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STANDARD SIGNAL MATERIAL PLANS

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REV.
JAN. 1932
JAN. 1932
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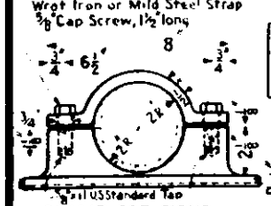
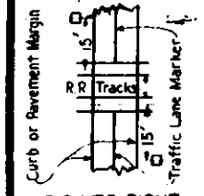
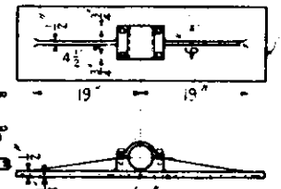


CLAMP FOR SIGNS
FIGS. 3, 4, 5 & 6

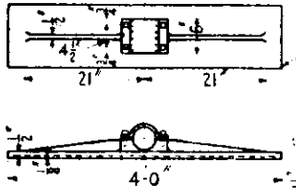


SIGN TO RIGHT OF HIGHWAY



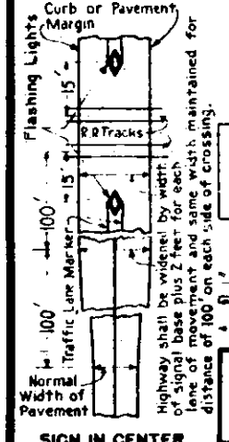
LOOK OUT FOR THE LOCOMOTIVE

FIG. 3

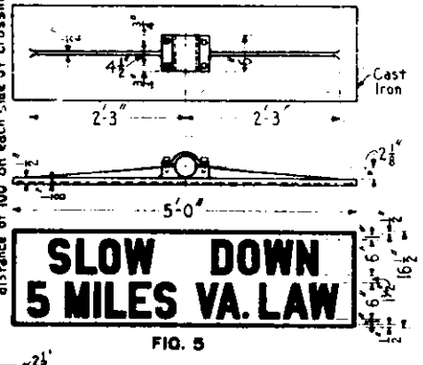


DANGER

FIG. 4



SIGN IN CENTER OF HIGHWAY



SLOW DOWN
5 MILES VA. LAW

FIG. 5

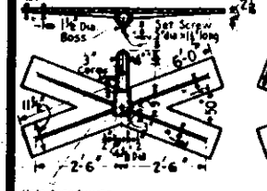


FIG. 1-a

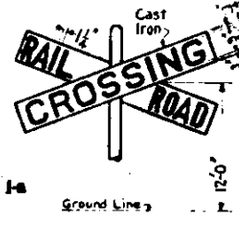
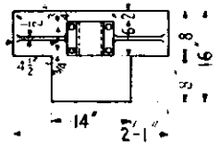


FIG. 9
See Plan No. S-465
(basic number)



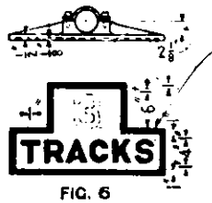
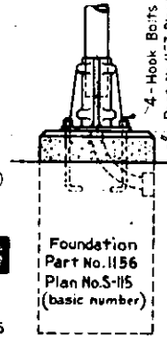


FIG. 6

FIG. 8
See Plan No. S-465
(basic number)



Foundation For Use When Sign Is Erected At The Side Of Highway

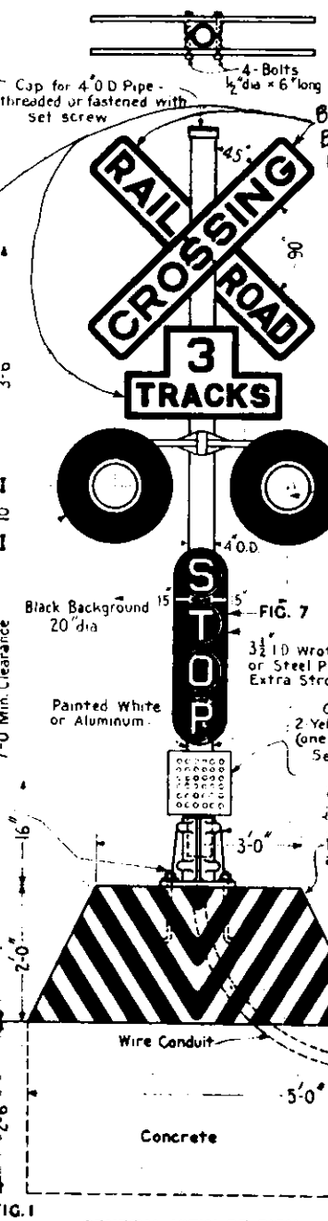


FIG. 1

GENERAL VIEW OF SIGN Showing Foundation For Use When Erected In Center Of Highway

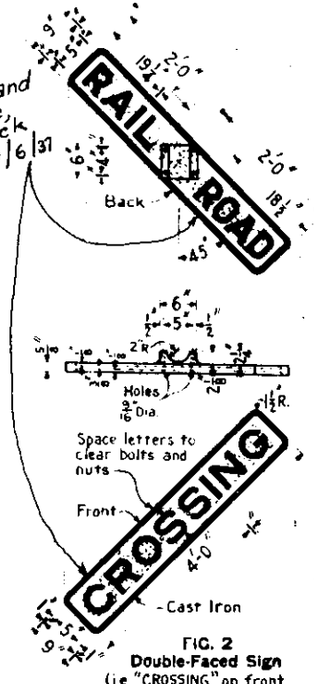
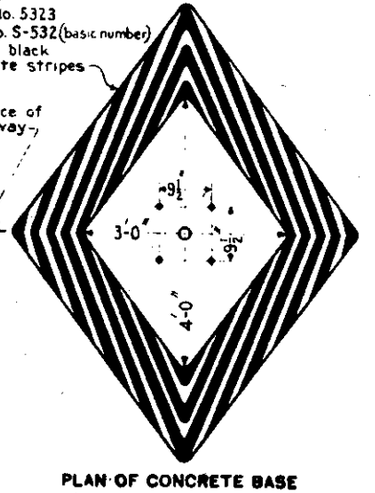


FIG. 2
Double-Faced Sign
(ie "CROSSING" on front and "RAILROAD" on back)



PLAN OF CONCRETE BASE

NOTE:-

A sign made in accordance with Fig. 1, except as modified by the following notes and the legal requirements of several of the states, shall be erected on each side of the railroad crossing.

Signs shall be erected at such points as will afford the best view by persons approaching the crossing and generally on the right hand side of the highway, or on the left hand side of

Signs shall not be erected in the center of the highway except where required by public authorities having jurisdiction.

Where state law or local ordinance requires the sign designated as Fig. 1-a, it shall be located only at the side of the highway.

Where the distance between any two tracks is more than 100 feet a sign shall be erected on each side of each single track or group of tracks so separated.

A sign erected at a crossing of two or more tracks shall include the sign designated as Fig. 6, unless a state law or local ordinance prescribes a sign of the reflector type, in which case the sign designated as Fig. 9 shall be installed, the letters and numerals being studded with colorless reflectors [illegible] and all surfaces of the letters, Numerals [illegible] shall be white. All other parts dull black. The numerals appearing on the signs shown as Figs. 6 and 9 shall be the proper ones to indicate the number of tracks and shall be so specified on the requisition.

Signs shall be equipped with flashing lights only when ordered by special executive authority.

30. Flashing lights used to indicate the approach of trains shall start to flash at least [illegible] seconds before the arrival of the fastest train operated over the crossing and the electric circuits so arranged that the lights will continue to operate until rear of train reaches or clears the crossing.

Fig. 7 may be used with flashing lights where commercial current is available.

Fig. 8 shall be used with flashing lights if Fig. 7 is not used and shall have the letters studded with colorless reflectors [illegible] as shown. The letters [illegible] shall be white. All other parts dull black.

The yellow caution marker shown in Fig. 1 shall be used only on signs erected in the center of the highway.

Additions to the sign Figs. 1 or 1-a (modified in accordance with the above instructions), are made necessary by the legal requirements of several of the states as follows:

A - Within the State of West Virginia Fig. 3 shall be added to Figs. 1 or 1-a.
B - Within the State of Indiana Fig. 4 shall be added to Figs. 1 or 1-a.
C - Within the State of Virginia Fig. 5 shall be added to Figs. 1 or 1-a, except within the limits of incorporated cities and towns of 1000 population or more.

On Figs. 1-a, 3, 4, 5 and 8 the face of letters, numerals and borders, the edges and backs of signs shall be painted black, the background white.

The forms of the letters on Fig. 4 shall be full width letters and on Figs. 3 and 5 condensed letters and numerals as given on Standard Plan showing Letters and Figures for Signs and Notices, except that the serifs (the points at the corners of the letters) shall be omitted.

The forms of the letters and numerals on signs Figs. 1-a, 3, 4, 7, 8 and 9 shall be as given on this plan.

All letters, numerals and borders in relief shall be raised 1/8th inch with a slight draft.

All iron or steel parts shall be thoroughly cleaned and given a shop coat of red lead at the place of manufacture.

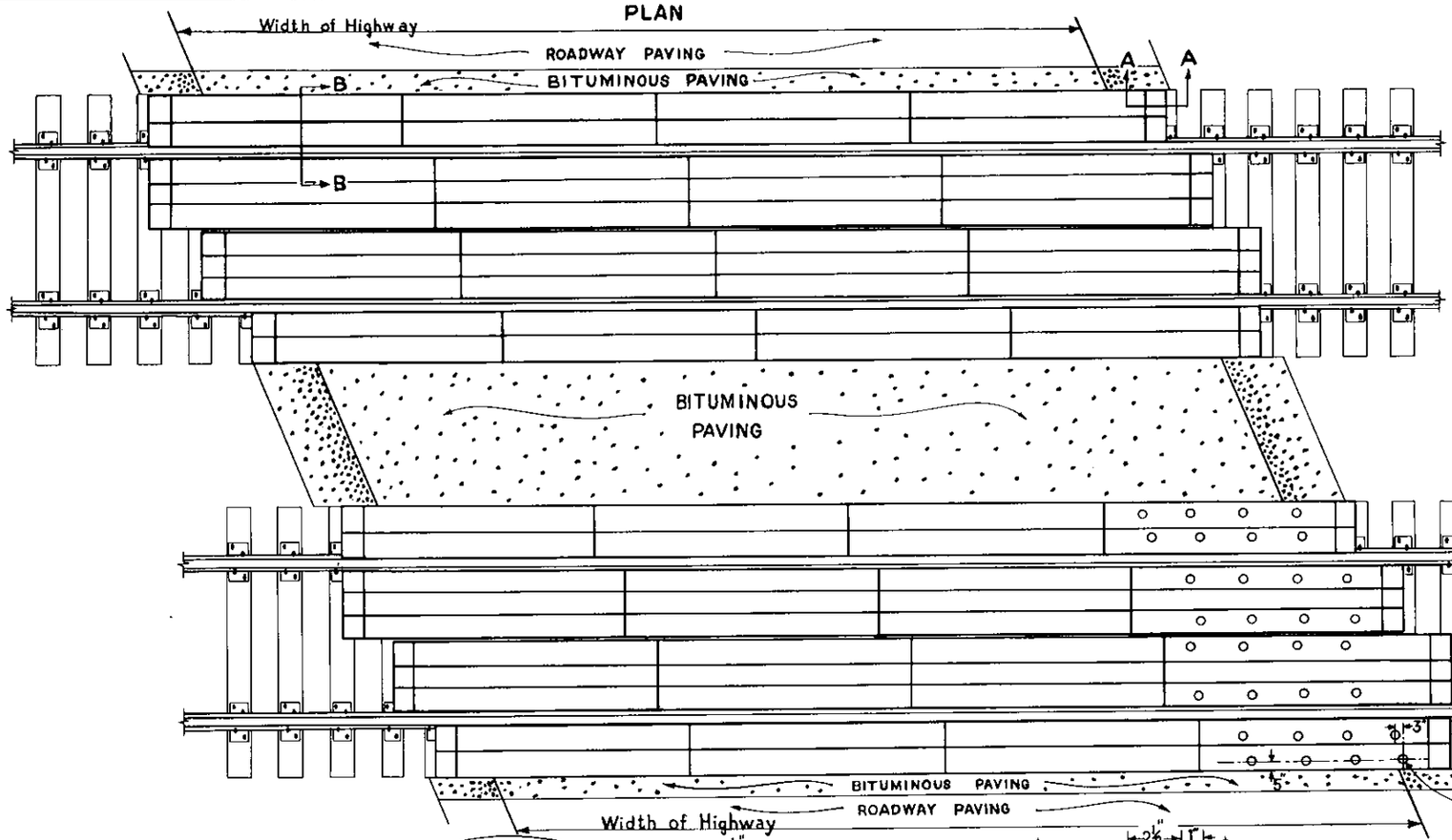
& See Note on Fig. 1, 2 & 6.

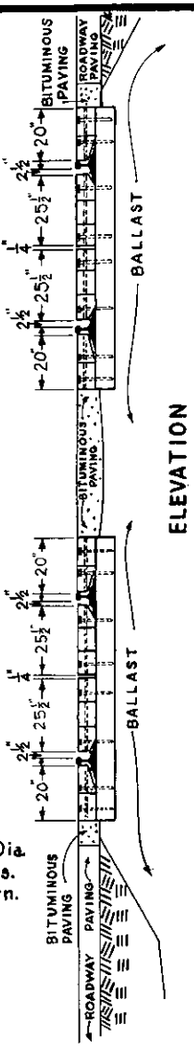
66207-F
Revised
10-8 1937

THE PENNSYLVANIA RAILROAD

HIGHWAY CROSSING SIGNS AND SIGNALS

OFFICE OF ENGINEER OF STANDARDS, PHILA., PA., APRIL, 1931





HARDWARE

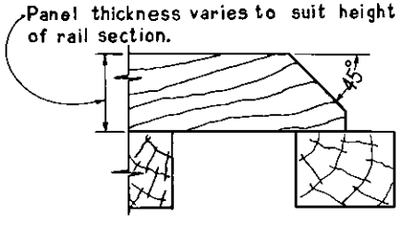
(To be ordered separately)

Washer-Head Drive Spikes Plan 71650-( )

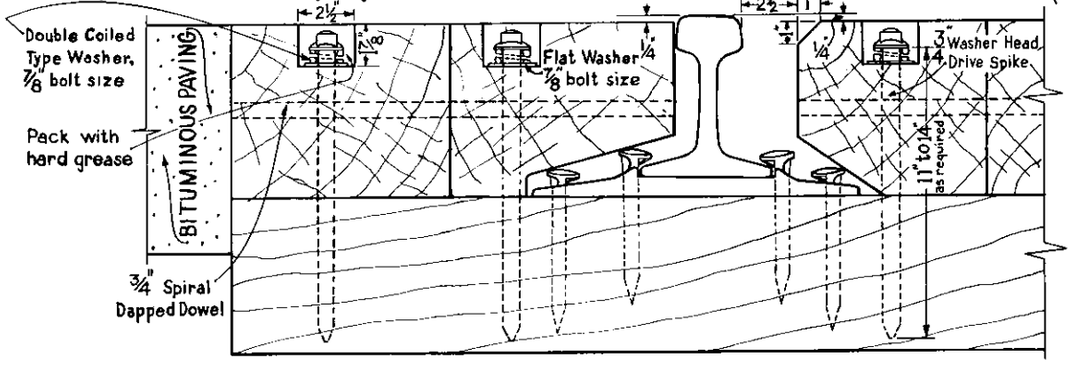
Rail Section	Length of Spikes	Ref. No.
85 lb.	11"	1B-647
100 lb.	11"	1B-647
112 lb.	12"	1B-648
131 lb.	13"	1B-649
133 lb.	13"	1B-649
140 lb.	13"	1B-649
152 lb	14"	1B-650
155 lb.	14"	1B-650
Double Coiled Type Washer		1B-570
Steel Flat Washer		11-967

All ties shall be prebored with 11/16" Dia. hole for 3/4" Washer Head Drive Spikes. Holes shall be staggered 3" as shown.

This plan is not intended to show details on construction which will be determined for each individual crossing.



SECTION A-A



SECTION B-B

Details:-
As to angle, width of crossing, height of rail and other information shall be shown on PRR Form - ( ).

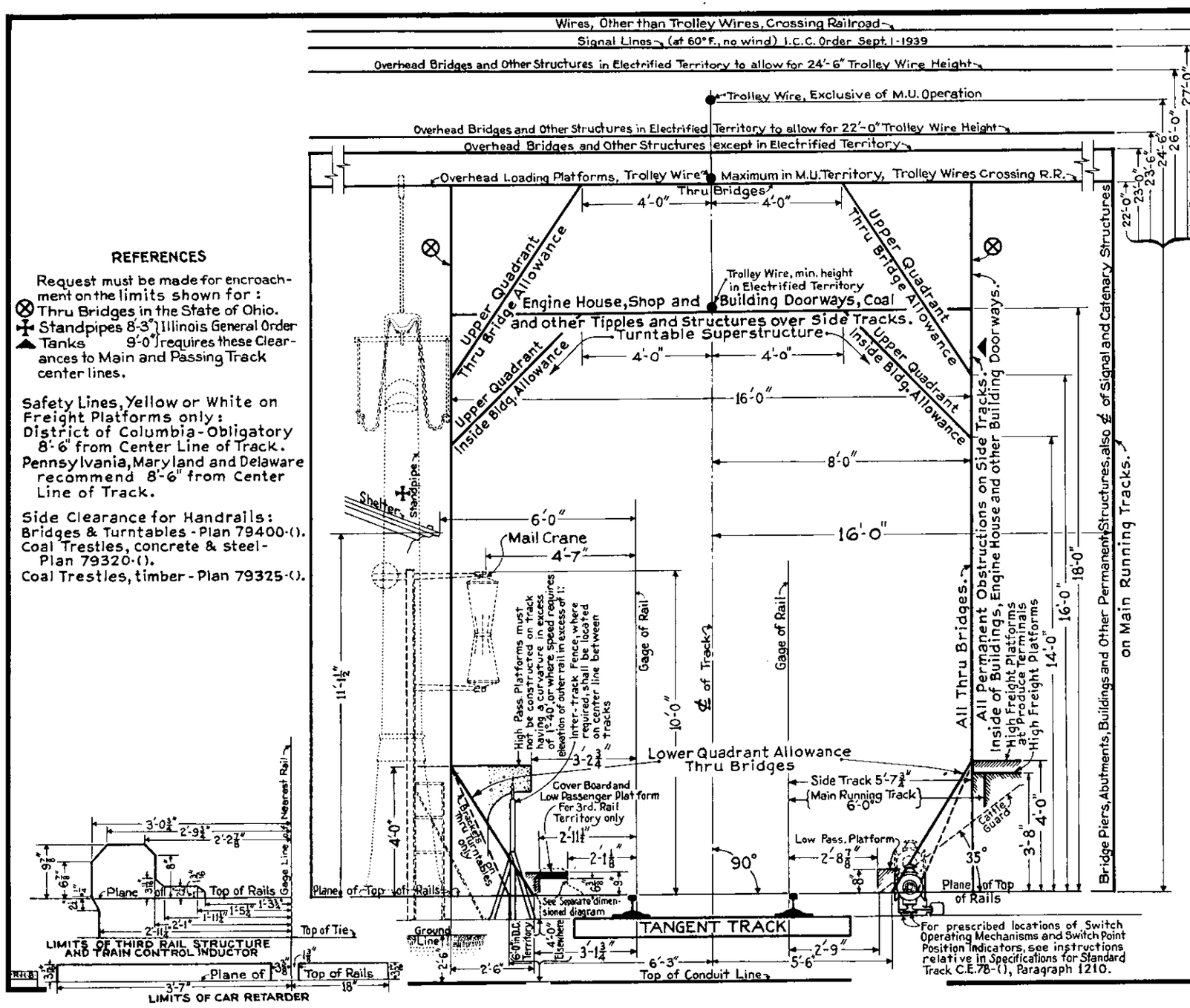
70120-A

THE PENNSYLVANIA RAILROAD
STANDARD
TIMBER PANEL HIGHWAY CROSSING

OFFICE OF CHIEF ENGINEER, PHILA., PA. DECEMBER, 1958

C.J. Henry
Chief Engineer

REV.
THIS PLAN
REPLACES
"A" NOV. 1948
"B" NOV. 1955



REFERENCES

Request must be made for encroachment on the limits shown for:
⊗ Thru Bridges in the State of Ohio.
✝ Standpipes 8'-3" } Illinois General Order
▲ Tanks 9'-0" } requires these Clearances to Main and Passing Track center lines.

Safety Lines, Yellow or White on Freight Platforms only:
District of Columbia - Obligatory 8'-6" from Center Line of Track.
Pennsylvania, Maryland and Delaware recommend 8'-6" from Center Line of Track.

Side Clearance for Handrails:
Bridges & Turntables - Plan 79400-().
Coal Trestles, concrete & steel - Plan 79320-().
Coal Trestles, timber - Plan 79325-().

Structures must not be located nearer to the track than the minimum clearance limits prescribed by this plan and these distances should be exceeded where possible.

Minimum Clearances:

For Tangent Track - Shall be as shown on this plan.

