUCTION OF LOCOS. TO BE INSPECTED BY R.W. HUNT & CO.

3 LIMITS OF HEIGHT AND WIDTH AS RY. CO'S. GABARIT, I.E., B.L.W. TRACING 45256.

4 TOOL EQUIPMENT TO INCLUDE TWO RERAILING FROGS, JOHNSON TYPE FOR 75 POUND RAILS.
TWO TRAVERSING JACKS.

5 BOILER: OUTSIDE DIAM. OF LARGEST COURSE TO BE 86".
BOILER TO HAVE SLOPING BACK HEAD AND THROAT.

6 MAIN DOME TO BE ONE-PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE LOCATED OVER FIRE BOX.

7 FIRE BOX TO BE ESPECIALLY DESIGNED FOR OIL BURNING WITH FLUSH CROWN BOLTS.
FIRE BOX CROWN AND SIDES IN ONE SHEET.
FIRE BOX TUBE SHEET SEAM TO BE WELDED ON THE FIRE SIDE ABOVE THE FIRE BRICK ONLY.

8 STAYBOLT MATERIAL: ALL RIGID STAYBOLTS TO BE ROME SUPERIOR IRON FOR 12 44½ E 135 ONLY.
ALL RIGID STAYBOLTS INCLUDING RADIAL STAYS TO BE MADE OF OF READING IRON CO'S. STAYBOLT IRON FOR 12 44½ E 136 TO 141 EXCEPT HOLLOW STAYS TO BE MADE OF ROME HOLLOW IRON.
TATE FLEXIBLE STAYS TO BE MADE OF BURDEN IRON, OF THE SAME QUALITY AS ROME SUPERIOR IRON.

9 OIL BURNING ARRANGEMENT TO BE B. L. W. STANDARD, WITH VON BODEN INGLES BURNER IN FRONT END OF FIRE BOX.
ROYALTY, IF ANY, PAYABLE BY THE B. L. W.
OIL BURNING CONNECTIONS BETWEEN ENGINE AND TENDER FOR OIL AND STEAM TO BE BARCO FLEXIBLE JOINTS.

10 SUPERHEATER TO BE AS THE SUPERHEATER CO'S. SPECN. NO. N37-282-D DATED JUNE 13, 1921 (COPY ATTACHED).
SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
SUPERHEATER HEADERS TO BE MADE BY B. L. W.
ROYALTY PAYABLE BY THE B. L. W.

11 PATENT PLATES (HEREWITH) FROM THE SUPERHEATER COMPANY, COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

12 HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

13 GAUGE COCKS TO BE O'MALLEY BEARE PERFECTION.

14 CLASSIFICATION LAMP HOLDERS AT SIDES OF SMOKE BOX.

15 CAB GLASS MUST BE EQUAL TO QUALITY AND THICKNESS FURNISHED BY ALCO., I. E., AMERICAN DOUBLE A.

16 CYLINDERS TO HAVE U. S. GRAPHITE LUBRICATOR, DRY GRAPHITE AMORPHOUS.

17 YOUNG VALVE GEAR TO BE MADE AND APPLIED BY THE B. L. W.
ROYALTY PAYABLE BY THE B. L. W.
STOPS FOR REVERSE SHAFT TO BE APPLIED ON THE REVERSE LINK BEARING.

18 PATENT PLATES (2 PLATES PER ENGINE HEREWITH) NOS. 400 TO 406 COVERING YOUNG VALVE GEAR, TO BE APPLIED TO REVERSE LINK BEARING EACH SIDE OF ENGINE.

19 RAGONNET POWER REVERSE GEAR, TYPE "B", COVERED BY EXTRA ORDER NO. 10177, DATED 8-23-21.

20 DETROIT FLANGE LUBRICATOR FOR FRONT AND REAR DRIVERS.

21 LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

22 LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

23 BACK ENGINE TRUCK TO HAVE SWING LINK WITH SIDE BEARINGS.
LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS ½" TOTAL. THERE WILL BE NO LATERAL PLAY IN BACK ENGINE TRUCK BOX PEDESTAL FITS.

24 AIR PUMP TO HAVE WESTINGHOUSE No. 5½ STRAINER.

25 MAIN AIR RESERVOIRS TOTAL CAPACITY OF AT LEAST 60,000 CUBIC INCHES, AND TO HAVE HYDROSTATIC TEST OF 210 POUNDS.
BRAKE PIPE FITTINGS TO BE WESTINGHOUSE.
AIR BRAKE CONNECTIONS BETWEEN ENGINE AND TENDER TO BE McLAUGHLIN FLEXIBLE JOINTS.