For Curved Track:

Above Top of Rail - Are same as shown for tangent track measured vertically from top of high rail, except passenger and freight platforms, the height of which shall be measured from top of nearest rail.

Side Clearances (Measured Radially)
- Outside - On the outside of curved track, side clearances shall be measured horizontally from the gage of nearest rail and be increased by 1 inch per degree of curvature over that shown for tangent track.
- Inside - On the inside of curved track, side clearances shall be measured horizontally from the gage of nearest rail and be increased by 1 inch per degree of curvature over that shown for tangent track, to which must also be added 3½ times the amount of super-elevation of the high rail above the low rail.

Consideration should always be given to the probability of increased distance between track centers, and widening ditches, and the structures located accordingly.

For standard distances, C. to C. of tracks and spacing of tracks where intertrack Clearance Limiting Objects are located, see Spec. for Standard Track C.E. 78-(), Paragraphs 937 to 941, incl.

Where physical conditions impose insurmountable restrictions, closer than those specified; the matter must be submitted to the Chief Engineer for any modification, also to local or state authorities if necessary.

Clearance Requirements set forth on this plan shall apply only to new construction or reconstruction. Structures and Tracks constructed prior to July, 1953 may be maintained and extended at the existing clearances.

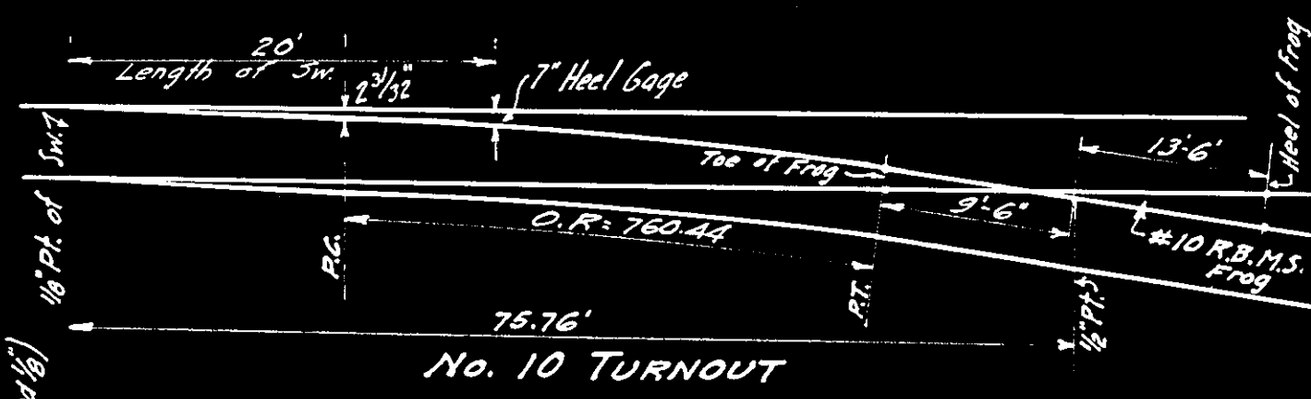
For prescribed locations of Switch Operating Mechanisms and Switch Point Position Indicators, see instructions relative in Specifications for Standard Track C.E. 78-(), Paragraph 1210.

70050-C

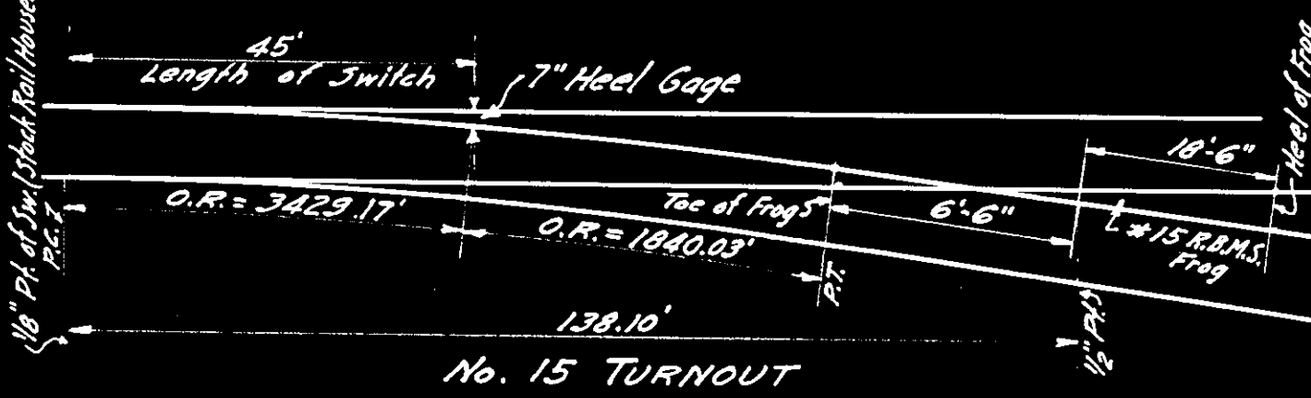
THE PENNSYLVANIA RAILROAD
STANDARD
MINIMUM ROADWAY CLEARANCES
OFFICE OF CHIEF ENGINEER PHILA., PA., NOV. 1956

R. J. Henry
Chief Engineer

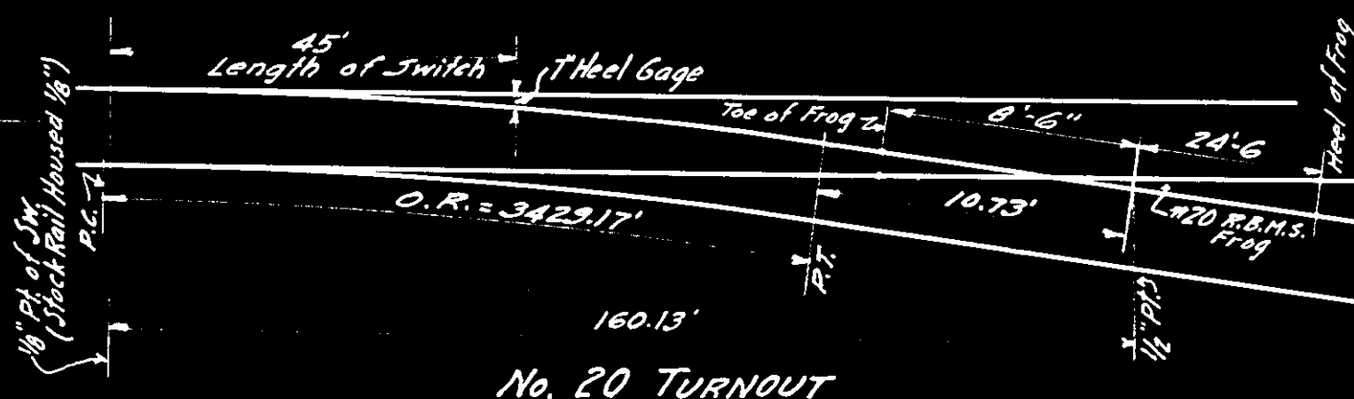
The lines of the diagrams indicate gage lines only.



No. 10 TURNOUT



No. 15 TURNOUT

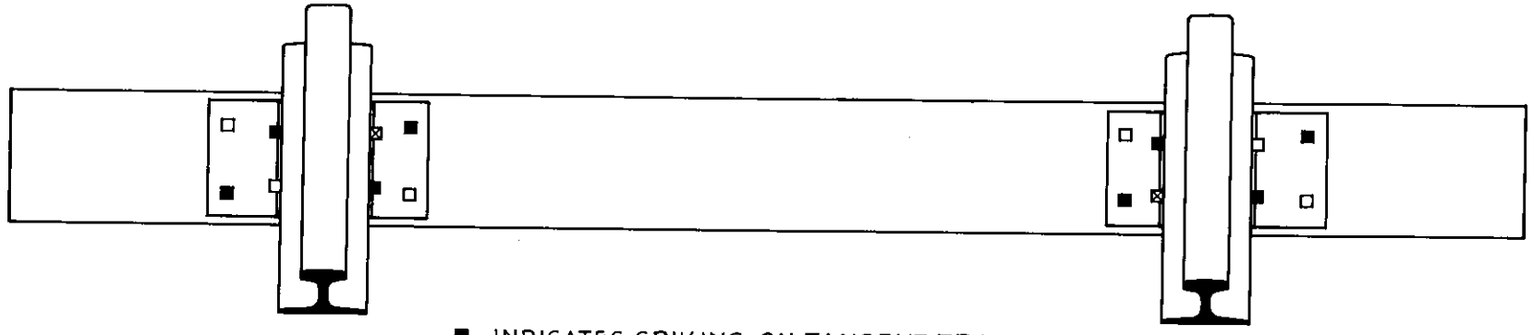


No. 20 TURNOUT

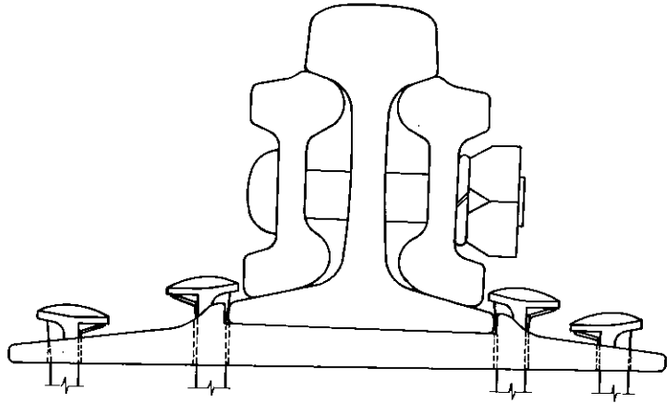
Traced from
69546-A
2-21-33.

THE PENNSYLVANIA RAILROAD
DIAGRAM SHOWING DIMENSIONS OF TURNOUTS FROM TANGENT TRACK
FOR 131 AND 152 LB. P.S. RAILS
Office of Chief Engineer Phila. Pa. July 1932.

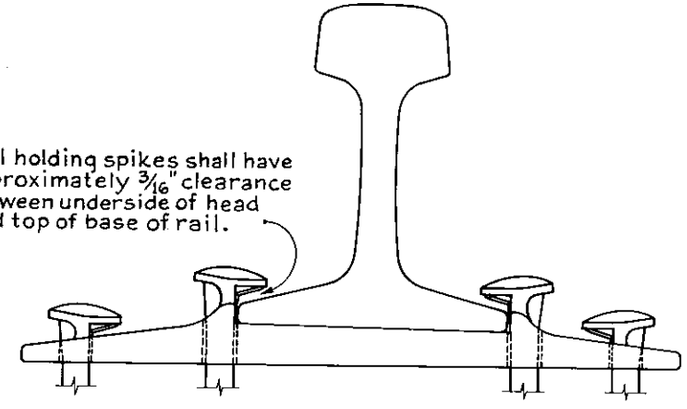
REV.
THIS PLAN
REPLACES
"A" JULY 1956



■ INDICATES SPIKING ON TANGENT TRACK.
⊠ " ADDITIONAL SPIKES ON CURVED TRACK AS SPECIFIED.
□ " HOLES TO BE USED ONLY WHEN OTHER HOLES CANNOT BE SPIKED EFFECTIVELY.



SPIKE APPLICATION WITHIN JOINT BAR LIMITS
NOTE REVERSE POSITION OF HEADS OF RAIL HOLDING SPIKES



SPIKE APPLICATION OF RAIL AND PLATE HOLDING SPIKES
TANGENT AND CURVED TRACK

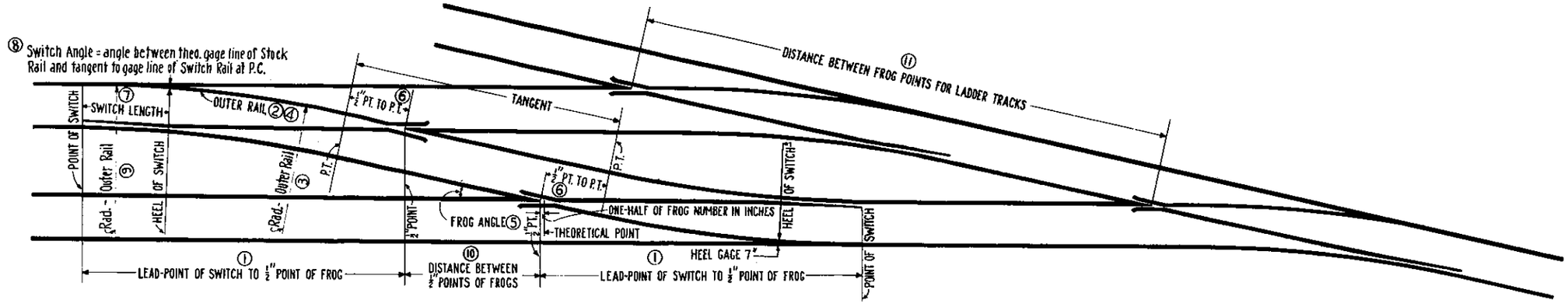
Spiking shall be in accordance with The Pennsylvania Railroad Specifications for Construction and Maintenance of Track, C.E.78-().
Spiking on bridges and trestles shall be the same as for Standard Ballasted Track.

72050-B

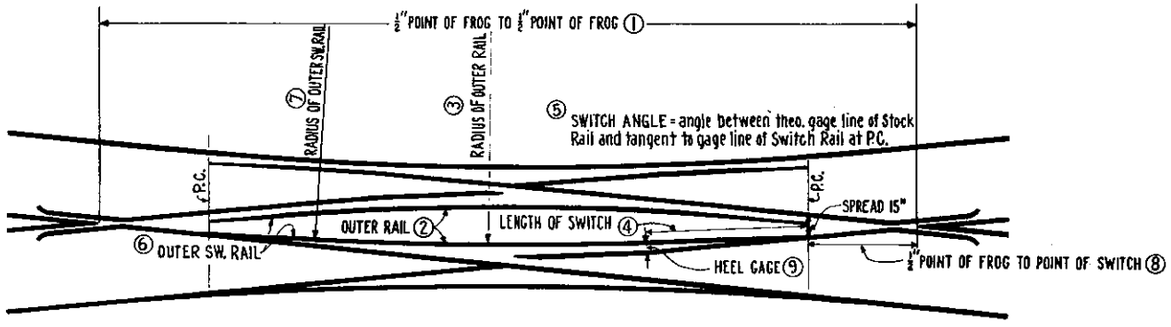
THE PENNSYLVANIA RAILROAD
STANDARD
SPIKING ARRANGEMENT FOR TIE PLATES
OFFICE OF CHIEF ENGINEER, PHILA., PA.-JULY 1957

Chief Engineer

REV.
AUG. 1953



TURNOUTS												CROSSOVERS						LADDER TRACKS					
					FROG		SWITCH					DISTANCE BETWEEN FROG POINTS ⑩						DISTANCE BETWEEN FROG POINTS ⑪					
												TRACK CENTERS						TRACK CENTERS					
FROG NO.	LEAD ① POINT OF SWITCH TO ½" POINT OF FROG	DEGREE OF CURVE ② OF OUTER RAIL	RADIUS ③ OF OUTER RAIL	DISTANCE-④ HEEL OF SWITCH TO TOE OF FROG ON CURVED LEAD	ANGLE ⑤	½" PT. TO P.T. ⑥	LENGTH ⑦	ANGLE ⑧	LOCATION OF P.C.	DEGREE OF CURVE OF OUTER RAIL	RADIUS ⑨ OF OUTER RAIL	12'-2"	13'-0"	14'-0"	16'-0"	17'-0"	19'-0"	12'-2"	13'-0"	14'-0"	17'-0"	20'-0"	FROG NO.
8	67.11'	12°14'-38"	468.85'	40.31'	7°09'-09.7"	7'-0"	20'	1°26'-00"	8'-0¼" BACK OF PT. OF SW.	6°37'-31"	865.30'	20.95'	27.59'	35.56'	51.50'	59.47'	75.41'	97.71'	104.41'	112.44'	136.53'	160.63'	8
10	75.76'	7°32'-24"	760.44'	46.43'	5°43'-29.3"	9'-6"	20'	1°26'-00"		6°37'-31"	865.30'	26.36'	34.67'	44.65'	64.60'	74.58'	94.53'	121.98'	130.33'	140.35'	170.43'	200.50'	10
15	116.33'	2°51'-07"	2009.22'	78.03'	3°49'-05.9"	6'-6"	30'	0°41'-00"	AT PT. OF SW.	2°51'-07"	2009.22'	39.80'	52.28'	67.27'	97.23'	112.22'	142.18'	182.70'	195.22'	210.23'	255.28'	300.33'	15
20	160.13'	1°40'-15"	3429.17'	106.71'	2°51'-51.1"	10'-8 13/16"	45'	0°22'-00"	AT PT. OF SW.	1°40'-15"	3429.17'	53.18'	69.84'	89.83'	129.80'	149.79'	189.76'	243.49'	260.16'	280.17'	340.21'	400.25'	20



SLIP CROSSINGS									
FROG NO.	① ½" POINT OF FROG TO ½" POINT OF FROG	② DEGREE OF CURVE OF OUTER RAIL	③ RADIUS OF OUTER RAIL	④ LENGTH OF SWITCH	⑤ ANGLE OF SWITCH	⑥ DEGREE OF CURVE OF OUTER SW. RAIL	⑦ RADIUS OF OUTER SW. RAIL	⑧ ½" POINT OF FROG TO POINT OF SWITCH	⑨ HEEL GAGE
8	76.15'	8°27'-06"	678.53'	17'	1°14'-00"	8°27'-06"	678.53'	10.33'	6 15/16"
10	95.12'	4°41'-19"	1222.34'	20'	1°10'-00"	5°02'-52"	1135.46'	12.92'	7"
15	142.58'	1°41'-23"	3390.78'	30'	0°41'-00"	2°51'-07"	2009.22'	19.38'	7"
20	190.06'	1°20'-48"	4253.51'	45'	0°30'-00"	1°20'-48"	4253.51'	25.83'	7 9/16"

NOTE:-
The lines of the diagrams indicate gage lines only.

73001-B

THE PENNSYLVANIA RAILROAD
STANDARD

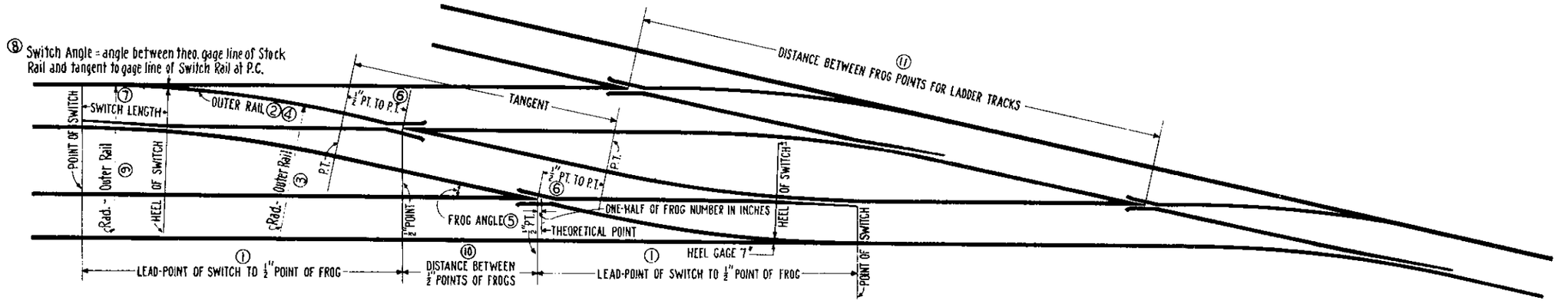
TABLES OF DIMENSIONS OF TURNOUTS, CROSSOVERS, SLIP CROSSINGS AND LADDER TRACKS FROM TANGENT TRACK

FOR 131 LB. R.E. - 140, 152, 155 LB. P.S. RAILS

OFFICE OF CHIEF ENGINEER, PHILA., PA. - DEC. 1948

Chief Engineer

REV.
THIS PLAN
REPLACES
"A" DEC. 1949
"B" AUG. 1953



TURNOUTS

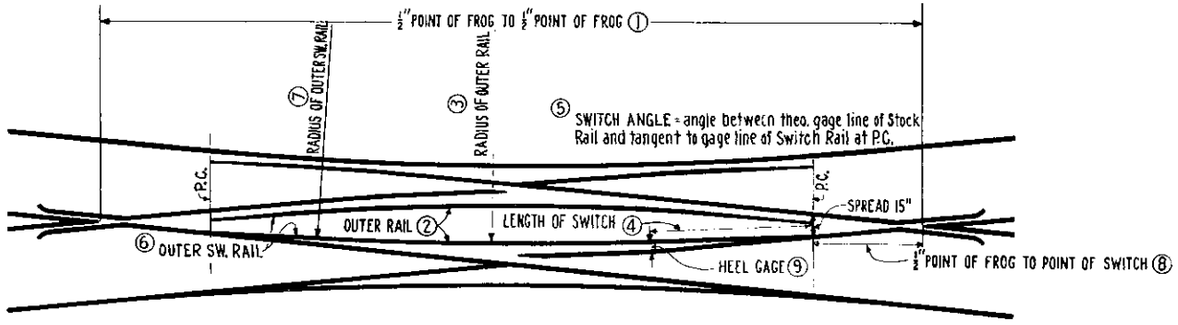
FROG NO.	① LEAD POINT OF SWITCH TO ½" POINT OF FROG	② DEGREE OF CURVE OF OUTER RAIL	③ RADIUS OF OUTER RAIL	④ DISTANCE-HEEL OF SWITCH TO TOE OF FROG ON CURVED LEAD	FROG ⑤ ANGLE	FROG ⑥ ½" PT. TO P.T.	SWITCH ⑦ LENGTH	SWITCH ⑧ ANGLE	SWITCH LOCATION OF P.C.	SWITCH DEGREE OF CURVE OF OUTER RAIL	SWITCH ⑨ RADIUS OF OUTER RAIL
8	67.11'	12°14'-38"	468.85'	40.31'	7°09'-09.7"	7'-0"	20'	1°26'-00"	8'-0½"	6°37'-31"	865.30'
10	75.76'	7°32'-24"	760.44'	46.43'	5°43'-29.3"	9'-6"	20'	1°26'-00"	BACK OF PT. OF SW.	6°37'-31"	865.30'
15	116.33'	2°51'-07"	2009.22'	78.03'	3°49'-05.9"	6'-6"	30'	0°41'-00"	AT PT. OF SW.	2°51'-07"	2009.22'
20	160.13'	1°40'-15"	3429.17'	106.71'	2°51'-51.1"	10'-8 13/16"	45'	0°22'-00"	AT PT. OF SW.	1°40'-15"	3429.17'

CROSSOVERS

⑩ DISTANCE BETWEEN FROG POINTS — TRACK CENTERS					
12'-2"	13'-0"	14'-0"	16'-0"	17'-0"	19'-0"
20.95'	27.59'	35.56'	51.50'	59.47'	75.41'
26.36'	34.67'	44.65'	64.60'	74.58'	94.53'
39.80'	52.28'	67.27'	97.23'	112.22'	142.18'
53.18'	69.84'	89.83'	129.80'	149.79'	189.76'

LADDER TRACKS

⑪ DISTANCE BETWEEN FROG POINTS — TRACK CENTERS					
12'-2"	13'-0"	14'-0"	17'-0"	20'-0"	FROG NO.
97.71'	104.41'	112.44'	136.53'	160.63'	8
121.98'	130.33'	140.35'	170.43'	200.50'	10
182.70'	195.22'	210.23'	255.28'	300.33'	15
243.49'	260.16'	280.17'	340.21'	400.25'	20



The lines of the diagrams indicate gage lines only.

SLIP CROSSINGS

FROG NO.	① ½" POINT OF FROG TO ½" POINT OF FROG	② DEGREE OF CURVE OF OUTER RAIL	③ RADIUS OF OUTER RAIL	④ LENGTH OF SWITCH	⑤ ANGLE OF SWITCH	⑥ DEGREE OF CURVE OF OUTER SW. RAIL	⑦ RADIUS OF OUTER SW. RAIL	⑧ ½" POINT OF FROG TO POINT OF SWITCH	⑨ HEEL GAGE
8	76.15'	8°27'-06"	678.53'	17'	1°14'-00"	8°27'-06"	678.53'	10.33'	6 15/16"
10	95.12'	4°41'-19"	1222.34'	20'	1°10'-00"	5°02'-52"	1135.46'	12.92'	7"
15	142.58'	1°41'-23"	3390.78'	30'	0°41'-00"	2°51'-07"	2009.22'	19.38'	7"
20	190.06'	1°20'-48"	4253.51'	45'	0°30'-00"	1°20'-48"	4253.51'	25.83'	7 9/16"

73001-C

THE PENNSYLVANIA RAILROAD
STANDARD

TABLES OF DIMENSIONS OF TURNOUTS, CROSSOVERS, SLIP CROSSINGS AND LADDER TRACKS FROM TANGENT TRACK

FOR 131, 140 LB. R.E. - 152, 155 LB. P.S. RAILS

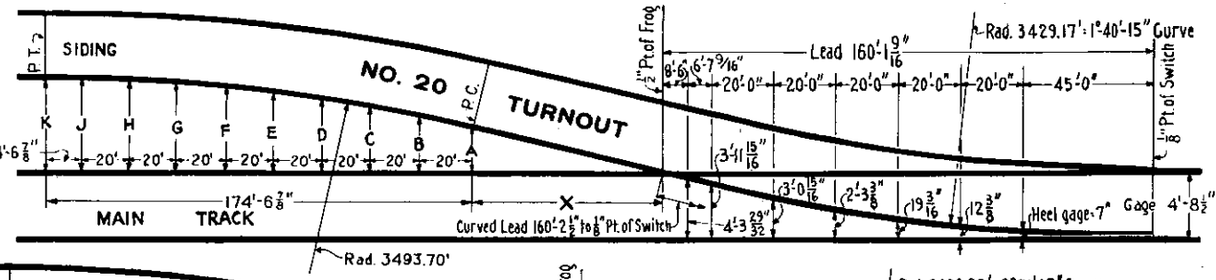
OFFICE OF CHIEF ENGINEER, PHILA., PA. - MAY 1957

R. J. Henry
Chief Engineer

REV. THIS PLAN REPLACES "A" DEC. 1949

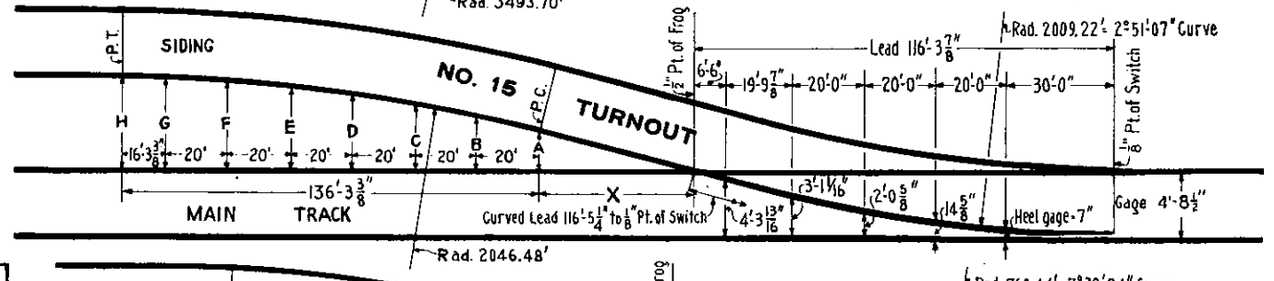
NO. 20 TURNOUT

TRACK CENTERS	X	K	J	H	G	F	E	D	C	B	A
12'-2"	61'-0⅛"	7'-5½"	7'-5⅛"	7'-3½"	7'-0⅝"	6'-8"	6'-2⅝"	5'-7"	4'-10⅜"	4'-0½"	3'-1⅛"
13'-0"	77'-8"	8'-3½"	8'-3⅛"	8'-1½"	7'-10⅜"	7'-6"	7'-0⅛"	6'-5"	5'-8⅜"	4'-10½"	3'-11⅛"
14'-0"	97'-7⅞"	9'-3½"	9'-3⅛"	9'-1½"	8'-10⅜"	8'-6"	8'-0⅛"	7'-5"	6'-8⅜"	5'-10½"	4'-11⅛"
15'-0"	117'-7⅞"	10'-3½"	10'-3⅛"	10'-1½"	9'-10⅜"	9'-6"	9'-0⅛"	8'-5"	7'-8⅜"	6'-10½"	5'-11⅛"
16'-0"	137'-7⅞"	11'-3½"	11'-3⅛"	11'-1½"	10'-10⅜"	10'-6"	10'-0⅛"	9'-5"	8'-8⅜"	7'-10½"	6'-11⅛"
17'-0"	157'-7⅞"	12'-3½"	12'-3⅛"	12'-1½"	11'-10⅜"	11'-6"	11'-0⅛"	10'-5"	9'-8⅜"	8'-10½"	7'-11⅛"
18'-0"	177'-7¼"	13'-3½"	13'-3⅛"	13'-1½"	12'-10⅜"	12'-6"	12'-0⅛"	11'-5"	10'-8⅜"	9'-10½"	8'-11⅛"
19'-0"	197'-7"	14'-3½"	14'-3⅛"	14'-1½"	13'-10⅜"	13'-6"	13'-0⅛"	12'-5"	11'-8⅜"	10'-10½"	9'-11⅛"
20'-0"	217'-6⅞"	15'-3½"	15'-3⅛"	15'-1½"	14'-10⅜"	14'-6"	14'-0⅛"	13'-5"	12'-8⅜"	11'-10½"	10'-11⅛"



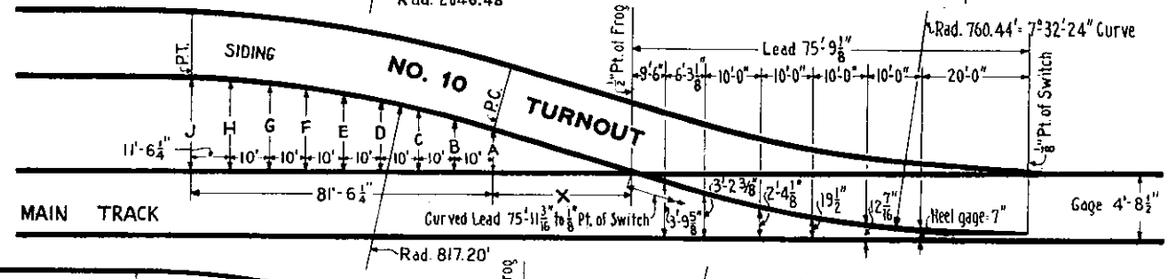
NO. 15 TURNOUT

TRACK CENTERS	X	H	G	F	E	D	C	B	A
12'-2"	43'-0 15/16"	7'-5½"	7'-4 3/4"	7'-1 5/8"	6'-8 3/16"	6'-0 7/16"	5'-2 5/16"	4'-1 13/16"	2'-11"
13'-0"	55'-6 9/16"	8'-3½"	8'-2 3/4"	7'-11 5/8"	7'-6 3/16"	6'-10 7/16"	6'-0 5/16"	4'-11 13/16"	3'-9"
14'-0"	70'-6 5/16"	9'-3½"	9'-2 3/4"	8'-11 5/8"	8'-6 3/16"	7'-10 7/16"	7'-0 5/16"	5'-11 13/16"	4'-9"
15'-0"	85'-6 1/16"	10'-3½"	10'-2 3/4"	9'-11 5/8"	9'-6 3/16"	8'-10 7/16"	8'-0 5/16"	6'-11 13/16"	5'-9"
16'-0"	100'-5 15/16"	11'-3½"	11'-2 3/4"	10'-11 5/8"	10'-6 3/16"	9'-10 7/16"	9'-0 5/16"	7'-11 13/16"	6'-9"
17'-0"	115'-5 3/4"	12'-3½"	12'-2 3/4"	11'-11 5/8"	11'-6 3/16"	10'-10 7/16"	10'-0 5/16"	8'-11 13/16"	7'-9"
18'-0"	130'-5 9/16"	13'-3½"	13'-2 3/4"	12'-11 5/8"	12'-6 3/16"	11'-10 7/16"	11'-0 5/16"	9'-11 13/16"	8'-9"
19'-0"	145'-5 5/16"	14'-3½"	14'-2 3/4"	13'-11 5/8"	13'-6 3/16"	12'-10 7/16"	12'-0 5/16"	10'-11 13/16"	9'-9"
20'-0"	160'-5 1/16"	15'-3½"	15'-2 3/4"	14'-11 5/8"	14'-6 3/16"	13'-10 7/16"	13'-0 5/16"	11'-11 13/16"	10'-9"



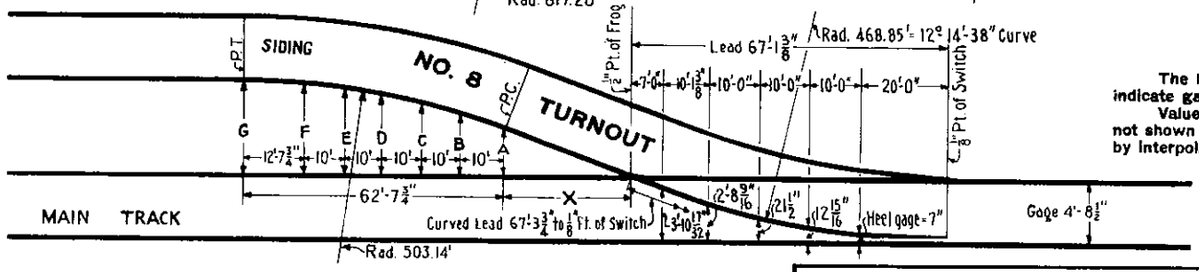
NO. 10 TURNOUT

TRACK CENTERS	X	J	H	G	F	E	D	C	B	A
12'-2"	33'-3 7/8"	7'-5½"	7'-4½"	7'-2⅛"	6'-10 1/4"	6'-4⅜"	5'-10"	5'-1⅝"	4'-3⅞"	3'-4 5/8"
13'-0"	41'-7 5/8"	8'-3½"	8'-2½"	8'-0⅛"	7'-8 1/4"	7'-2⅜"	6'-8"	5'-11⅝"	5'-1⅞"	4'-2 5/8"
14'-0"	51'-7⅝"	9'-3½"	9'-2½"	9'-0⅛"	8'-8 1/4"	8'-2⅜"	7'-8"	6'-11⅝"	6'-1⅞"	5'-2 5/8"
15'-0"	61'-7"	10'-3½"	10'-2½"	10'-0⅛"	9'-8 1/4"	9'-2⅜"	8'-8"	7'-11⅝"	7'-1⅞"	6'-2 5/8"
16'-0"	71'-6 3/4"	11'-3½"	11'-2½"	11'-0⅛"	10'-8 1/4"	10'-2⅜"	9'-8"	8'-11⅝"	8'-1⅞"	7'-2 5/8"
17'-0"	81'-6 1/2"	12'-3½"	12'-2½"	12'-0⅛"	11'-8 1/4"	11'-2⅜"	10'-8"	9'-11⅝"	9'-1⅞"	8'-2 5/8"
18'-0"	91'-6 1/8"	13'-3½"	13'-2½"	13'-0⅛"	12'-8 1/4"	12'-2⅜"	11'-8"	10'-11⅝"	10'-1⅞"	9'-2 5/8"
19'-0"	101'-5 7/8"	14'-3½"	14'-2½"	14'-0⅛"	13'-8 1/4"	13'-2⅜"	12'-8"	12'-11⅝"	11'-1⅞"	10'-2 5/8"
20'-0"	111'-5½"	15'-3½"	15'-2½"	15'-0⅛"	14'-8 1/4"	14'-2⅜"	13'-8"	13'-11⅝"	12'-1⅞"	11'-2 5/8"



NO. 8 TURNOUT

TRACK CENTERS	X	G	F	E	D	C	B	A
12'-2"	27'-10 3/4"	7'-5½"	7'-3 3/8"	6'-11 1/8"	6'-4 3/4"	5'-7 3/4"	4'-8 3/8"	3'-6½"
13'-0"	34'-6 1/2"	8'-3½"	8'-1 5/8"	7'-9 5/8"	7'-2 3/8"	6'-5 3/4"	5'-6 3/8"	4'-4½"
14'-0"	42'-6 1/8"	9'-3½"	9'-1 5/8"	8'-9 5/8"	8'-2 3/8"	7'-5 3/4"	6'-6 3/8"	5'-4½"
15'-0"	50'-5 3/4"	10'-3½"	10'-1 5/8"	9'-9 5/8"	9'-2 3/8"	8'-5 3/4"	7'-6 3/8"	6'-4½"
16'-0"	58'-5 3/8"	11'-3½"	11'-1 5/8"	10'-9 5/8"	10'-2 3/8"	9'-5 3/4"	8'-6 3/8"	7'-4½"
17'-0"	66'-5"	12'-3½"	12'-1 5/8"	11'-9 5/8"	11'-2 3/8"	10'-5 3/4"	9'-6 3/8"	8'-4½"
18'-0"	74'-4 5/8"	13'-3½"	13'-1 5/8"	12'-9 5/8"	12'-2 3/8"	11'-5 3/4"	10'-6 3/8"	9'-4½"
19'-0"	82'-4 1/4"	14'-3½"	14'-1 5/8"	13'-9 5/8"	13'-2 3/8"	12'-5 3/4"	11'-6 3/8"	10'-4½"
20'-0"	90'-3 7/8"	15'-3½"	15'-1 5/8"	14'-9 5/8"	14'-2 3/8"	13'-5 3/4"	12'-6 3/8"	11'-4½"



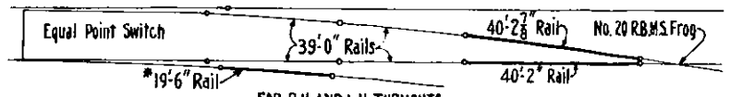
The lines of the diagrams indicate gage lines only.
Values for track centers not shown may be determined by interpolation.

73008-B

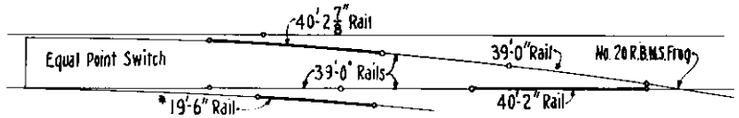
THE PENNSYLVANIA RAILROAD
STANDARD
TABLES OF OFFSETS OF
NOS. 8-10-15 AND 20 TURNOUTS FROM TANGENT TRACK
FOR 131, 140 LB. R.E. - 152, 155 LB. P.S. RAILS

OFFICE OF CHIEF ENGINEER, PHILA., PA. - MAY 1957

C. O. Chief Engineer



FOR R.H. AND L.H. TURNOUTS
WITH 30' EQUAL POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

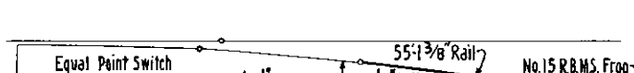


FOR R.H. AND L.H. TURNOUTS
WITH 30' EQUAL POINT SWITCHES AND DESIGN S STOCK RAILS
AND RIGID FROGS

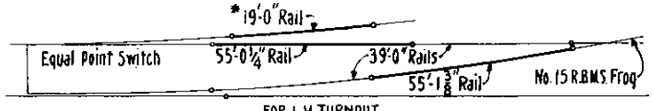
FOR R.H. AND L.H. TURNOUTS
WITH 30' STAGGERED POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

NO. 20 TURNOUTS

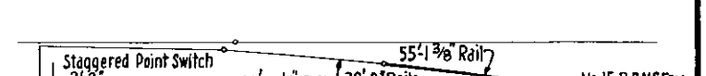
FOR R.H. TURNOUTS
WITH 30' EQUAL POINT SWITCHES AND DESIGN S STOCK RAILS
AND RIGID FROGS



FOR R.H. AND L.H. TURNOUTS
WITH 30' EQUAL POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS



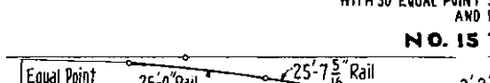
FOR L.H. TURNOUT
WITH 30' EQUAL POINT SWITCHES AND DESIGN S STOCK RAILS
AND RIGID FROGS



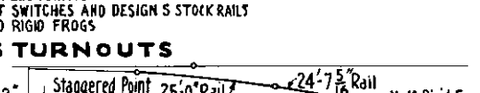
FOR R.H. AND L.H. TURNOUTS
WITH 30' STAGGERED POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

NO. 15 TURNOUTS

FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND RIGID FROGS

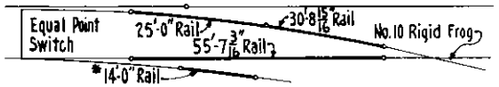


FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND SPRING RAIL FROGS

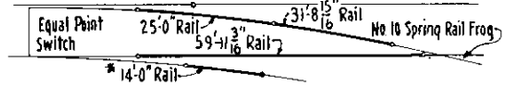


FOR R.H. AND L.H. TURNOUTS
WITH 18' STAGGERED POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

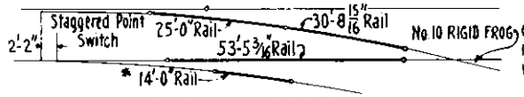
†NO. 10 TURNOUTS WITH SHORT LEADS



FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND RIGID FROGS

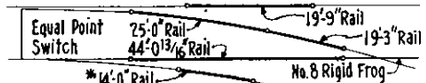


FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND SPRING RAIL FROGS



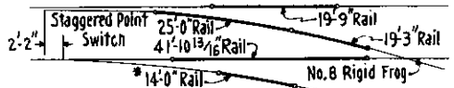
FOR R.H. AND L.H. TURNOUTS
WITH 18' STAGGERED POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

NO. 10 TURNOUTS WITH STANDARD LEADS



FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND RIGID FROGS

FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND SPRING RAIL FROGS



FOR R.H. AND L.H. TURNOUTS
WITH 18' STAGGERED POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

NO. 8 TURNOUTS

The lead rails covered by this plan are indicated by heavy solid lines and shall be ordered as separate items on the requisition, specifying quantity and length of rails required, weight and section of rail and number of this plan. 39'-0" Rails are not furnished where indicated as they shall be provided locally.