26 FOUNDATION BRAKES TO BE BUSHED AND CASE HARDENED, SCH. BC.

——TENDER——

31 TENDER TANKS TO BE SO CONSTRUCTED THAT OIL TANK CAN BE REMOVED SO THAT TENDER CAN BE USED, IF DESIRED, FOR COAL BURNING LOCOS.
OIL TANK TO BE BRACED TO HOLD WORKING PRESSURE OF 5 POUNDS, AND TO HAVE ONE SAFETY VALVE (APPROVED MAKE) SET TO 5 POUNDS.
OIL HEATER TO BE OF THE CLOSED TYPE.

32 CLASSIFICATION LAMP HOLDERS AT BACK OF TENDER.

33 FRANKLIN RADIAL BUFFER BETWEEN ENGINE AND TENDER.
DRAWBAR TO BE SINGLE, WITH SAFETY CHAINS, BETWEEN ENGINE AND TENDER.

34 FOR HEREAFTER:- OIL TANK CAPACITY CHART AND MEASURING ROD TO BE MARKED IN SPANISH, IN THE METRIC SYSTEM, IN LITROS PER DECIMETER, WITH A SMALL MARK PLACED CENTRALLY BETWEEN THE DECIMETER GRADUATIONS.

For Hereafter:- See note on Specn. 12-44¼ E 156 to 165, Book No. 74 page 426, regarding stack, exhaust and oil burning arrangement. R.S.McC., 6-8-32.

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SPECIFICATION FOR LOCOMOTIVES 12 44½ E 135 TO 141

FOR: NATIONAL RAILWAYS OF MEXICO

Specification for Type A Double Loop Superheater SPECN. #N37-282-D DATED JUNE 13TH., 1921.

BOILER TUBES	231 in number, 2 o. d., 19 ft. 3 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be beaded over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	36 in number, 5½ o. d., #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18	Card 14095
BOILER FLUE SETTING	¼ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, beaded and prosecred except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections.	Card 10051
TUBE SHEET LAYOUT		
UNITS	36 units, 1½ o. d. #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	Card 3L50845
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints.	Card 1052
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 1064-N
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down so secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls.	AAH 4x9 Card 11120
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place.	1323 Card
STEAM PIPE JOINT RINGS	Of cast iron.	
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card SEE ARRGS.
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing.	4L 11430 Card
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer.	Card 1067
PYROMETER	Model No. Pyrometer.	Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 4L 40827
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 2L 11518-H	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYCL. PIPECONNECTION	Card 1L 11437	S. H. PIPE BAND	Card 1988
DAMPER CYL. PIPING DIAGRAM	Card 2L 11442	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card 1068-Z	RETURN BENDS	Card 11022
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 1023
DAMPER SHAFT BEARING (O. S.)	Card 1148	DEFLECTING PLATE HANDLE	Card 1457
DAMPER SHAFT BEARING (I.S.)	Card 10386 W	DEFLECTING PLATE STUDS	Card 10809
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE CLAMP	Card 10809-A
PATENT PLATE	Card 3359 3L 33674	DAMPER RIGGING	CARD 11384-S

THE BALDWIN LOCOMOTIVE WORKS {DUP. 12 44 ½ E 141, WITH SAME EXTRAS, EXCEPT WHERE OTHERWISE SPECIFIED.

Memorandum Spec'n 21024.

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ E 142 TO 149.

Ry. Co's Class K-11

Gen. as PHOTO. 8059 {EXCEPT TO HAVE BAKER VALVE GEAR.

Engine Drawing No. 10.

FOR NATIONAL RAILWAYS OF MEXICO,

DAR MEXICO. 8-17-21.

Gauge of Road 4' 8½" Play ¾" EXCEPT 1" FOR F.& B. DRIVERS

Wheelbase, Rigid 15' 0" Driving 15' 0" Total 33' 7"

Total wheelbase, eng. and tend. {Actual 66' 9½" / Limited to ——

Curves 14.30 METRIC DEGREES.

GRADES 3%

Limits, Height (SEE SUP. 3) Width (SEE SUP. 3)

Weight (approximate) in working order, Total 270,000 POUNDS.

On F. tr'k 20,000 lbs., Drivers 210,000 lbs., B. tr'k 40,000 lbs.

Tractive power 53,000 lbs., Ratio of adhesion 3.96

Work'g St'm Pres. 190 lbs., Service FREIGHT.

Fuel OIL. (SEE SUP. 9)

Boiler STEEL. Thick ¾" & 13/16" Bill 9437

Front Tube Sheet 2" Thick

Boiler, Diam. 76" Plan EXTENDED WAGON TOP.

Allowable st'm pres. 190 lbs. / With Factor of Safety of 5.02 **Tested to** 210 lbs. steam pres. / 254 lbs. water pres.