The lead rails specified on this plan are for standard turnouts with Design L or S stock rails according to Plan 69886-( ), for 18 Ft. Switch, and Plan 69887-( ), for 30 Ft. Switch, with joints in turnout run beyond heel of switch staggered not more than 5'-0".

Lead rails shall meet the requirements of No.1 Rails as prescribed by The Pennsylvania Railroad Specifications for O.H. Steel Rails, C.E. 35-( ), excluding "A" Rails.

Lead rails shall be drilled $2\frac{23}{32}$"-6"-7" and shall be furnished straight.

†These turnouts shall be used only to meet special limiting conditions.

*This rail is necessary for locating insulating joints but any variation in length that will provide a stagger between joints of not more than 5'-0" will be permitted. The length of rails between heel of switch and toe of frog shall be as specified.

BILL OF MATERIAL OF LEAD RAILS FOR ONE TURNOUT EXCLUDING 39'-0" RAILS

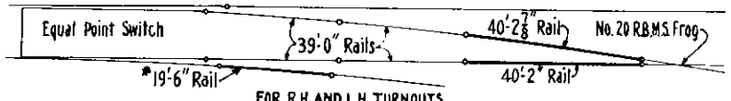
NO. 8 TURNOUTS			NO. 10 TURNOUTS			NO. 15 TURNOUTS		NO. 20 TURNOUTS	
R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS SPRING RAIL FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN L STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS SPRING RAIL FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN L STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DESIGN L STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN L STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN L STOCK RAILS RIGID FROGS
			WITH STANDARD LEADS						
1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 55'-1 3/8"	1 Rail 55'-1 3/8"	1 Rail 40'-2 7/8"	1 Rail 40'-2 7/8"
1 " 14'-0"	1 " 14'-0"	1 " 14'-0"	1 " 14'-0"	1 " 14'-0"	1 " 14'-0"	1 " 55'-0 1/4"	1 " 52'-10 1/4"	1 " 40'-2"	1 " 38'-0"
1 " 19'-3"	1 " 20'-1"	1 " 19'-3"	1 " 30'-8 15/16"	1 " 31'-8 15/16"	1 " 30'-8 15/16"	1 " 19'-6"	1 " 19'-6"	1 " 19'-6"	1 " 19'-6"
1 " 19'-9"	1 " 18'-11"	1 " 19'-9"	1 " 55'-7 3/16"	1 " 59'-11 3/16"	1 " 53'-5 3/16"				
1 " 44'-0 13/16"	1 " 48'-2 13/16"	1 " 41'-10 13/16"	† WITH SHORT LEADS			R.H. TURNOUTS EQUAL PT. SWITCHES DESIGN S STOCK RAILS RIGID FROGS	L.H. TURNOUTS EQUAL PT. SWITCHES DESIGN S STOCK RAILS RIGID FROGS		
			1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 55'-1 3/8"	1 Rail 55'-1 3/8"		
			1 " 14'-0"	1 " 14'-0"	1 " 14'-0"	1 " 55'-0 1/4"	1 " 55'-0 1/4"		
			1 " 24'-7 5/16"	1 " 25'-7 5/16"	1 " 24'-7 5/16"	1 " 19'-6"	1 " 19'-0"		
			1 " 49'-5 7/16"	1 " 53'-9 7/16"	1 " 47'-3 7/16"				

73049-A

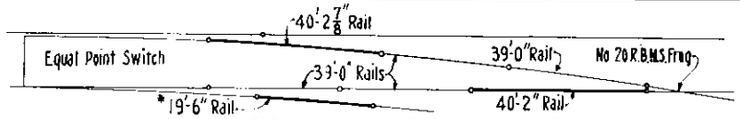
THE PENNSYLVANIA RAILROAD
STANDARD
LEAD RAILS
FOR TURNOUTS OF 130 LB. P.S. RAIL DRILLED $2\frac{23}{32}$"-6"-7"
OFFICE OF CHIEF ENGINEER, PHILA., PA. - JAN. 1953

J. Casanave
Chief Engineer

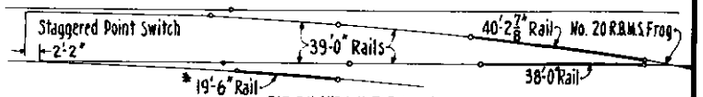
REV.
THIS PLAN
REPLACES
"A" JAN. 1953



FOR R.H. AND L.H. TURNOUTS
WITH 30' EQUAL POINT SWITCHES AND DESIGN **L** STOCK RAILS
AND RIGID FROGS



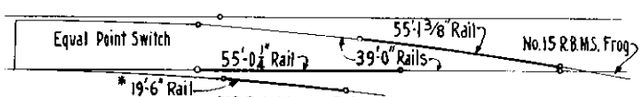
FOR R.H. AND L.H. TURNOUTS
WITH 30' EQUAL POINT SWITCHES AND DESIGN **S** STOCK RAILS
AND RIGID FROGS



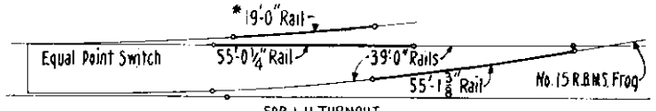
FOR R.H. AND L.H. TURNOUTS
WITH 30' STAGGERED POINT SWITCHES AND DESIGN **L** STOCK RAILS
AND RIGID FROGS

NO. 20 TURNOUTS

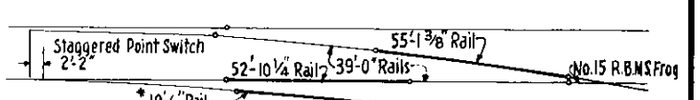
FOR R.H. TURNOUTS
WITH 30' EQUAL POINT SWITCHES AND DESIGN **S** STOCK RAILS
AND RIGID FROGS



FOR R.H. AND L.H. TURNOUTS
WITH 30' EQUAL POINT SWITCHES AND DESIGN **L** STOCK RAILS
AND RIGID FROGS

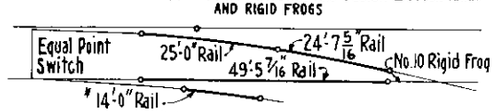


FOR L.H. TURNOUT
WITH 30' EQUAL POINT SWITCHES AND DESIGN **S** STOCK RAILS
AND RIGID FROGS

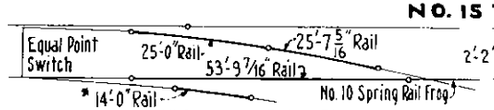


FOR R.H. AND L.H. TURNOUTS
WITH 30' STAGGERED POINT SWITCHES AND DESIGN **L** STOCK RAILS
AND RIGID FROGS

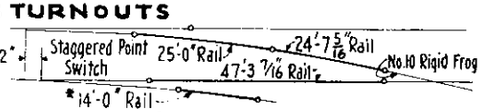
NO. 15 TURNOUTS



FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN **L** OR **S** STOCK RAILS
AND RIGID FROGS

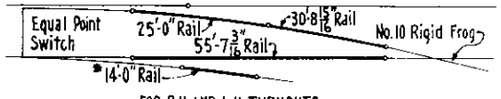


FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN **L** OR **S** STOCK RAILS
AND SPRING RAIL FROGS

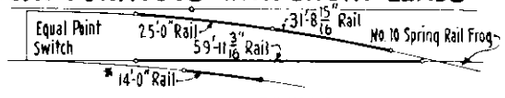


FOR R.H. AND L.H. TURNOUTS
WITH 18' STAGGERED POINT SWITCHES AND DESIGN **L** STOCK RAILS
AND RIGID FROGS

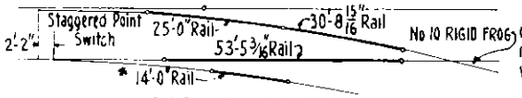
† NO. 10 TURNOUTS WITH SHORT LEADS



FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN **L** OR **S** STOCK RAILS
AND RIGID FROGS

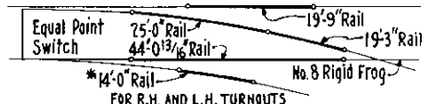


FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN **L** OR **S** STOCK RAILS
AND SPRING RAIL FROGS

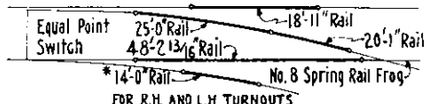


FOR R.H. AND L.H TURNOUTS
WITH 18' STAGGERED POINT SWITCHES AND DESIGN **L** STOCK RAILS
AND RIGID FROGS

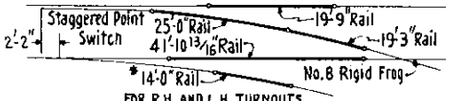
NO. 10 TURNOUTS WITH STANDARD LEADS



FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN **L** OR **S** STOCK RAILS
AND RIGID FROGS



FOR R.H. AND L.H. TURNOUTS
WITH 18' EQUAL POINT SWITCHES AND DESIGN **L** OR **S** STOCK RAILS
AND SPRING RAIL FROGS



FOR R.H. AND L.H. TURNOUTS
WITH 18' STAGGERED POINT SWITCHES AND DESIGN **L** STOCK RAILS
AND RIGID FROGS

NO. 8 TURNOUTS

† These turnouts shall be used only to meet special limiting conditions.

* This rail is necessary for locating insulating joints but any variation in length that will provide a stagger between joints of not more than 5'-0" will be permitted. The length of rails between heel of switch and toe of frog shall be as specified.

The Lead Rails covered by this plan are indicated by heavy solid lines and shall be ordered as separate items on the requisition, specifying quantity and length of rails required, weight and section of rail and number of this plan. 39'-0" Rails are not furnished where indicated as they shall be provided locally.

The Lead Rails specified on this plan are for Standard –

No. 8 Turnouts according to Plan 73000-( ).
No. 10 " " " " "
No. 15 " " " " "
No. 20 " " " " "

with Design **L** or **S** Stock Rails for 18 Ft. and 30 Ft. Switches, according to Plan 73060-( ) and with joints in turnout run beyond heel of switch staggered not more than 5'-0".

Lead Rails shall meet the requirements of No. 1 Rails as prescribed by The Pennsylvania Railroad Specifications for O.H. Steel Rails, C.E. 35-( ), excluding "A" Rails.

Lead Rails shall be drilled $2\frac{23}{32}$"-6"-7" and shall be furnished straight.

† No. 10 Turnout with Short Leads shall be used only to meet special limiting conditions; upon approval of the Chief Engineer.

BILL OF MATERIAL OF LEAD RAILS FOR ONE TURNOUT EXCLUDING 39'-0" RAILS

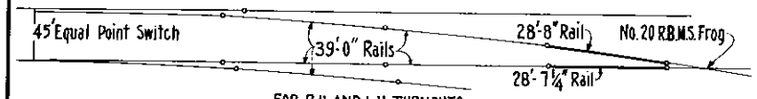
NO. 8 TURNOUTS			NO. 10 TURNOUTS			NO. 15 TURNOUTS		NO. 20 TURNOUTS	
R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. **L** OR **S** STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. **L** OR **S** STOCK RAILS SPRING RAIL FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN **L** STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. **L** OR **S** STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. **L** OR **S** STOCK RAILS SPRING RAIL FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN **L** STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DESIGN **L** STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN **L** STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. **L** OR **S** STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN **L** STOCK RAILS RIGID FROGS
			WITH STANDARD LEADS						
1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 55'-1 3/8"	1 Rail 55'-1 3/8"	1 Rail 40'-2 7/8"	1 Rail 40'-2 7/8"
" 14'-0"	" 14'-0"	" 14'-0"	" 14'-0"	" 14'-0"	" 14'-0"	" 55'-0 1/4"	" 52'-10 1/4"	" 40'-2"	" 38'-0"
" 19'-3"	" 20'-1"	" 19'-3"	" 30'-8 15/16"	" 31'-8 15/16"	" 30'-8 15/16"	" 19'-6"	" 19'-6"	" 19'-6"	" 19'-6"
" 19'-9"	" 18'-11"	" 19'-9"	" 55'-7 3/16"	" 59'-11 3/16"	" 53'-5 3/16"				
" 44'-0 13/16"	" 48'-2 13/16"	" 41'-10 13/16"	† WITH SHORT LEADS			R.H. TURNOUTS EQUAL PT. SWITCHES DESIGN **S** STOCK RAILS RIGID FROGS	L.H. TURNOUTS EQUAL PT. SWITCHES DESIGN **S** STOCK RAILS RIGID FROGS		
			1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 55'-1 3/8"	1 Rail 55'-1 3/8"		
			" 14'-0"	" 14'-0"	" 14'-0"	" 55'-0 1/4"	" 55'-0 1/4"		
			" 24'-7 5/16"	" 25'-7 5/16"	" 24'-7 5/16"	" 19'-6"	" 19'-0"		
			" 49'-5 7/16"	" 53'-9 7/16"	" 47'-3 7/16"				

73049-B

THE PENNSYLVANIA RAILROAD
STANDARD
LEAD RAILS
FOR TURNOUTS OF 130 LB. P.S. RAIL DRILLED $2\frac{23}{32}$"-6"-7"
OFFICE OF CHIEF ENGINEER, PHILA., PA. - MAY 1957

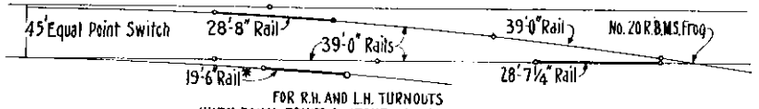
G. J. Huntley
Chief Engineer

REV.
THIS PLAN
REPLACES
"A" OCT. 1951

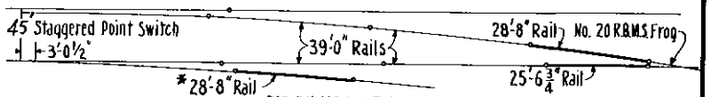


FOR R.H. AND L.H. TURNOUTS
WITH EQUAL POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

No. 20 R.B.M.S. Frogs in accordance with Plan 74143-().

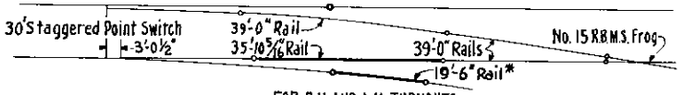


FOR R.H. AND L.H. TURNOUTS
WITH EQUAL POINT SWITCHES AND DESIGN S STOCK RAILS
AND RIGID FROGS



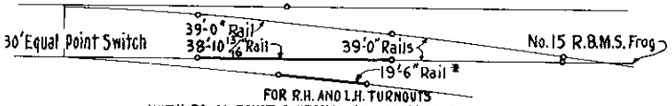
FOR R.H. AND L.H. TURNOUTS
WITH STAGGERED POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

NO. 20 TURNOUTS



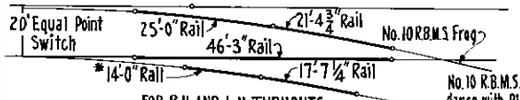
FOR R.H. AND L.H. TURNOUTS
WITH STAGGERED POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

No. 15 R.B.M.S Frogs in accordance with Plan 74142-().



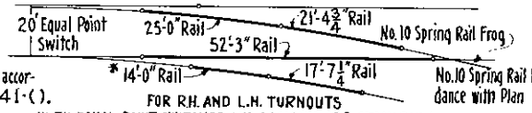
FOR R.H. AND L.H. TURNOUTS
WITH EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND RIGID FROGS

NO. 15 TURNOUTS



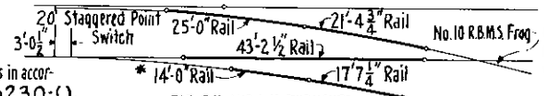
FOR R.H. AND L.H. TURNOUTS
WITH EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND RIGID FROGS

No. 10 R.B.M.S. Frogs in accordance with Plan 74141-().



FOR R.H. AND L.H. TURNOUTS
WITH EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND SPRING RAIL FROGS

No. 10 Spring Rail Frogs in accordance with Plan 66230-().

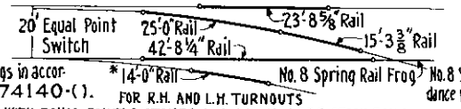


FOR R.H. AND L.H. TURNOUTS
WITH STAGGERED POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

NO. 10 TURNOUTS

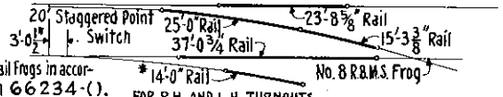
FOR R.H. AND L.H. TURNOUTS
WITH EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND RIGID FROGS

No. 8 R.B.M.S. Frogs in accordance with Plan 74140-().



FOR R.H. AND L.H. TURNOUTS
WITH EQUAL POINT SWITCHES AND DESIGN L OR S STOCK RAILS
AND SPRING RAIL FROGS

No. 8 Spring Rail Frogs in accordance with Plan 66234-().



FOR R.H. AND L.H. TURNOUTS
WITH STAGGERED POINT SWITCHES AND DESIGN L STOCK RAILS
AND RIGID FROGS

NO. 8 TURNOUTS

The Lead Rails covered by this plan are indicated by heavy solid lines and shall be ordered as separate items on the requisition, specifying quantity and length of rails required, weight and section of rail and number of this plan. 39'-0" Rails are not furnished where indicated as they shall be provided locally.

The Lead Rails specified on this plan are for Standard -
No. 8 Turnouts according to Plan 73001-().
No. 10 " " " " "
No. 15 " " " " "
No. 20 " " " " "
with Design L or S Stock Rails for 20 Ft., 30 Ft. and 45 Ft. Switches, according to Plan 73061-() and with joints in turnout run beyond heel of switch staggered not more than 5'-0".

Lead Rails shall meet the requirements of No. 1 Rails as prescribed by The Pennsylvania Railroad Specifications for O.H. Steel Rails, C.E. 35-(), excluding "A" Rails.

Lead Rails shall be drilled $2\frac{23}{32}$"-6"-7" and shall be furnished straight.

*This rail is necessary for locating insulating joints but any variation in length that will provide a stagger between joints of not more than 5'-0" will be permitted. The length of rails between heel of switch and toe of frog shall be as specified.

BILL OF MATERIAL OF LEAD RAILS FOR ONE TURNOUT EXCLUDING 39'-0" RAILS

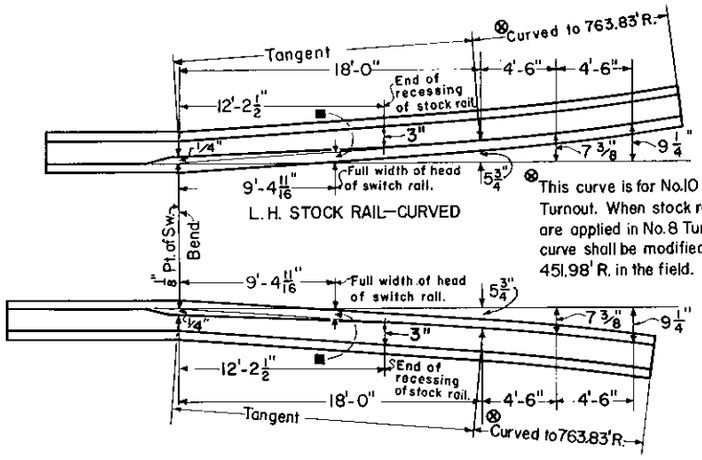
NO. 8 TURNOUTS			NO. 10 TURNOUTS			NO. 15 TURNOUTS		NO. 20 TURNOUTS		
R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS SPRING RAIL FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN L STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS SPRING RAIL FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN L STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DES. L OR S STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN L STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DESIGN L STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS EQUAL PT. SWITCHES DESIGN S STOCK RAILS RIGID FROGS	R.H. & L.H. TURNOUTS STAGGERED PT. SWITCHES DESIGN L STOCK RAIL RIGID FROGS
1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 25'-0"	1 Rail 38'-10 13/16"	1 Rail 35'-10 5/16"	1 Rail 28'-8"	1 Rail 28'-8"	2 Rails 28'-8"
1 " 14'-0"	1 " 14'-0"	1 " 14'-0"	1 " 14'-0"	1 " 14'-0"	1 " 14'-0"	1 " 19'-6"	1 " 19'-6"	1 " 28'-7¼"	1 " 28'-7¼"	1 Rail 25'-6¾"
1 " 23'-8 5/8"	1 " 23'-8 5/8"	1 " 23'-8 5/8"	1 " 21'-4¾"	1 " 21'-4¾"	1 " 21'-4¾"				1 " 19'-6"	
1 " 15'-3 3/8"	1 " 15'-3 3/8"	1 " 15'-3 3/8"	1 " 17'-7¼"	1 " 17'-7¼"	1 " 17'-7¼"					
1 " 40'-1¼"	1 " 42'-8¼"	1 " 37'-0¾"	1 " 46'-3"	1 " 52'-3"	1 " 43'-2½"					

73050-B

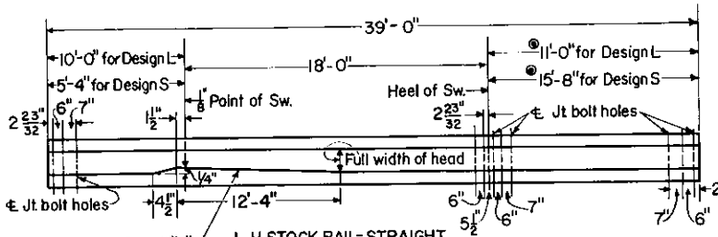
THE PENNSYLVANIA RAILROAD
STANDARD
LEAD RAILS
FOR 131-140 LB. R.E. AND 152-155 LB. P.S. TURNOUTS
OFFICE OF CHIEF ENGINEER, PHILA., PA. - MAY 1957

C.J. Henny
Chief Engineer

244

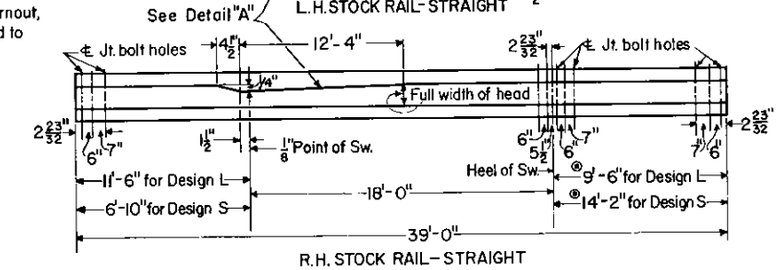


L. H. STOCK RAIL—CURVED



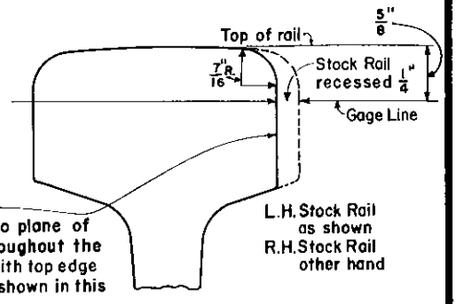
L. H. STOCK RAIL—STRAIGHT

R. H. STOCK RAIL—CURVED



R. H. STOCK RAIL—STRAIGHT

STOCK RAILS FOR 18 FT. SPLIT SWITCHES, 130 LB. P.S., 3 HOLE DRILLING,—39'-0" LONG



This surface of recess shall be perpendicular to plane of base of stock rail throughout the length of the recess with top edge rounded throughout as shown in this section.