Longitud. seams BUTT JOINTED, WITH DOUBLE COVERING STRIPS.

Dome, diam. 32" Pos. FORWARD OF FIRE BOX.

Firebox STEEL. Combustion chamb. NONE.

Firebox, length 111⅛" Width 84⅛" Depth F. 84½" B. 66"

Firebox, Tube ½" Crown ⅜" Sides ⅜" Back ⅜"

Firedoor opening OVAL 16"x 20"

Water space, Front 5" Sides 5" Back 5"

Water space frame DOUBLE. Riveted

Water space stays ⅞" DIAM. WITH 3/16" HOLES 1½" DEEP FROM O.S.

TATE FLEXIBLE STAYS IN BREAKING ZONE.

Radial stays 1" DIAM. Sling stays front {THREE ROWS B.L.W. EXPANSION STAYS.

Button heads below crown on NONE. central rows

Crown bars NONE. Placed --- above crown ---

Crown bolts ----

Flues No.9 B.W.G. SEAMLESS STEEL.

Tubes No.11 B.W.G. PARKESBURG CHARCOAL IRON.

Tube ends SWAGED FOR COPPER FERRULES, FIRE BOX ENDS.

Number {36 / 231 Diam {5⅜" / 2" Length 19' 3"

TUBES AND FLUES TO BE WELDED TO FIRE BOX TUBE SHEET.

Heating Surface Flues 971 Combus. Chamb. --- Total 3517

Tubes 2318 Fire Box 228 Fire Brick Tubes ---

Grate area 66.6 Ratio to Heating Surface 1: 52.8

Superheater 828

Fire Brick Arch, NONE.

FIRE BOX LINED WITH FIRE BRICK, FOR OIL BURNING.

FIRE BRICK PAVEMENT IN PAN.

Grates NONE.

Ash Pan, Dampers FRONT AND BACK.

Throttle CHAMBERS BALANCE Pos. DOME.

Dry pipe STEEL OR IRON. DRY PIPE TO HAVE SUPPORT.

Superheater SCHMIDT TYPE (SEE SUP. 10.11¼)

Smokebox extension NONE. Cleaning hole and cap NONE.

Spark ejector or hopper NONE.

SUPERHEATER deflect. plates WITH

Exhaust nozzles SINGLE, LOW.

CLEANING PIPE, WITH

Stack CAST IRON, STRAIGHT. Dia. 18"

Safety Valves TWO CONSOLIDATED 3" OPEN. (Spec.)

Safety valves NONE. with relief lever. Set to 190 POUNDS.

Whistle ONE B. L. W. PLAIN.

Steam Gauge ONE BRASS 7" MAKER: ASHCROFT. (Spec.)

Steam gauge stand CAST IRON. **Clock** NONE.

Water Gauge ONE REFLEX. **Cab Lamps** ELECTRIC.

Gauge Cocks THREE BACK. Surface valve NONE.

Lowest gauge cock 4½" above highest part of crown

Lubricator steam valve WITHOUT separate dry pipe to dome

Blower Valve B. L. W.

Blow off Cock TWO EVERLASTING Pos: ONE EACH SIDE OF FIRE BOX.

Cleaning Plugs ONE PLUG ABOVE FIRE DOOR.

Firebox, CORNERS DIAGONAL, SIDES AND BACK.

Crown, THREE EACH SIDE AND FOUR BACK.

Waist, ONE UNDER FRONT AND ONE UNDER BACK.

Front tube sheet, NONE. Fusible plug ONE.

PRESSED STEEL COLLARS RIVETED TO JACKET AROUND CLEANING HOLES.

Pump NONE.

(Spec.) INJECTOR STARTING VALVES TO BE NATHAN SCREW TYPE No. 144.

Injectors TWO NATHAN TYPE WF NON-LIFTING No.12.

Injectors, Pos. RIGHT AND LEFT. Steam pipes COPPER.

Pipes, Check COPPER Feed COPPER. Overflow IRON.

Check NATHAN, WITH STOP VALVES. Pos. RIGHT AND LEFT.

INJECTOR CHECKS TO BE NATHAN 1918 SPECIAL.

Steam Heat NONE.

Cab STEEL, LINED WITH WOOD THROUGHOUT, INCLUDING ROOF.

CAB BOARDS TO BE COVERED WITH WOOD.

Cab boards STEEL. Nosing T-IRON.

Running boards STEEL. Nosing T-IRON.

Hand rail IRON. Located on BOILER.

Back Bumper BAR STEEL. Back drawbar height 35"

DRAWBAR TO BE SINGLE, WITH SAFETY CHAINS, BETWEEN ENG. & TENDER.

FRANKLIN RADIAL BUFFER BETWEEN ENGINE AND TENDER.

Pilot OF STEEL SECTION.

Front Bumper CAST STEEL. Bumper plate WITH

Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Front Drawhead, Center above rail I.C.C. STANDARD, I.E., 33½"

Coupler M.C.B. AUTOMATIC FROM AMERICAN STEEL FOUNDRIES, WITH EXTENDED FLOOR POCKET FROM NATIONAL MALLEABLE CASTING'S CO.

Signal fixtures IRON ON BUMPER.

HEADLIGHT AND EQUIP. TO BE PYLE NATIONAL ELECTRIC, TYPE K-2, WITH INCANDESCENT HEADLIGHTS.

Headlight ONE ROUND CASE 18" Reflector,

Headlight, Nos. on sides WITH H'dl't step WITH

Lamp shelf NONE Nosing ---

Bell 92 POUNDS.

Sand Box ONE Diam. 33" Body IRON PAINTED. Pipes IRON.

Sander GRAHAM WHITE AIR, DOUBLE, TO SAND FRONT AND BACK.

Dome casing IRON PAINTED.

Boiler Jacket #18 SOFT STEEL PTD. Bands IRON. Style 9 AND 14.

Boiler Lagging MAGNESIA SECTIONAL.

BACK HEAD OF BOILER TO BE LAGGED AND JACKETED.

THE BALDWIN LOCOMOTIVE WORKS

C.O. Elliott

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ E 142 TO 149. Dec. 1921.

FOR NATIONAL RAILWAYS OF MEXICO.

DAR.

Frames CAST STEEL, WITH SEPARATE SLAB SECTION AT REAR.

Cylinders, Diam. 25" Stroke 30"

St'm ports, Length 33" Width 1¾" Bridges ---

Exh. ports, Length --- Width --- Valve lead ¼"

Valve travel 8" **FOR** Steam lap 1¼" Exhaust clearance ——

Eccentric crank throw 7⅜" **BACK** 22½" By-pass valve NONE.

F. Lubr. NATHAN FIVE-FEED No.31 BULL'S EYE. (Spec.)

Cyl'r heads CAST STEEL. Lubr. PIPES OF COPPER UNDER JACKET.

Cyl'r casings IRON PAINTED Head covers STEEL PAINTED.

St'm chest casings --- Covers ---

St'm chest valves 14" DIAM., PISTON TYPE.

Met. pkg. PISTON RODS VALVE STEMS U.S. KING TYPE. (Spec.)

PISTON RODS TO BE KEYED TO CROSSHEADS.

Pistons HEADS OF CAST STEEL, RINGS OF CAST IRON SPRUNG IN.

Guides ALLIGATOR TYPE, STEEL. Oil cups NEEDLE.

Crossheads CAST STEEL, WITH BEARINGS OF CAST IRON, TINNED.

Wrist Pins STEEL. Rod cups FOR GREASE.

PARALLEL RODS TO HAVE SOLID ENDS.

Valve Motion BAKER. (SEE SUP. 17)

Links, sliding blocks, pins, lifting links and eccentric rod jaws to be well case hardened or to have hardened bushings.

REVERSE GEAR. (SEE SUP. 18)

All threads on bolts (except staybolts) to be United States Standard.

All finished movable nuts of steel or of iron case hardened.

FIVE GALLONS LOCOLINE ENGINE OIL, SPECN. "D"

FIVE GALLONS LOCOLINE VALVE OIL, SPECN. "R-2"

Wearing Bearings "VIM".

Driving wheel hub liners BRONZE.

Drivers, O. S. Diam. 57" Cen. diam. 50" CENTERS CAST STEEL.

DRIVING TIRES FROM STANDARD STEEL WORKS.

Tires STEEL. Held by SHRINKAGE AND SHOULDER.

Tires, Flanged, Pos. ALL. Size 3½"x 5½"

Tires, Plain, Pos. NONE. Size ——

Lateral play between driving boxes and wheel hubs (SEE SUP. 20)

Driving Boxes CAST STEEL.

Journals, Diam. {MAIN 10½" / OTHERS 9½" Length 12"

Springs. Make, B.L.W.

Front Engine Truck TWO Wheeled SWING BOLSTER, CENTER BEARING.

To swing 5⅝" each side of cen. Cen. pin liners NONE.

Journals, Diam. 6" Length 12" Boxes CAST IRON.

Wheel hub liners BRONZE, ON FACE OF BOX NEXT TO HUB OF WHEEL.

Wheels, Diam. 33" Tread --- Kind {ROLLED STEEL FROM STANDARD STEEL WORKS.