SECTION THROUGH STOCK RAIL AT ⅛" PT. OF SWITCH
DETAIL A

NOTE:-

Requisitions for stock rails shall specify weight and type of rail, hand, whether straight or curved, design, the length of switch with which they are to be used, and the number of this plan.

Wherever practicable, two Design L or one Design L and one Design S stock rails shall be used. Two Design S stock rails shall be used only to meet special limiting conditions.

Stock Rails shall meet the requirements of No. 1 Rails as prescribed by the Pennsylvania Railroad Specifications for O.H. Steel Rails, excluding "A" Rails, C.E. 35-( ). No rails which were cut when cold by the use of a high speed friction saw shall be used.

Rail Ends shall be beveled as indicated on Plan 71099-( ).

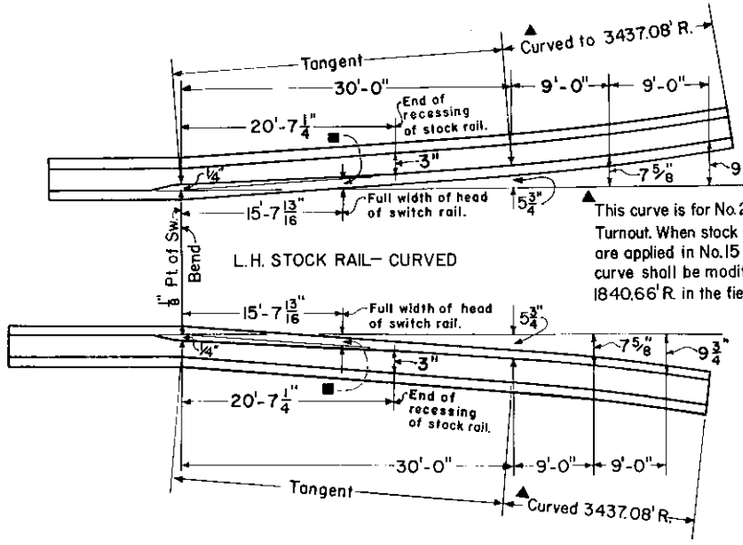
One straight and one curved stock rail are used with each standard switch.

Details of curved stock rails are same as for straight stock rails of same hand except curved stock rails shall be furnished bent and curved to the alinement specified above and below.

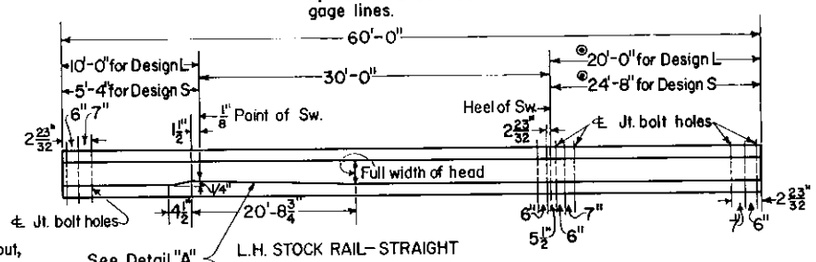
Joint Bolt Holes shall be 1 5/16" Dia. Center line of Joint Bolt Holes shall be 2¾" above base of rail.

⊛ Any variation in rail length, within limits prescribed by rail specification, shall occur in this dimension.

■ Spread of 3" between theoretical gage lines.

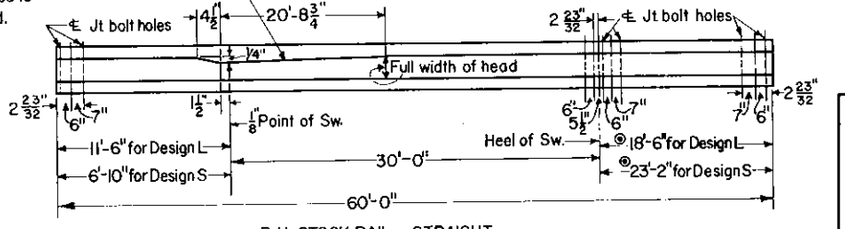


L. H. STOCK RAIL—CURVED



L. H. STOCK RAIL—STRAIGHT

R. H. STOCK RAIL—CURVED



R. H. STOCK RAIL—STRAIGHT

STOCK RAILS FOR 30 FT. SPLIT SWITCHES, 130 LB. P.S., 3 HOLE DRILLING,—60'-0" LONG

73060-A

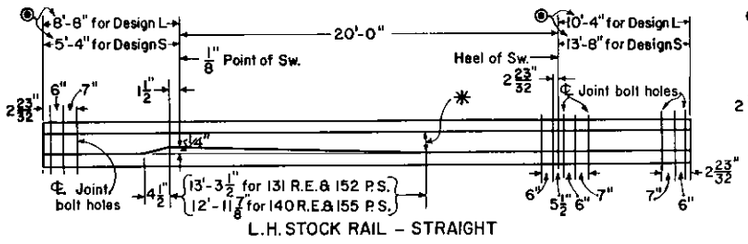
THE PENNSYLVANIA RAILROAD
STANDARD

STOCK RAILS

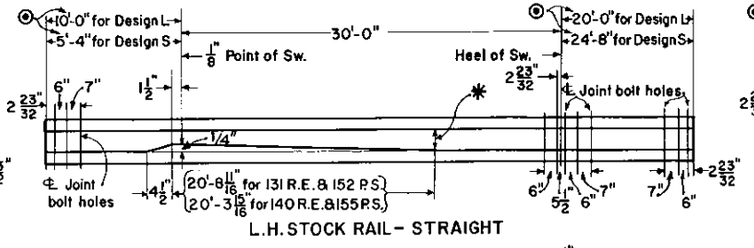
RECESSED ¼"—FOR 18 FT. AND 30 FT. SPLIT SWITCHES, 130 LB. P.S. DRILLED 2 23/32"-6"-7"

OFFICE OF CHIEF ENGINEER, PHILA., PA., JUNE 1957

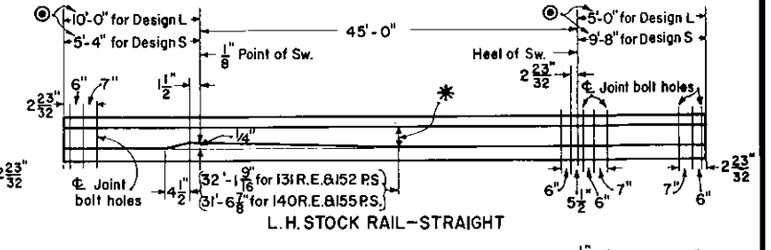
Chief Engineer



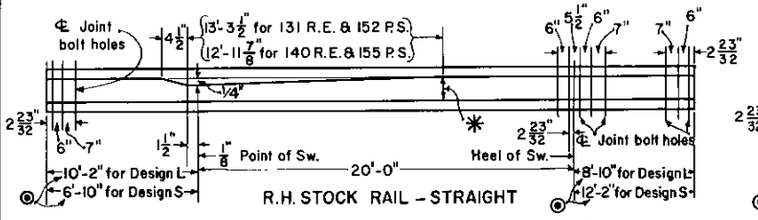
L.H. STOCK RAIL – STRAIGHT



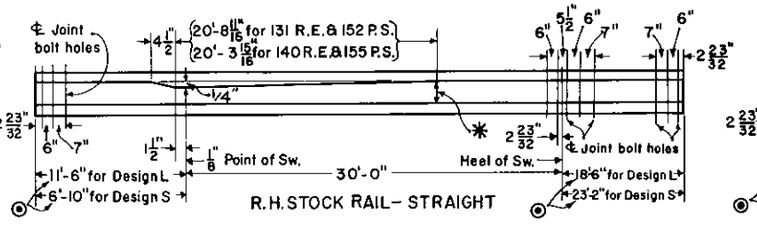
L.H. STOCK RAIL – STRAIGHT



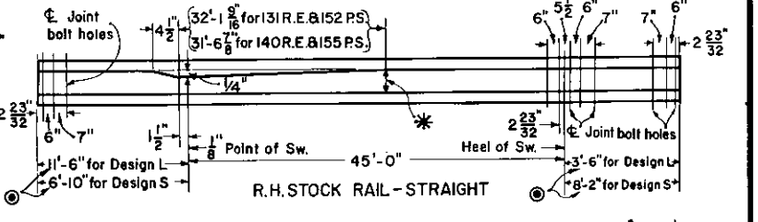
L.H. STOCK RAIL – STRAIGHT



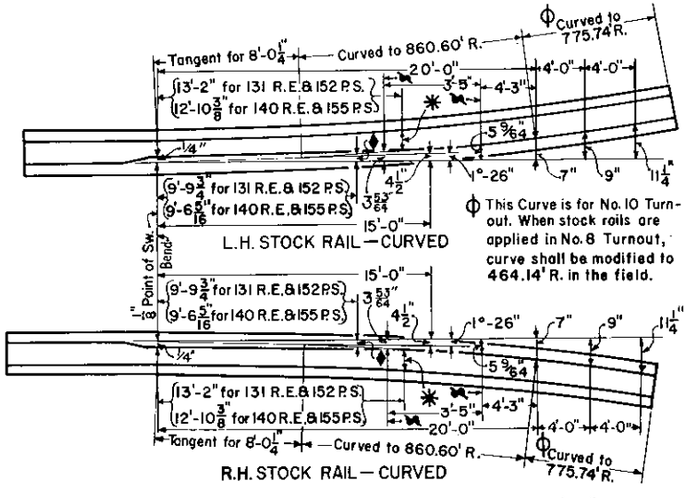
R.H. STOCK RAIL – STRAIGHT



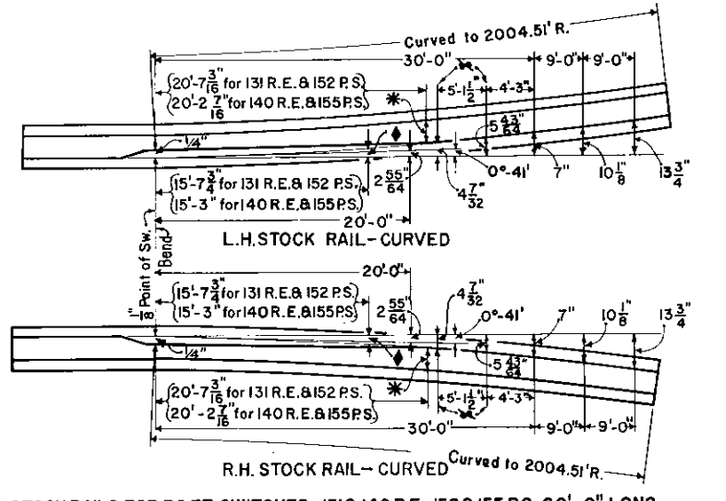
R.H. STOCK RAIL – STRAIGHT



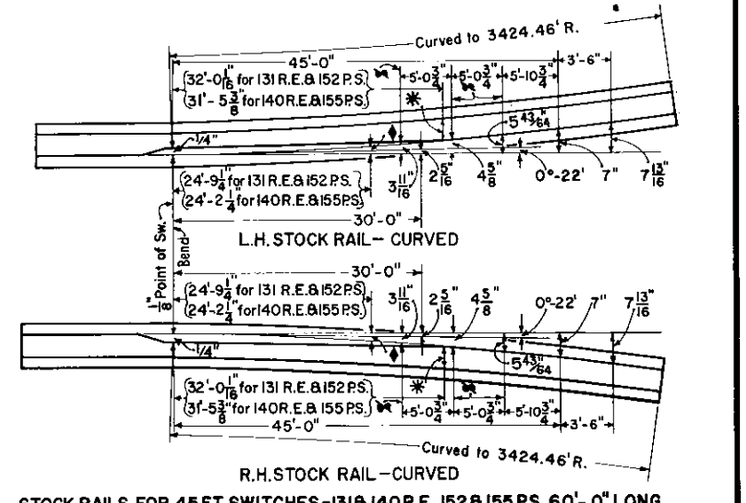
R.H. STOCK RAIL – STRAIGHT



STOCK RAILS FOR 20 FT. SWITCHES – 131 & 140 R.E., 152 & 155 P.S., 39'-0" LONG



STOCK RAILS FOR 30 FT. SWITCHES – 131 & 140 R.E., 152 & 155 P.S., 60'-0" LONG



STOCK RAILS FOR 45 FT. SWITCHES – 131 & 140 R.E., 152 & 155 P.S., 60'-0" LONG (FOR NO. 20 TURNOUTS)

NOTE :–

Requisitions for stock rails shall specify weight and type of rail, hand, whether straight or curved, design, the length of switch with which they are to be used and the number of this plan. (One straight and one curved stock rail are used with each standard switch).

Wherever practicable, two Design L or one Design L and one Design S stock rails shall be used. Two Design S stock rails shall be used only to meet special limiting conditions.

Details of curved stock rails are same as for straight stock rails of same hand except curved stock rails shall be furnished bent and curved to the alinement specified on this plan.

Size and distance of joint bolt holes from rail base shall conform to Standard Plans of the respective rail sections.

The ends of the stock rails shall be beveled as shown on Standard Plan 71099-( ).

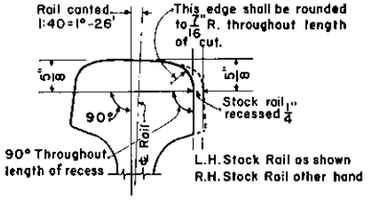
Stock rails shall meet the requirements of No. 1 Rails as prescribed by the Pennsylvania Railroad Specifications for O.H. Steel Rails, C.E. 35-( ), excluding "A" Rails. No rails which were cut when cold by the use of a high speed friction saw shall be used.

◉ Any variation in rail length within limits prescribed by rail specifications, shall occur in this dimension.

✱ Full width of head of rail at gage line – (2 31/32" for 131 R.E. & 152 P.S., and 2 7/8" for 140 R.E. & 155 P.S.).

♦ Spread between theoretical gage lines – (2 31/32" for 131 R.E. & 152 P.S., and 2 7/8" for 140 R.E. & 155 P.S.).

Center line of stop on switch rail; (spread between theoretical gage lines shown).



SECTION THROUGH STOCK RAIL AT 1/8 POINT OF SWITCH

73061-A

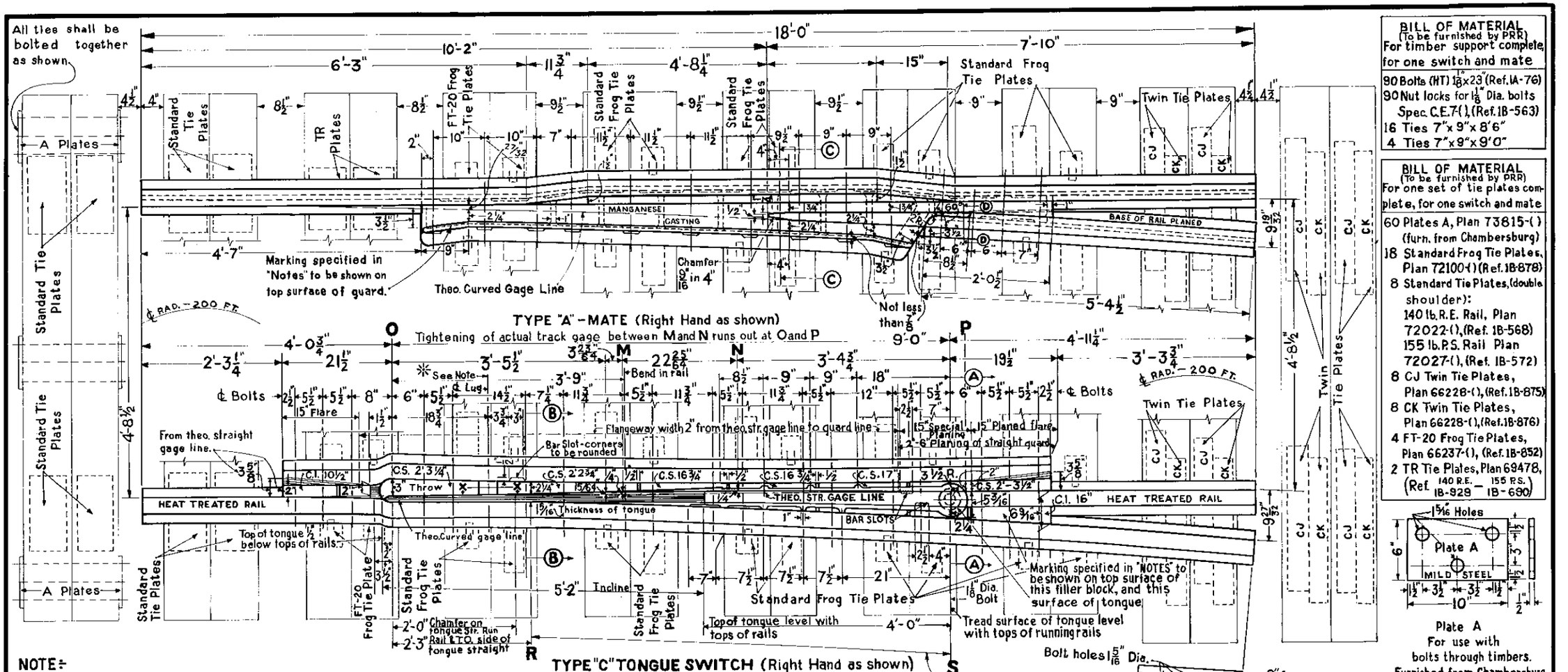
THE PENNSYLVANIA RAILROAD
STANDARD

STOCK RAILS

RECESSED 1/4" FOR 20 FT., 30 FT., AND 45 FT. SPLIT SWITCHES, 131 AND 140 LB. R.E., 152 AND 155 LB. P.S. DRILLED 2 23/32" – 6" – 7"

OFFICE OF CHIEF ENGINEER, PHILA., PA., JUNE 1957

Chief Engineer



BILL OF MATERIAL
(To be furnished by PRR)
For timber support complete, for one switch and mate

90 Bolts (HT) 1⅛"x23" (Ref. IA-76)
90 Nut locks for 1⅛" Dia. bolts Spec. C.E.7(), (Ref. IB-563)
16 Ties 7"x9"x8'6"
4 Ties 7"x9"x9'0"

BILL OF MATERIAL
(To be furnished by PRR)
For one set of tie plates complete, for one switch and mate

60 Plates A, Plan 73815-( ) (furn. from Chambersburg)
18 Standard Frog Tie Plates, Plan 72100-() (Ref. IB-878)
8 Standard Tie Plates, (double shoulder):
140 lb. R.E. Rail, Plan 72022-(), (Ref. IB-568)
155 lb. P.S. Rail Plan 72027-(), (Ref. IB-572)
8 CJ Twin Tie Plates, Plan 66228-(), (Ref. IB-875)
8 CK Twin Tie Plates, Plan 66228-(), (Ref. IB-876)
4 FT-20 Frog Tie Plates, Plan 66237-(), (Ref. IB-852)
2 TR Tie Plates, Plan 69478, (Ref. 140 R.E. IB-928 — 155 P.S. IB-690)

Plate A
For use with bolts through timbers. Furnished from Chambersburg on SK-5 order.