Tires NONE. Cen. diam. --- Size ---

Tires held by --- WHEEL RIMS 2½" THICK x 5½" WIDE.

Back Engine Truck TWO Wheeled HODGES TYPE (SEE SUP. 22)

To swing 5⅛" each side of cen. Cen. pin liners NONE.

Journals, Diam. 8" Length 14" Boxes CAST STEEL.

Wheel hub liners BRONZE.

Wheels, Diam. 40" Tread --- Kind CAST STEEL SPOKE CENTER.

Tires STEEL. Cen. diam. 34" Size 3"x 5½"

Tires held by SHRINKAGE AND SHOULDER.

BACK TRUCK TIRES FROM STANDARD STEEL WORKS.

Brake, position ON ALL DRIVING AND TENDER WHEELS.

Operating Engine, sch. No.6-ET WEST'G. COMBINED AUTO. AND STRAIGHT AIR.

Parts Eng. Trk. sch. ---

Foundation Drivers, sch. WN-3-BC, AMERICAN OUTSIDE EQUALIZED.

Parts Eng. Trk. sch. ---

Air pump TWO 11" Pos. BOTH LEFT SIDE.

Train connections FRONT AND BACK.

Train signal, sch. NONE.

Tender EIGHT Wheeled, Drawing No. 1675. {TENDER TO BE WEIGHED: No.

Weight, with fuel and water, about 169,000 POUNDS.

Tank {OIL 3500 / WATER 8500 Gallons, Bill 5691 / 5682.

TANK WATER BOTTOM TYPE, WITH STRAIGHT TOP.

Tool Boxes STEEL, TOP.

Frame STEEL, 12" CHANNELS, WITH FRONT BUMPER OF WOOD AND BACK BUMPER OF CAST STEEL.

Front Drawbar height 33¾"

Pilot NONE.

Back drawhead, center above rail I.C.C. STANDARD I.E., 33"

Coupler M.C.B. AUTO. FROM AMERICAN STEEL FOUNDRIES CO., WITH BRADFORD DRAFT GEAR WITH FARLOW ATTACHMENTS.

Steps AND HAND HOLDS TO CONFORM TO I.C.C. REQUIREMENTS.

Trucks ANDREWS CAST STEEL SIDE FRAMES, BOLSTERS OF CAST STEEL.

Springs ELLIPTIC, B.L.W. MAKE.

Journals, Diam. 5½" Length 10"

Wheels, Diam. 33" Tread --- Kind {ROLLED STEEL FROM STANDARD STEEL WORKS.

Tires NONE. Cen. diam. ---

Tires held by --- WHEEL RIMS 2½" THICK x 5½" WIDE.

Safety chains SINGLE.

Brake Position ON ALL WHEELS.

Brake sch. No. 6 ET WEST'G. AUTO. AND STRAIGHT AIR, WITH 14"x 12" TENDER BRAKE CYLINDER.

List of tools, sch. 166, EXCEPT OMIT PACKING LIST CASE (SEE SUP. 4)

Photo sch. No. 2-R Inspection (SEE SUP. 2)

To be weighed No. Material specns (SEE SUP. 1)

Certificate of boiler test THREE COPIES B.L.W. FORM 1036.

Junior laws to 7-6-21 Shipment ON OWN WHEELS.

Brass shop finish, No. 1

Machine shop finish D-165.

B. L. W. {REAR TRUCK, 106099, PATD. APRIL 20, 1913 (BRASS PLATE)

Patents {SPRING CLIP, 1013774, PATD. JAN. 3, 1912 (CAST ON)

Property plates B.L.W., FOR ENGINE AND TENDER.

MARKING ETC., TO BE SAME AS FOR 12 34 ¼ E 50 TO 54.

Painting, style ---OLIVE GREEN, NO STRIPING.

LETTERING TO BE RY. CO'S. STANDARD, IN ALUMINUM LEAF.

CLASSIFICATION MARK ON CAB SIDES: CLASE K-11

Mark on TANK SIDES N. DE M. CAPACIDAD

MARK ON BACK OF TANK {AGUA 32125 LITROS. / ACEITE 13250 LITROS.

Road Nos. Pos.	Road Nos.	Name NONE.
F. No. PLATE	933 TO 940	
SAND BOX		
CAB SIDES		
BACK OF TENDER FRAME		

Actual Dimensions of Loco. Extreme height over all 15' 1½"

Extreme Width Cab boards 10' 5" Cylinders ~~or valve fairings~~ 10' 2⅝"

Length outside face front bumper of engine to face of tender wedge 44' 5"

Length face of tender wedge to outside face back bumper of tender 28' 9½"

Total length outside face front bumper of engine to outside face back bumper of tender 73' 2½"

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ E 142 TO 149

FOR NATIONAL RAILWAYS OF MEXICO.
DAR.