Sections and other details shall be in accordance with Plan 73816-( ).

NOTE:-

Requisitions for switches or mates as per this plan, shall specify the weight and type of rail, and hand of switch or mate desired.

When switches as per this plan are ordered, Manufacturer shall furnish switch complete with tongue, but excluding the mate, and switch shall be furnished with the two running rails heat treated as shown.

The mates for use with this switch are shown also on this plan, and shall be ordered on a separate requisition.

The Body Casting for the mate shall be manganese or other approved alloy steel.

When tongues alone are desired, they shall be described on the requisition as follows, with hand of tongue being same as the hand of switch into which they are to fit:

TONGUES, R.H.-L.H. 155 lb. P.S. (140 lb. R.E.) Switch Type C, Forged steel, H.T. and reinforced per this plan.

* Bolt through lug shall be removed when throwing device is applied.

All rail parts shall meet the requirements of No. 1 Rails as prescribed by The Pennsylvania Railroad Spec. C.E.35-( ).

All body bolts shall be 1⅜" Dia. except 1⅛" Dia. bolt through pin.

The Tongue Switch and Mate shall be marked, where indicated on this plan, with characters not less than ½" high to indicate the manufacturer's name or trade mark, weight and type of rail, the letters "HT" to indicate Heat Treated running rails for the switch, and design of switch or mate, ("Type C" for switch; "Type A" for mate).

The steel of manganese steel casting shall conform to the following requirements as to chemical composition:

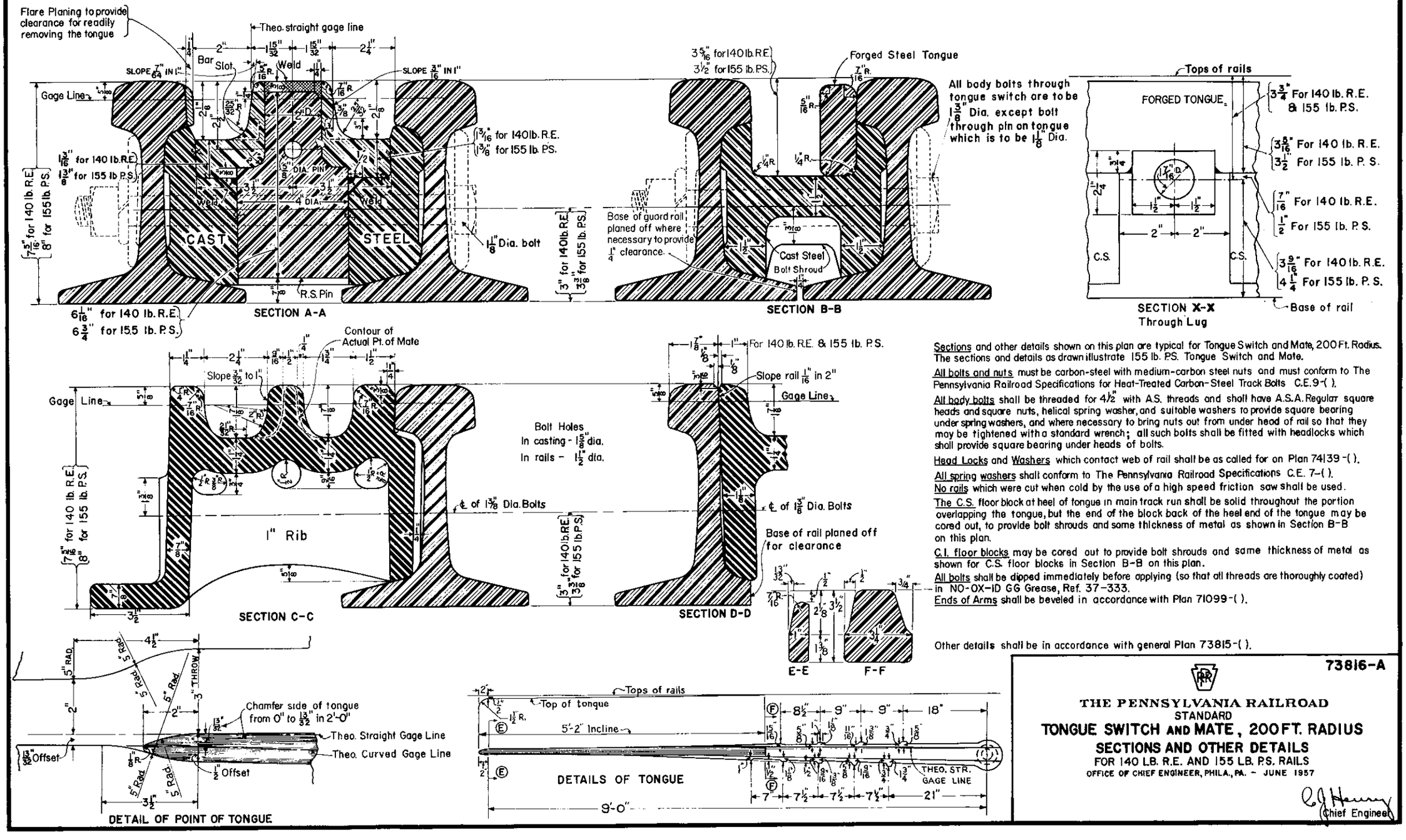
Carbon, per cent	1.00 - 1.30
Manganese, Min., percent	12.00
Silicon, Max., per cent	2.00
Phosphorus, Max., per cent	0.10
Sulfur, Max., per cent	0.05

A copy of the analysis of the manganese steel with test drillings shall be furnished by manufacturer to the P.R.R. inspector.

73815-A

THE PENNSYLVANIA RAILROAD
STANDARD
TONGUE SWITCH AND MATE, 200 FT. RADIUS FOR USE IN PAVED STREETS
FOR 140 LB. R.E. AND 155 LB. P.S. RAILS
OFFICE OF CHIEF ENGINEER, PHILA., PA. - JUNE 1957

C.J. Henry
Chief Engineer



Sections and other details shown on this plan are typical for Tongue Switch and Mate, 200 Ft. Radius. The sections and details as drawn illustrate 155 lb. P.S. Tongue Switch and Mate.

All bolts and nuts must be carbon-steel with medium-carbon steel nuts and must conform to The Pennsylvania Railroad Specifications for Heat-Treated Carbon-Steel Track Bolts C.E.9-( ).

All body bolts shall be threaded for 4 1/2" with A.S.A. Regular square heads and square nuts, helical spring washer, and suitable washers to provide square bearing under spring washers, and where necessary to bring nuts out from under head of rail so that they may be tightened with a standard wrench; all such bolts shall be fitted with headlocks which shall provide square bearing under heads of bolts.

Head Locks and Washers which contact web of rail shall be as called for on Plan 74139-( ).

All spring washers shall conform to The Pennsylvania Railroad Specifications C.E. 7-( ).

No rails which were cut when cold by the use of a high speed friction saw shall be used.

The C.S. floor block at heel of tongue in main track run shall be solid throughout the portion overlapping the tongue, but the end of the block back of the heel end of the tongue may be cored out, to provide bolt shrouds and same thickness of metal as shown in Section B-B on this plan.

C.I. floor blocks may be cored out to provide bolt shrouds and same thickness of metal as shown for C.S. floor blocks in Section B-B on this plan.

All bolts shall be dipped immediately before applying (so that all threads are thoroughly coated) in NO-OX-ID GG Grease, Ref. 37-333.

Ends of Arms shall be beveled in accordance with Plan 71099-( ).

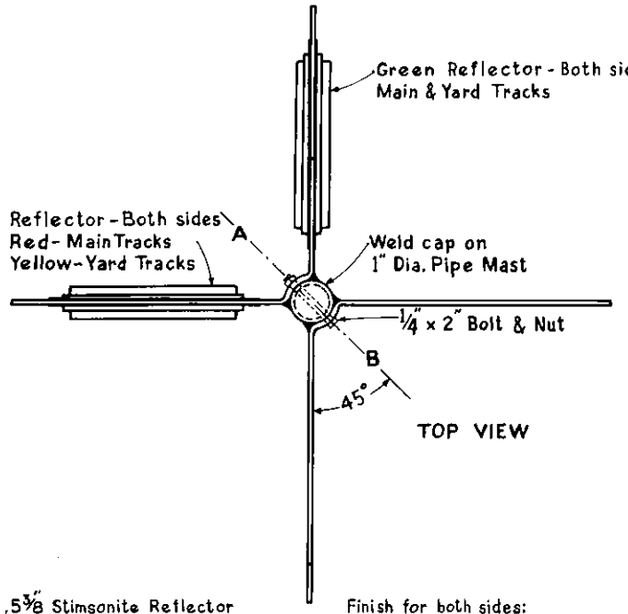
Other details shall be in accordance with general Plan 73815-( ).

73816-A

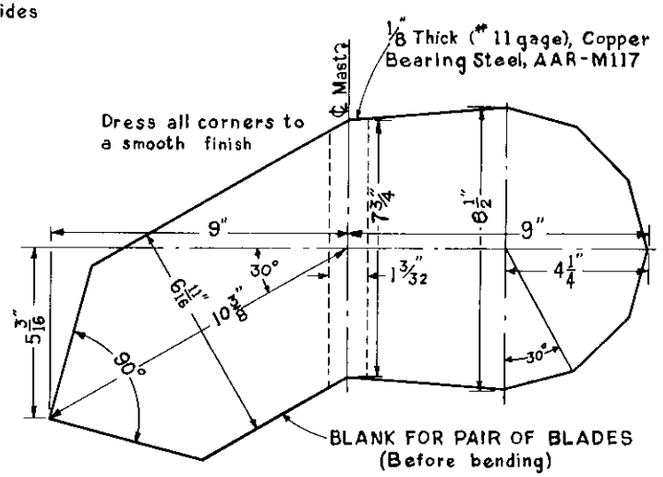
THE PENNSYLVANIA RAILROAD
STANDARD
TONGUE SWITCH AND MATE, 200 FT. RADIUS
SECTIONS AND OTHER DETAILS
FOR 140 LB. R.E. AND 155 LB. P.S. RAILS

OFFICE OF CHIEF ENGINEER, PHILA., PA. - JUNE 1957

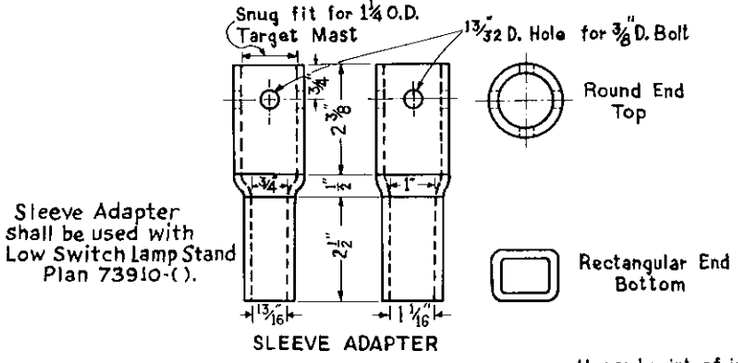
C. J. Henry
Chief Engineer



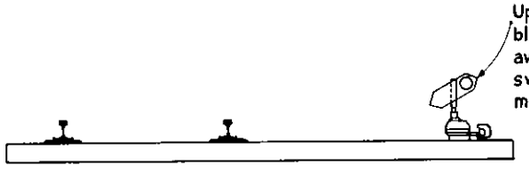
TOP VIEW



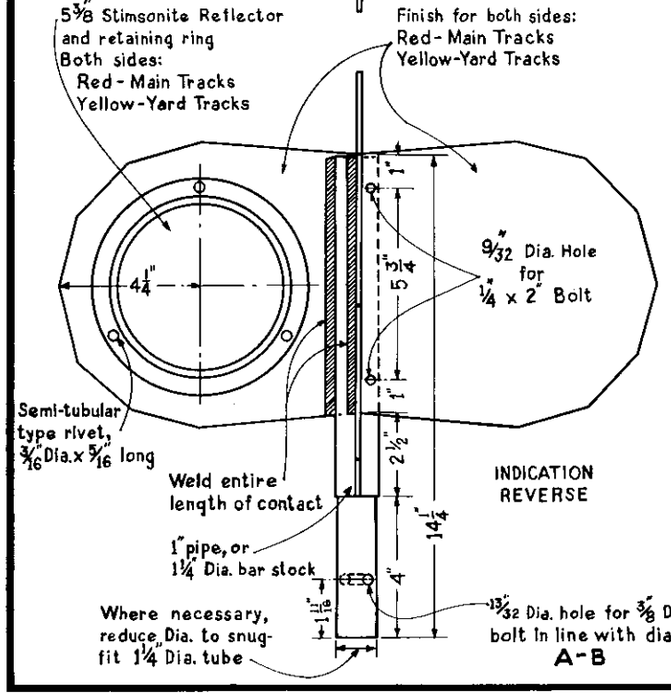
BLANK FOR PAIR OF BLADES
(Before bending)



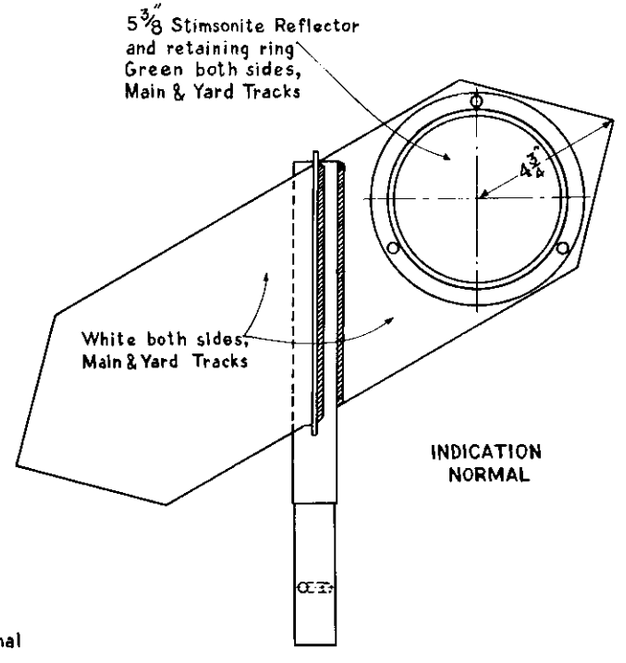
SLEEVE ADAPTER



GENERAL APPLICATION



INDICATION
REVERSE



INDICATION
NORMAL

Reflectorized Low Switch Targets shall be used in accordance with The Pennsylvania Railroad Specifications for Construction and Maintenance of Track, C.E. 78-( ) and where not prohibited by Public Authorities having jurisdiction.

Targets shall be 1/8" thick (#11 gage) copper bearing steel, AAR-M117.

Mast shall be 1" I.D.-W.I. pipe or 1 1/4" Dia. bar stock.

Steel surfaces shall be well sanded to remove corrosion, oil and dirt, and cleaned with turpentine substitute and dried thoroughly.

Mast shall have one coat zinc chromate primer, Ref. 47-2077, then one coat black enamel Ref. 47-3315.

Steel targets shall have one coat of white primer Ref. 47-2366 both sides. The pointed blades shall have a finish coat of Bulletin White, Ref. 47-3314, both sides. The circular blades shall be finished in either Target Red, Ref 47-2289 both sides or Yellow Enamel, Ref. 47-2590 both sides as required.

Stimsonite Reflectors, 5 3/8" Dia. shall be applied after painting and secured by retaining ring with semi-tubular type rivets 3/16" Dia. 5/16" long.

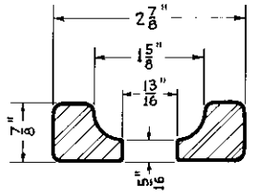
73915-A

THE PENNSYLVANIA RAILROAD
STANDARD
REFLECTORIZED LOW SWITCH TARGET

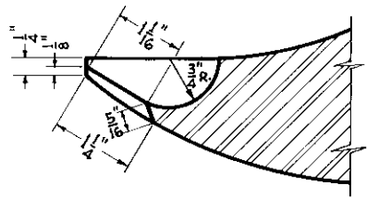
OFFICE OF CHIEF ENGINEER, PHILA., PA., MARCH, 1957

Chief Engineer

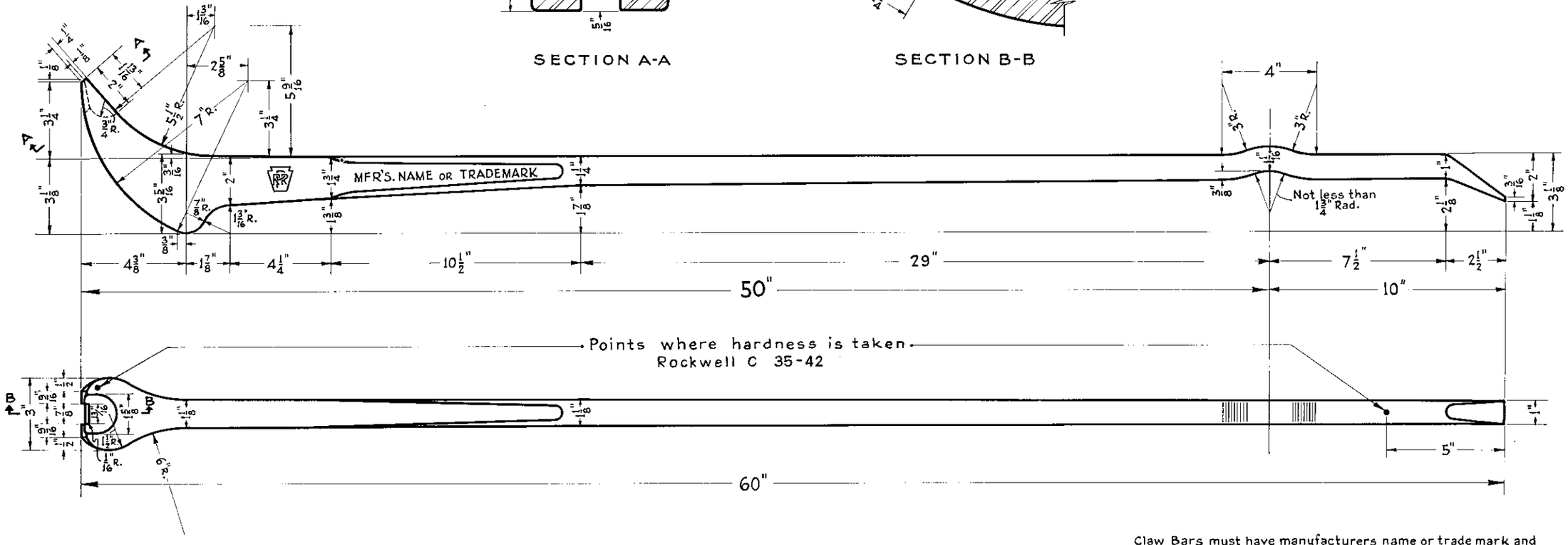
REV.
THIS PLAN
REPLACES
"A"-AUG. 1920
"B"-OCT. 1951
"C"-AUG. 1956



SECTION A-A



SECTION B-B



Claw Bars must have manufacturers name or trade mark and The Pennsylvania Railroad Monogram stamped plainly thereon in the positions indicated.
This Claw Bar is identical with the A.R.E.A. Claw Bar, Plan 11-54.

Tolerance -
2% on length, lift & location of heel.
5% on cross section dimensions.
Approximate Weight 27 lb.