1. THE PHYSICAL AND CHEMICAL PROPERTIES OF MATERIALS USED IN THE LOCOMOTIVES TO BE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE AMERICAN SOCIETY FOR TESTING MATERIALS, AS FOLLOWS:-

——STEEL——

* A-10-16 STRUCTURAL STEEL FOR LOCOMOTIVES.
A-18-18 CLASS A FORGINGS TO BE WELDED OR CASE HARDENED.
A-20-16 CARBON STEEL FORGINGS FOR LOCOMOTIVES.
A-21-18 CARBON STEEL TENDER AXLES.
A-26-16 STEEL TIRES.
* A-27-16 STEEL CASTINGS, CLASS B MEDIUM GRADE (SPECIAL REQUIREMENTS FOR CASTINGS FOR RAILWAY ROLLING STOCK)
* A-28-18 LAP WELDED AND SEAMLESS STEEL BOILER TUBES, BOILER FLUES AND SUPERHEATER PIPES, SAFE ENDS AND ARCH TUBES FOR LOCOMOTIVES.
A-30-18 BOILER AND FIRE BOX STEEL.
A-57-16 WROUGHT SOLID CARBON STEEL WHEELS FOR STEAM RAILWAY SERVICE.
A-61-16 HELICAL SPRINGS FOR RAILWAYS.
A-62-16 ELLIPTIC SPRINGS FOR RAILWAYS.

——WROUGHT IRON——

A-38-18 LAP WELDED CHARCOAL IRON BOILER TUBES, BOILER FLUES, SAFE ENDS AND ARCH TUBES FOR LOCOMOTIVES.
A-39-18 STAYBOLT IRON.

——CAST IRON——

A-45-14 LOCOMOTIVE CYLINDERS (CAST IRON.)
A-48-18 GRAY IRON CASTINGS.

* THESE SPECIFICATIONS ARE TO INCLUDE THE MODIFICATION IN SULPHUR AND PHOSPHORUS AND MANGANESE LIMITS RECOMMENDED BY THE SOCIETY ON ACCOUNT OF THE WAR AND WILL APPLY UNTIL THE LIMITS SHOWN IN THE SPECIFICATIONS ARE RESTORTED BY THE SOCIETY.

2. MATERIALS TO BE INSPECTED BY THE B.L.W.
CONSTRUCTION OF LOCOS TO BE INSPECTED BY R.W.HUNT & Co.

3. LIMITS OF HEIGHT AND WIDTH AS Ry. Co's GABARIT, I.E., B.L.W. TRACING 45256.

4. TOOL EQUIPMENT TO INCLUDE TWO RERAILING FROGS, JOHNSON TYPE FOR 75 POUND RAILS.
TWO TRAVERSING JACKS.

5. BOILER: OUTSIDE DIAM. OF LARGEST COURSE TO BE 86".
BOILER TO HAVE SLOPING BACK HEAD AND THROAT.

6. MAIN DOME TO BE ONE-PIECE TYPE.
AUXILIARY DOME FOR SAFETY VALVES AND WHISTLE LOCATED OVER FIRE BOX.

7. FIRE BOX TO BE ESPECIALLY DESIGNED FOR OIL BURNING WITH FLUSH CROWN BOLTS.
FIRE BOX CROWN AND SIDES TO BE IN ONE SHEET.
FIRE BOX-TUBE SHEET SEAM TO BE WELDED ON THE FIRE SIDE ABOVE THE FIRE BRICK ONLY.

8. STAYBOLT MATERIAL: ALL RIGID STAYBOLTS INCLUDING RADIAL STAYS TO BE MADE OF READING IRON Co's STAYBOLT IRON, EXCEPT HOLLOW STAYS TO BE MADE OF ROME HOLLOW IRON. TATE FLEXIBLE STAYS TO BE MADE OF BURDEN IRON, OF THE SAME QUALITY AS ROME SUPERIOR IRON.

9. OIL BURNING ARRANGEMENT TO BE B.L.W. STANDARD, WITH VON BODEN INGLES BURNER IN FRONT END OF FIRE BOX. ROYALTY, IF ANY, PAYABLE BY THE B.L.W. OIL BURNING CONNECTIONS BETWEEN ENGINE AND TENDER FOR OIL AND STEAM TO BE BARCO FLEXIBLE JOINTS.

10. SUPERHEATER TO BE AS THE SUPERHEATER Co's SPECN. No. N 37-282-D DATED JUNE 13, 1921 (COPY ATTACHED). SUPERHEATER TO CONNECT WITH TOP HEADER IN SMOKE BOX AND TO HAVE OUTSIDE STEAM PIPE CONNECTIONS TO VALVE CHAMBERS.
SUPERHEATER HEADERS TO BE MADE BY B.L.W.
ROYALTY, PAYABLE BY THE B.L.W.

11. PATENT PLATES (HEREWITH) FROM THE SUPERHEATER Co, COVERING THE SUPERHEATER DAMPER CYLINDER, TO BE APPLIED TO THE SUPERHEATER DAMPER CYLINDER.

12. HAND HOLE AND CAP IN EACH SIDE OF SMOKE BOX FOR INSPECTION OF SUPERHEATER.

13. GAUGE COCKS TO BE O'MALLEY BEARE PERFECTION.

14. CLASSIFICATION LAMP HOLDERS AT SIDES OF SMOKE BOX.

15. CAB GLASS MUST BE EQUAL TO QUALITY AND THICKNESS FURNISHED BY ALCO., I.E., AMERICAN DOUBLE A.

16. CYLINDERS TO HAVE U.S. GRAPHITE LUBRICATOR, DRY GRAPHITE AMORPHOUS.

17. BAKER VALVE GEAR TO BE PURCHASED FROM PILLOID Co.
ROYALTY PAYABLE BY THE B.L.W.

18. RAGONNET POWER REVERSE GEAR, TYPE "B", COVERED BY EXTRA ORDER No. 10496 DATED 9-7-21.

19. DETROIT FLANGE LUBRICATOR FOR FRONT AND REAR DRIVERS.

20. LATERAL PLAY BETWEEN DRIVING BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 7/32" TOTAL.

21. LATERAL PLAY BETWEEN FRONT ENGINE TRUCK BOXES AND WHEEL HUBS, INCLUDING LATERAL PLAY IN BOX PEDESTAL FITS, 5/16" TOTAL.

22. BACK ENGINE TRUCK TO HAVE SWING LINK WITH SIDE BEARINGS. LATERAL PLAY BETWEEN BACK ENGINE TRUCK BOXES AND WHEEL HUBS ¼" TOTAL. THERE WILL BE NO LATERAL PLAY IN BACK ENGINE TRUCK BOX PEDESTAL FITS.

23. AIR PUMP TO HAVE WESTINGHOUSE No. 54 STRAINER.

24. MAIN AIR RESERVOIRS TOTAL CAPACITY OF AT LEAST 60,000 CUBIC INCHES, AND TO HAVE HYDROSTATIC TEST OF 210 POUNDS.
BRAKE PIPE FITTING TO BE WESTINGHOUSE.
AIR BRAKE CONNECTIONS BETWEEN ENGINE AND TENDER TO BE McLAUGHLIN FLEXIBLE JOINTS.

25. FOUNDATION BRAKES TO BE BUSHED AND CASE HARDENED, SCH. BC.

——TENDER——

31. TENDER TANKS TO BE SO CONSTRUCTED THAT OIL TANK CAN BE REMOVED SO THAT TENDER CAN BE USED, IF DESIRED, FOR COAL BURNING LOCOS.
OIL TANK TO BE BRACED TO HOLD WORKING PRESSURE OF 5 POUNDS, AND TO HAVE ONE SAFETY VALVE (APPROVED MAKE) SET TO 5 POUNDS.
OIL HEATER TO BE OF THE CLOSED TYPE.

32. CLASSIFICATION LAMP HOLDERS AT BACK OF TENDER.

33. FRANKLIN RADIAL BUFFER BETWEEN ENGINE AND TENDER.
DRAWBAR TO BE SINGLE, WITH SAFETY CHAINS, BETWEEN ENGINE AND TENDER.

35. FOR HEREAFTER:- OIL TANK CAPACITY CHART AND MEASURING ROD TO BE MARKED IN SPANISH, IN THE METRIC SYSTEM, IN LITROS PER DECIMETER, WITH A SMALL MARK PLACED CENTRALLY BETWEEN THE DECIMETER GRADUATIONS.

For Hereafter:- See note on Specns. 12 44 ½ E 156 to 165, Book No. 74, page 426, regarding Stacks, exhaust and Oil burning arrangement. - R.S.McC., 6.8.32.

1/23
4-25

SPECIFICATION FOR LOCOMOTIVES 12 44 ½ E 142 TO 149

FOR: NATIONAL RAILWAYS OF MEXICO

Specification for Type A Double Loop Superheater SPECN. #N37-282-D DATED JUNE 13TH, 1921.