77151-D

THE PENNSYLVANIA RAILROAD
STANDARD
CLAW BAR

OFFICE OF CHIEF ENGINEER, PHILA., PA. - AUGUST 1957

J. R. Hunt
Chief Engineer

REV.
THIS PLAN
REPLACES
"A" AUG. 1926

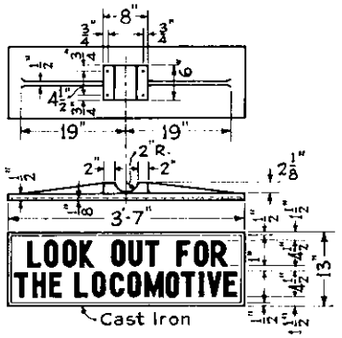
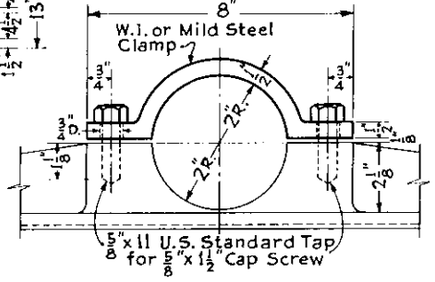


FIGURE 4
19-M53797



CLAMP FOR SIGNS
1C-641

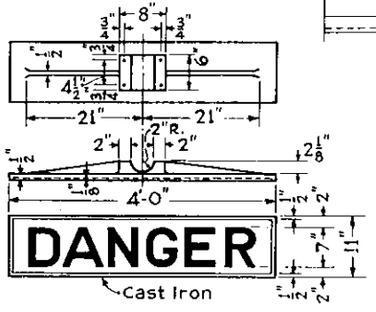
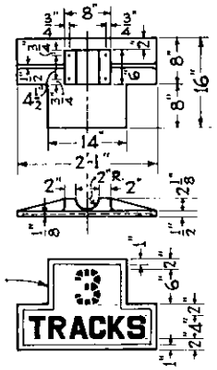


FIGURE 5
19-M53795-F



MULTIPLE TRACK SIGN
FIGURE 3
19-M53911

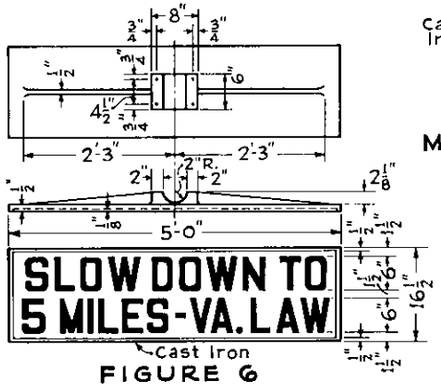
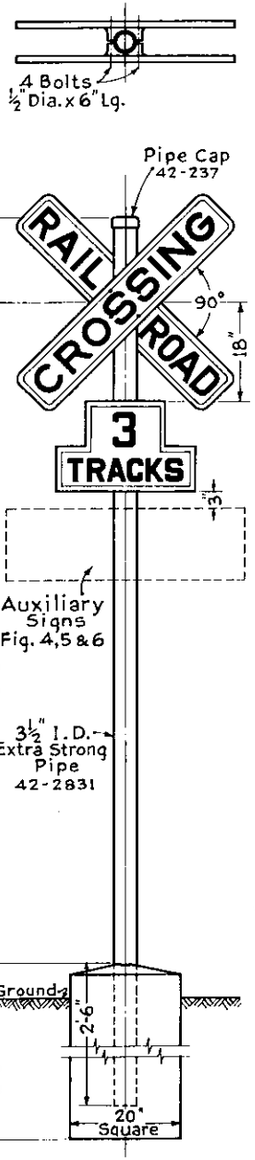
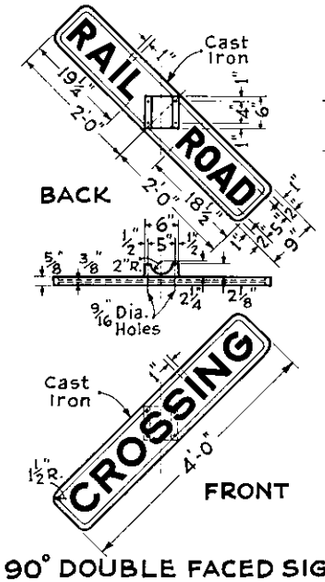


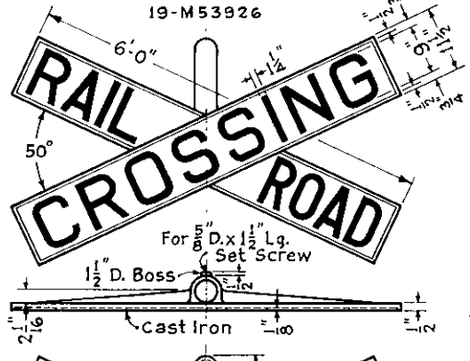
FIGURE 6
19-M53798

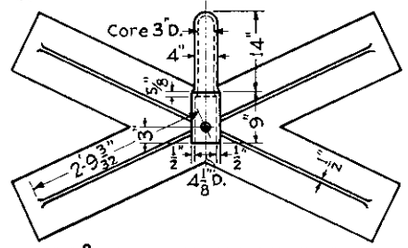


GENERAL
ASSEMBLY

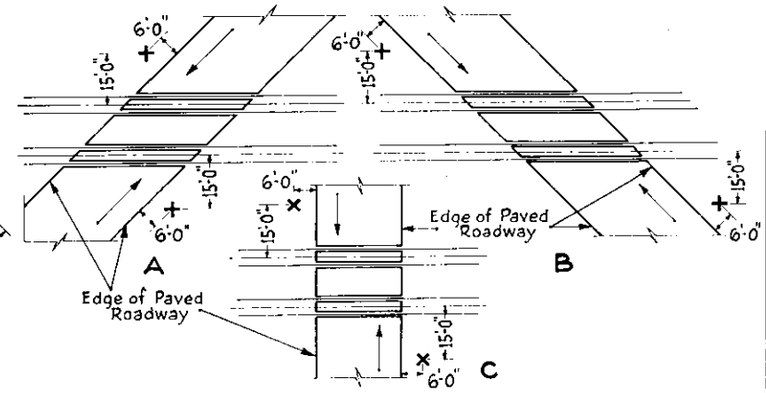


90° DOUBLE FACED SIGN
FIGURE 1
19-M53926





50° SINGLE FACE SIGN
FIGURE 2
19-M53794



TYPICAL LOCATIONS

Highway Crossing Signs as shown in the General Assembly shall be erected on each side of the railroad crossing, on the right hand side of the highway and placed at a point which shall afford the best view to all approaching the crossing. Any deviation from the location of crossing signs, as shown on this plan, shall be at the direction of the Public Authorities having jurisdiction.

The 90° Crossing Sign, Figure 1, shall be used universally except where State Laws require the 50° Crossing Sign, Figure 2. When the distance between any two tracks or group of tracks is 100 feet or more, a crossing sign shall be erected on each side of each single track or group of tracks, so separated. At a crossing of two or more tracks, auxiliary sign, Figure 3, shall be included with a numeral indicating the number of tracks to be crossed. Auxiliary Signs, Figures 4, 5 & 6 shall be used only in compliance with the State Laws. Letters, numerals and borders of all signs shall be raised in relief 1/8" with a slight draft, as shown.

All signs shall have the letters and numerals black and the borders and background white. All surfaces shall be well sanded to remove corrosion, oil and dirt, shall be cleaned with turpentine substitute and dried thoroughly. The faces of all signs shall have one coat, white primer, Ref. 47-2366, then the borders and background, one finish coat, self cleaning white, Ref. 47-3152. The letters and numerals shall have a finish coat, black enamel, Ref. 47-3315. The backs of all signs shall have one coat, zinc chromate primer, Ref. 47-2077, then a finish coat, black enamel, Ref. 47-3315. The post shall have one coat, white primer, Ref. 47-2366, then one finish coat, self cleaning white, Ref. 47-3152 or one coat, aluminum, Ref. 47-3159.

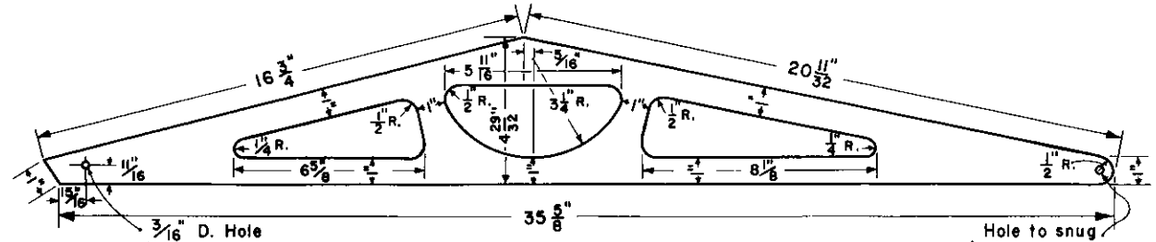
Where State Laws require reflectorization of Highway Crossing Signs, existing cast iron signs shall be reflectorized by the overlay method.
New or replacement signs where reflectorization is desired, shall be in accordance with Plan ~~78301-A~~.

78300-B

THE PENNSYLVANIA RAILROAD
STANDARD
HIGHWAY CROSSING SIGNS
CAST IRON

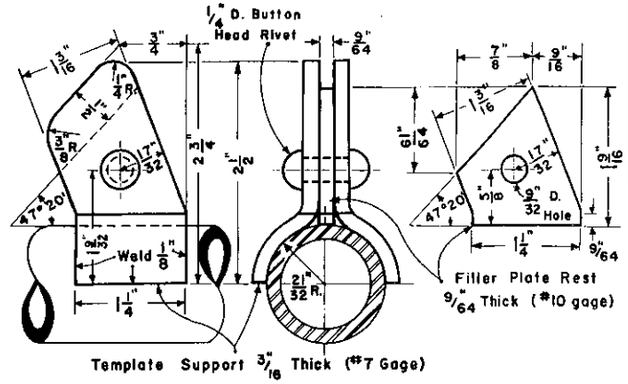
OFFICE OF CHIEF ENGINEER, PHILA., PA. - DEC. 1955

J. R. Hunsh.
Chief Engineer

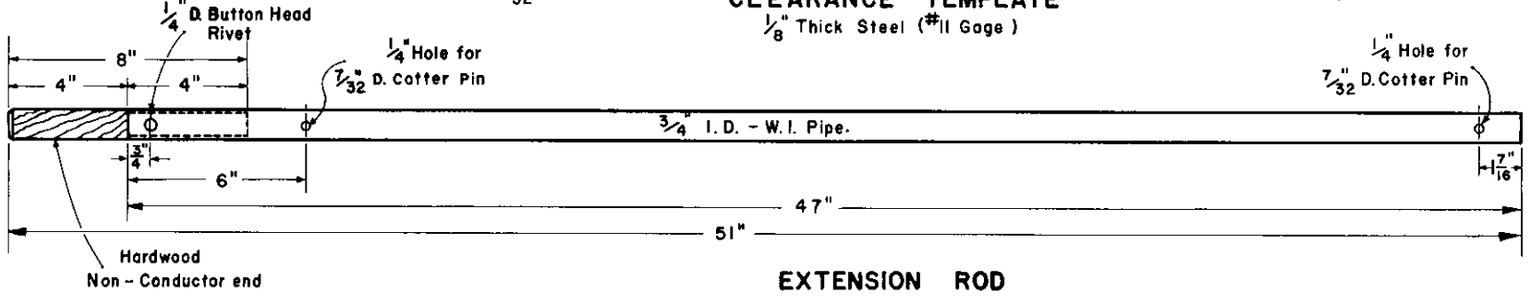


CLEARANCE TEMPLATE

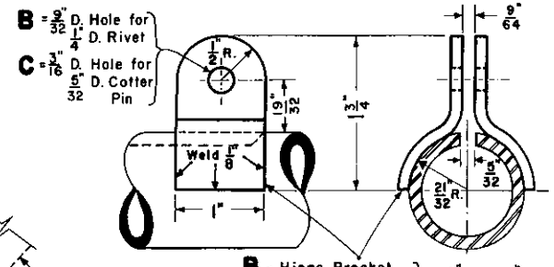
1/8" Thick Steel (#11 Gage)



DETAIL A

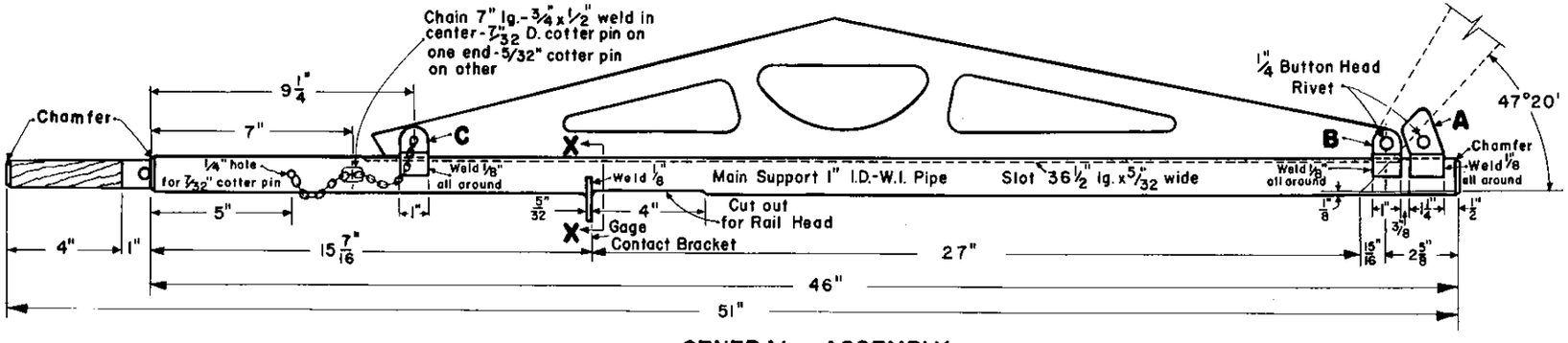


EXTENSION ROD

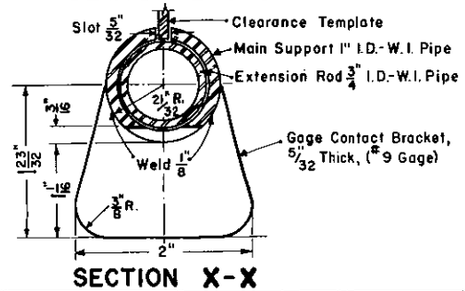


B - Hinge Bracket
C - Locking Bracket
} 1/8" Thick (#11 Gage)

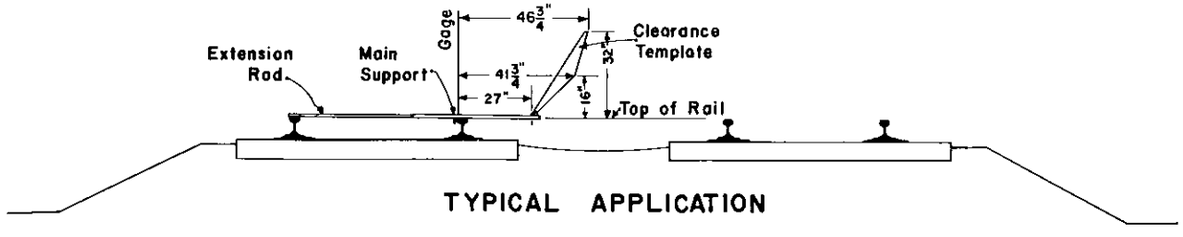
DETAIL B & C



GENERAL ASSEMBLY



SECTION X-X



TYPICAL APPLICATION

77325-A

THE PENNSYLVANIA RAILROAD
STANDARD
CLEARANCE GAGE
FOR
M. W. TRACK MACHINERY

OFFICE OF CHIEF ENGINEER, PHILA., PA., OCT. 1956

J. R. Hursh
Chief Engineer

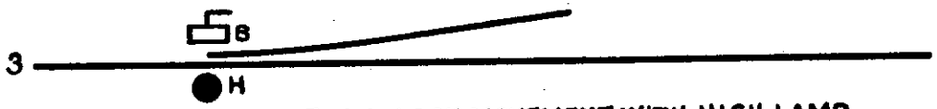
EXAMPLES OF APPLICATION OF SYMBOLS.

1 

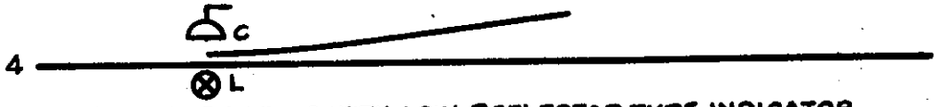
T-10 SWITCH & LOCK MOVEMENT WITH LOW LAMP AND HEAVY DUTY CIRCUIT CONTROLLER.

2 

T-20 SWITCH & LOCK MOVEMENT WITH INTERMEDIATE LAMP AND LIGHT DUTY CIRCUIT CONTROLLER.

3 

BETHLEHEM CO. SWITCH & LOCK MOVEMENT WITH HIGH LAMP.

4 

NEW CENTURY STAND WITH LOW REFLECTOR TYPE INDICATOR.

5 

T-10 SWITCH & LOCK MOVEMENT, LIGHT DUTY CIRCUIT CONTROLLER.

6 

NEW CENTURY STAND WITH INTERMEDIATE TARGET.

7 

T-20 SWITCH & LOCK MOVEMENT WITH LOW LAMP, HEAVY DUTY CIRCUIT CONTROLLER AND POINT DETECTOR.

SYMBOLS.

10 — T-10 SWITCH & LOCK MOVEMENT.

20 — T-20 SWITCH & LOCK MOVEMENT.

B — BETHLEHEM CO. SWITCH & LOCK MOVEMENT.

C — NEW CENTURY SWITCH STAND.

TO THESE SYMBOLS COVERING SWITCH STANDS SHOULD BE ADDED THE FOLLOWING DESIGNATIONS OF LAMPS, REFLECTOR INDICATORS, TARGETS ETC.

● L — LOW TYPE LAMP.

● I — INTERMEDIATE HIGH TYPE LAMP.

● H — HIGH TYPE LAMP.

⊗ L — LOW REFLECTOR TYPE INDICATOR.

⊗ I — INTERMEDIATE HIGH REFLECTOR TYPE INDICATOR.

⊗ H — HIGH REFLECTOR TYPE INDICATOR.

○ L — LOW TARGET (NO LAMP - NO REFLECTOR INDICATOR)

○ I — INTERMEDIATE HIGH TARGET (NO LAMP - NO REFLECTOR INDICATOR).

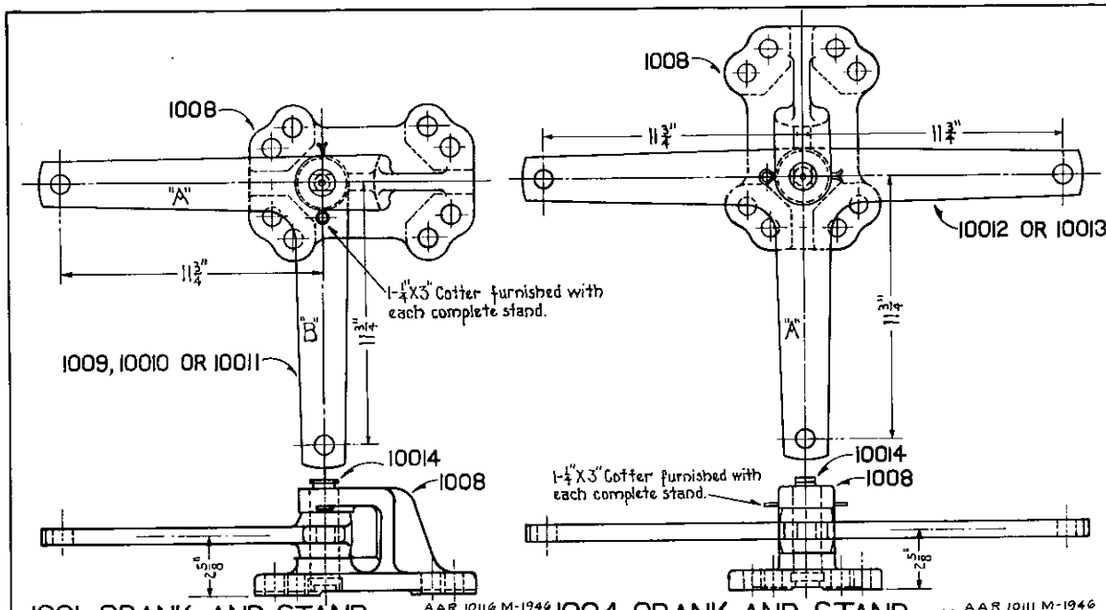
○ H — HIGH TARGET (NO LAMP - NO REFLECTOR INDICATOR).

HD — HEAVY DUTY CIRCUIT CONTROLLER.

LD — LIGHT DUTY CIRCUIT CONTROLLER.

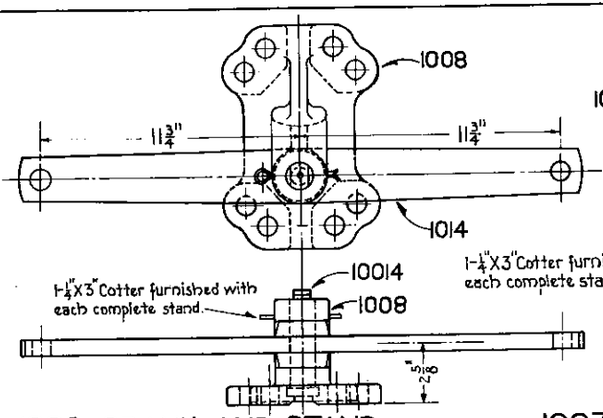
PD — POINT DETECTOR.

THE PENNSYLVANIA RAILROAD
SYMBOLS
FOR INDICATING ON SINGLE LINE PLANS THE DIFFERENT TYPES OF SWITCH THROWING MECHANISMS, LAMPS, TARGETS ETC.
OFFICE OF CHIEF ENGINEER, PHILA., PA.
MARCH 24, 1941.