BOILER TUBES	231 in number 2 o.d 19 ft 3 in. over tube sheets. Tubes located between and adjacent to boiler flues are to be headed over at front end. Tubes to be in accordance with the American Society for Testing Materials Specification A-28-18.	
BOILER FLUES	36 in number 5½ o.d #9 B.W.G. of cold drawn seamless steel. Flues to be in accordance with the American Society for Testing Materials Specification A-28-18	Card 11095
BOILER FLUE SETTING	⅛ in. radius on both edges of flue holes in fire box tube sheet and on front edge of flue holes in front tube sheet as shown on drawings, except for copper sheets. Back end set with copper ferrule, rolled, headed and prosserized except for copper sheets. Front end rolled and beaded. Rollers to have at least 5 rolls. Prosser to have at least 12 sections	Card 10051
TUBE SHEET LAYOUT		Card 3L 50845
UNITS	36 units 1½ o.d #9 B.W.G. Pipes in accordance with the American Society for Testing Materials Specification A-28-18. Pipes united by return bends. Each unit tested, before being placed in boiler, with water under pressure of 500 lb. per sq. in.	
UNIT PIPE SUPPORTS	Of steel fastened securely on superheater pipes so as not to slide	Card 10773
UNIT PIPE JOINT	Made in best possible manner to insure absolutely tight joints	Card 1032
UNIT CLAMP BOLT	In accordance with Locomotive Superheater Company Material Specification No. 12-A	Card 1094-N
HEADER	Of close grain cylinder iron, steam tight in every respect. Joint ring for connection to dry pipe to have flat side against header flange. Casting should be moulded with the unit joint face down to secure the best quality of metal on surface where superheater unit joints are made. Each header to have a serial number cast on in such a location as not to be removed in finishing. No patch plugs or chaplets allowed in ball joint seats. Headers must not be treated with sal ammoniac. Header casting to be tight under water pressure of 250 lb. Test pressure to be applied separately to the saturated and to the superheated steam passages, so as to insure soundness of all partition walls	Card 11120
HEADER SUPPORTS	Securely fastened to boiler shell with rivets or turned bolts fitted in reamed holes. Properly located so as to support the header after header has been correctly located. Header should then be secured to supports. This to be done before superheater units are put in place	Card 1323
STEAM PIPE JOINT RINGS	Of cast iron.	Card SEE ABOVE
DEFLECTING PLATE	To permit of easy inspection and removal of superheater units	Card
DAMPER CYLINDER	Carefully and accurately made. Piston not to be more than 0.01 in. smaller than bore. Bearings for piston and extension to be in line. Piston to be ground and to operate freely under a pressure as low as 40 lb. per sq. in. Steam pipe to damper cylinder should be as short and free from bends as possible so as not to cause water to collect in pipe or cylinder. Pipe to be well protected against freezing	Card 4L 11436
DAMPER SHAFT COUNTERWEIGHT	Painted a light color to render it easily visible by the engineer	Card 1067
PYROMETER	Model No. Pyrometer	Card NONE
PYROMETER ARRANGEMENT	Generally in accordance with	Card
PYROMETER BRACKET	Firmly fastened to boiler to prevent vibration	Card
S. H. ARRANGEMENT	In accordance with	Card 4L 40827
TEST (FINAL)	The superheater, after assembling in boiler and after steam pipes are fitted up, is to be thoroughly tested and to be tight under water pressure of at least 30% more than the working pressure of the boiler.	

DAMPER	Card 2L 11518-H	S. H. UNIT BOLT WASHER	Card 1071
DAMPER CYL. ARM	Card 1074	S. H. UNIT CLAMP	Card 1073
DAMPER CYL. PIPE FITTING	Card 11115	S. H. UNIT CLAMP WASHER	Card 10305
DAMPER CYL. PIPE UNION	Card 11114	S. H. PIPE END	Card 1344
DAMPER CYL. PIPE CONNECTION	Card 4L 11437	S. H. PIPE BAND	Card 1368
DAMPER CYL. PIPING DIAGRAM	Card 2L 11442	SPACING OF BANDS & SUPPORTS	Card 10759
DAMPER CYL. SUPPORT	Card	TYPE OF RETURN BENDS	FORGED
DAMPER SHAFT	Card 1068.Z	RETURN BENDS	Card 11022
DAMPER SHAFT ARM	Card 1065	LUBRICATOR CONNECTION	Card 1023
DAMPER SHAFT BEARING (O. S.)	Card 1148	DEFLECTING PLATE HANDLE	Card 1457
DAMPER SHAFT BEARING (I.S.)	Card 10386 W	DEFLECTING PLATE STUDS	Card 10803
DAMPER SHAFT LINK	Card 1070	DEFLECTING PLATE CLAMP	Card 10305-A
PATENT PLATE	Card 3367 3L 3367 L	DAMPER RIGGING	CARD 11384-S