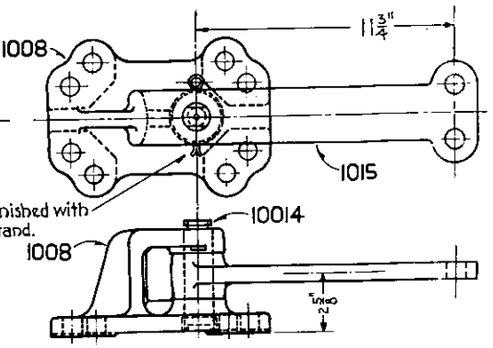


1001-CRANK AND STAND COMP. AAR 10116 M-1946 S.C.R. 2A-839
1002-AS ABOVE 4" SET IN ARM "A" S.C.R. 840
1003- " " 4" " " " "B" S.C.R. 841

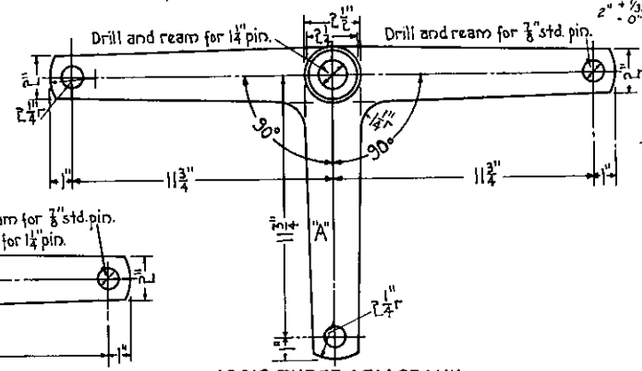
1004-CRANK AND STAND COMP. AAR 10111 M-1946 S.C.R. 2A-842
1005- AS ABOVE 4" SET IN ARM "A" S.C.R. 2A-843



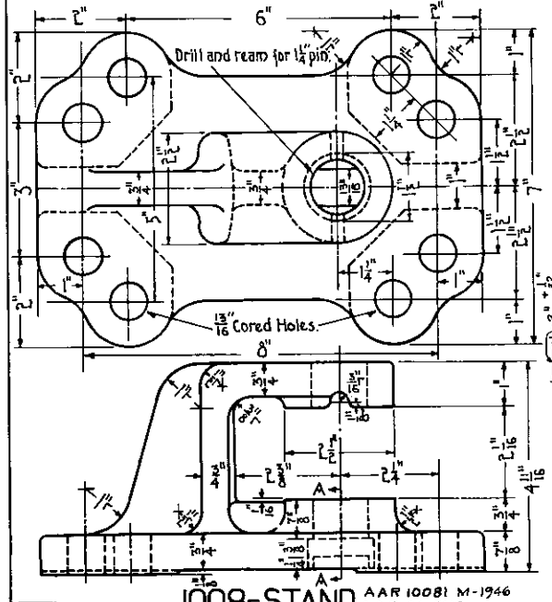
1006-CRANK AND STAND COMPLETE
AAR 10113 M-1946 S.C.R. 2A-837



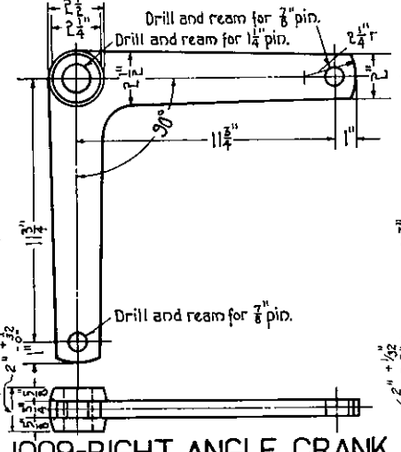
1007-RADIAL ARM AND STAND COMPLETE
S.C.R. 2A-61



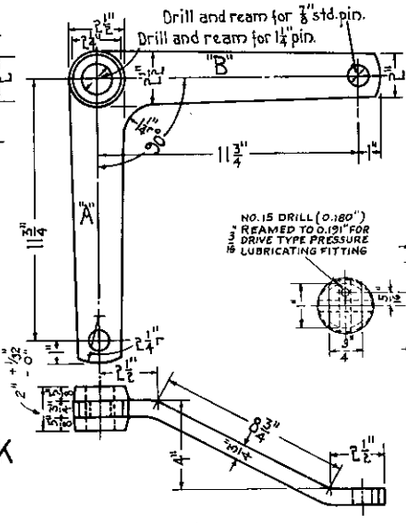
SPECIFICATION FOR TEST OF CRANKS.
CRANKS SHALL BE TESTED IN TENSION AND COMPRESSION TO A STRAIN OF 2500 POUNDS WHICH IT MUST WITHSTAND WITHOUT A PERMANENT SET OF MORE THAN ONE THIRTY SECOND (1/32) OF AN INCH OR OTHER DEFECTS. STRAIN TO BE APPLIED AT RIGHT ANGLES TO ARM AND THROUGH CENTER OF PIN HOLE.
AAR 10078 M-1940



1008-STAND AAR 10081 M-1946 S.C.R. 2A-2612
CAST IRON

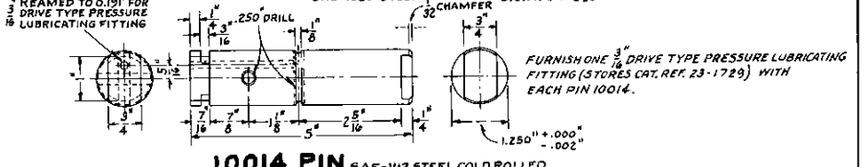


1009-RIGHT ANGLE CRANK
SAE-1020 STEEL
AAR 10076 M-1940
S.C.R. 2A-814

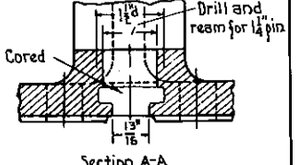


10010-R.A.CRANK 4" SET IN ARM "A"
SAE-1020 STEEL
S.C.R. 2A-815
10011-R.A.CRANK 4" SET IN ARM "B"
SAE-1020 STEEL
S.C.R. 2A-816

10012 THREE ARM CRANK NO SET
SAE-1020 STEEL AAR 10071 M-1940
10013 THREE ARM CRANK 4" SET IN ARM "A"
SAE-1020 STEEL S.C.R. 2A-820



10014 PIN SAE-1112 STEEL COLD ROLLED
AAR 10101 M-1944
S.C.R. 2A-1649



Section A-A of 1008

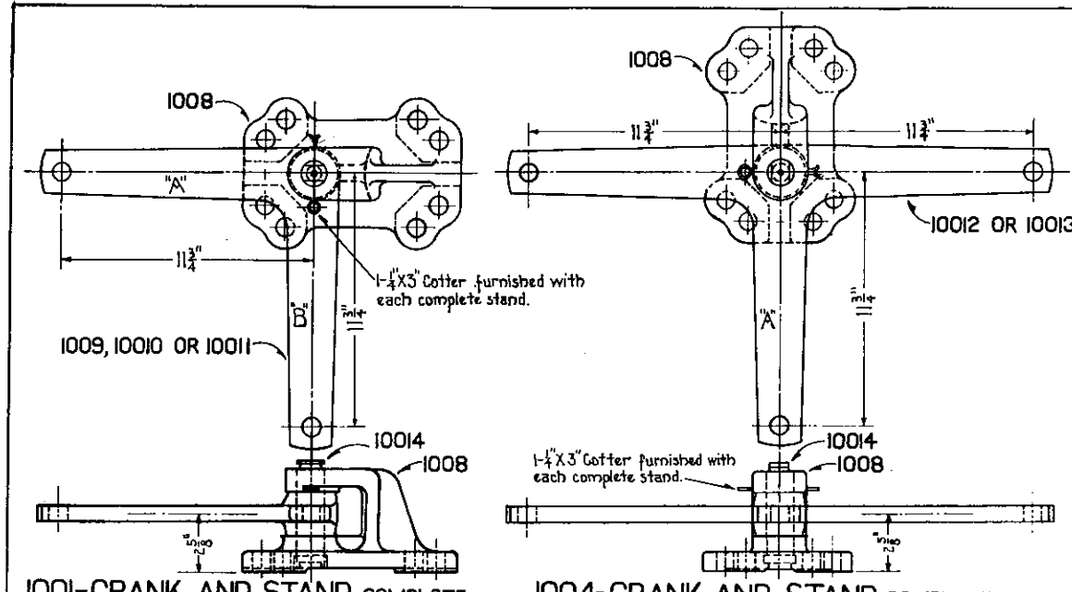
REVISIONS
B-Jan. 19, 1928. Approved: A.H. Rudd
C JANUARY 8, 1958 S.C.R. NUMBERS & AAR REFERENCE NO'S. ADDED, MINOR CHANGES MADE TO AGREE WITH AAR. APPROVED J.T. Kirsch

1 SHEET S-100-C

THE PENNSYLVANIA RAILROAD
STANDARD
CRANKS AND STAND
ONE WAY HORIZONTAL

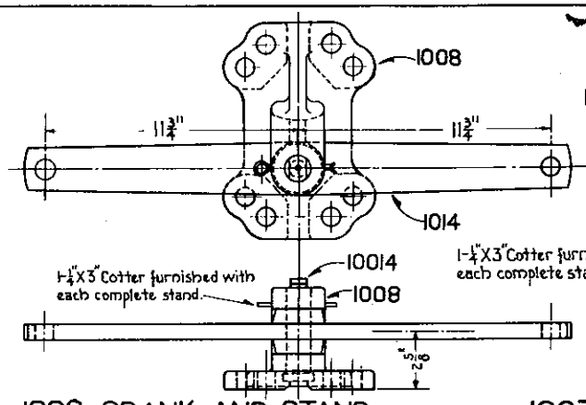
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., JUNE 4, 1920

Corrected A.H. Rudd Chief Signal Engineer
Approved Chief Engineer

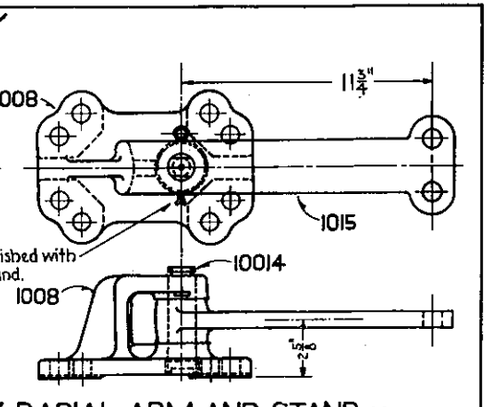


1001-CRANK AND STAND COMPLETE
1002-AS ABOVE 4" SET IN ARM "A"
1003- " " 4" " " "B"

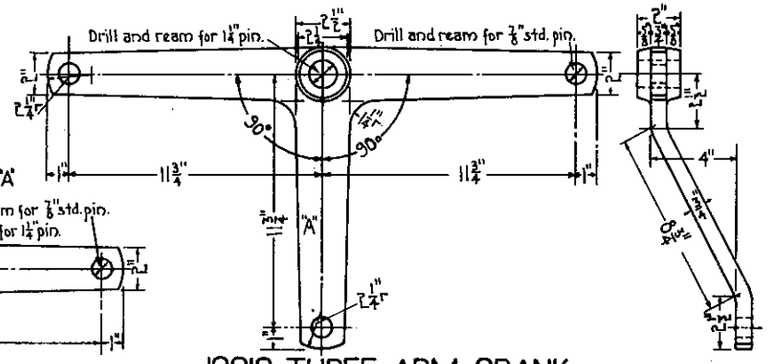
1004-CRANK AND STAND COMPLETE
1005- " " " " 4" SET IN ARM "A"



1006-CRANK AND STAND COMPLETE



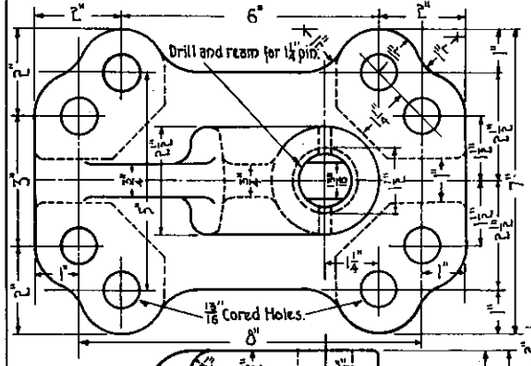
1007-RADIAL ARM AND STAND COMPLETE



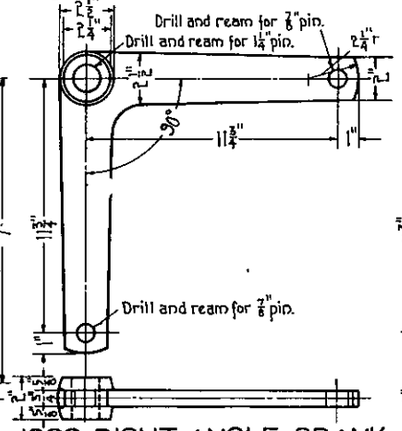
1012-THREE ARM CRANK NO SET
1013- " " " 4" SET IN ARM "A"
FORGED STEEL

Specification For Test of Cranks.

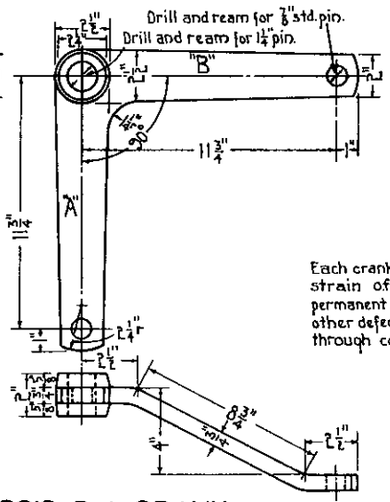
Each crank shall be tested in tension and compression to a strain of 2500 pounds, which it must stand without a permanent set of more than one thirty second (1/32) of an inch or other defects; strain to be applied at right angles to arm and through center of pin hole.

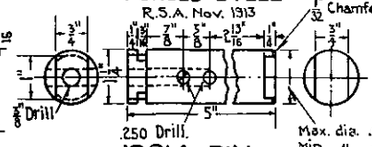


1008-STAND
CAST IRON A.R.A. M-1927.



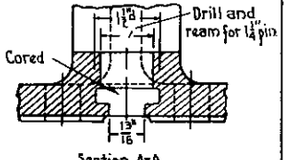
1009-RIGHT ANGLE CRANK
FORGED STEEL
R.S.A. Nov. 1913





10014-PIN
C.R. STEEL A.R.A. M-1927.

10010-R.A. CRANK 4" SET IN ARM "A"
10011- " " " 4" " " "B"
FORGED STEEL



Section A-A of 1008

REVISIONS
B-Jan. 19, 1928.
Approved: A.H. Rudd

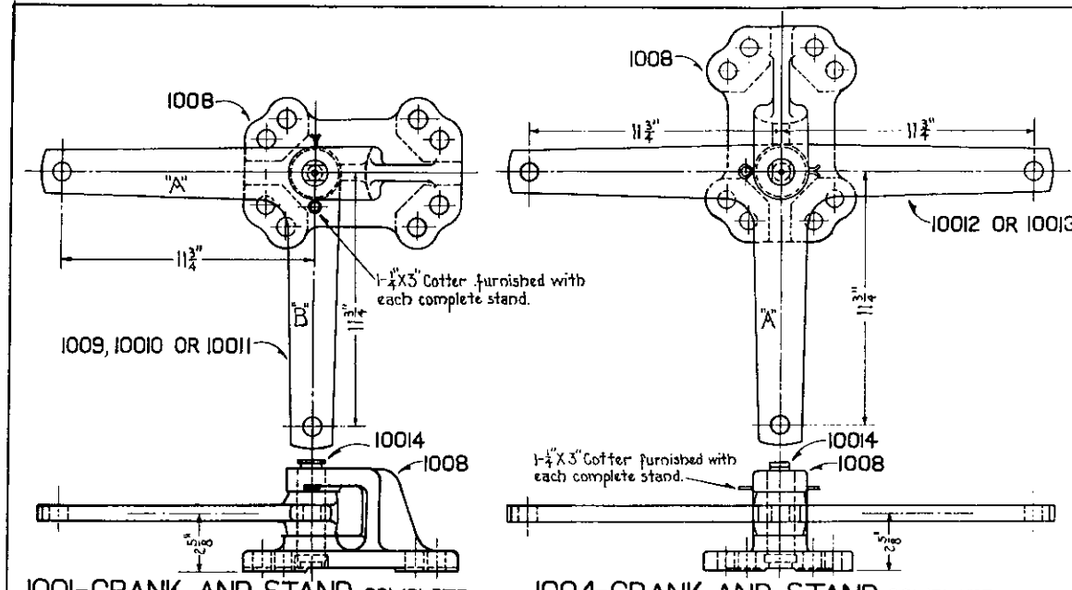
1 SHEET S-106-A

THE PENNSYLVANIA RAILROAD
STANDARD
CRANKS AND STAND
ONE WAY HORIZONTAL

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., [illegible]

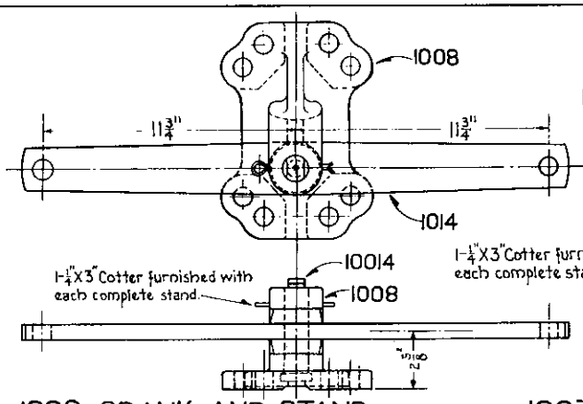
Correct: A.H. Rudd
Chief Signal Engineer

Approved: [illegible]
Chief Engineer

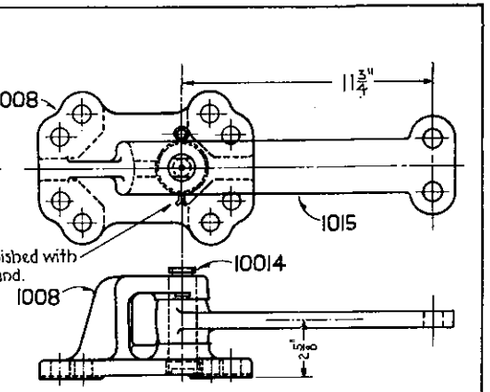


1001-CRANK AND STAND COMPLETE
1002-AS ABOVE 4" SET IN ARM "A"
1003- " " 4" " " " "B"

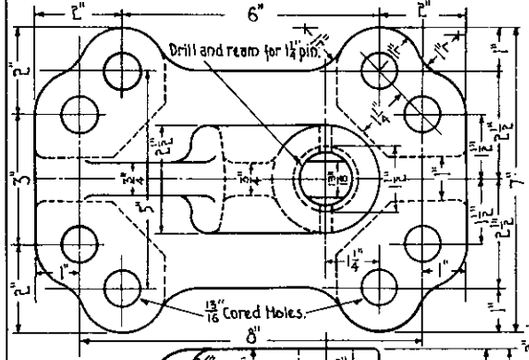
1004-CRANK AND STAND COMPLETE
1005- " " " " 4" SET IN ARM "A"

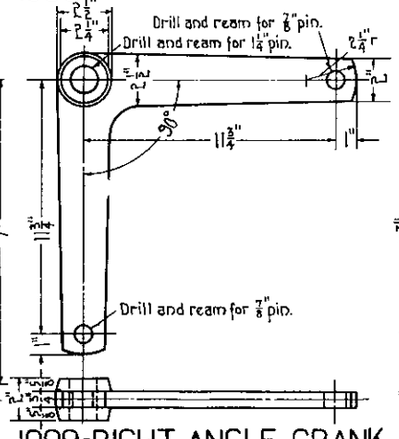


1006-CRANK AND STAND COMPLETE

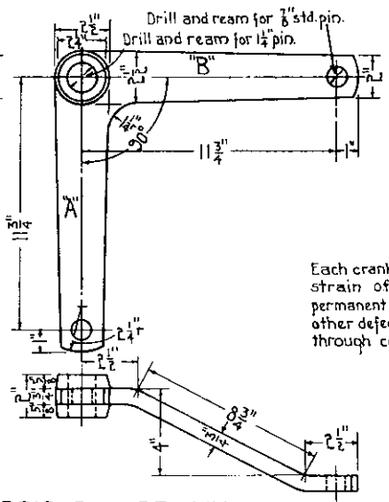


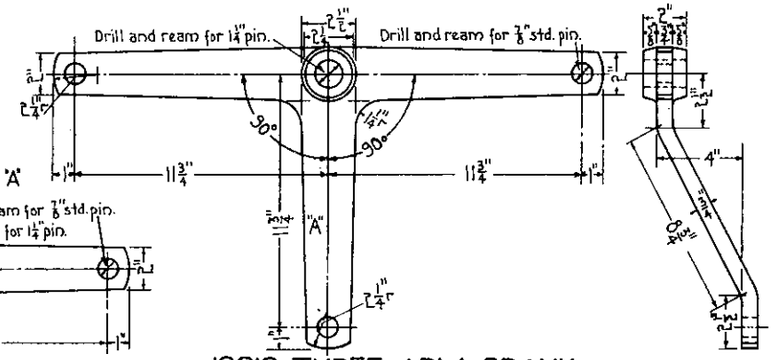
1007-RADIAL ARM AND STAND COMPLETE





1009-RIGHT ANGLE CRANK
FORGED STEEL
R.S.A. Nov. 1913



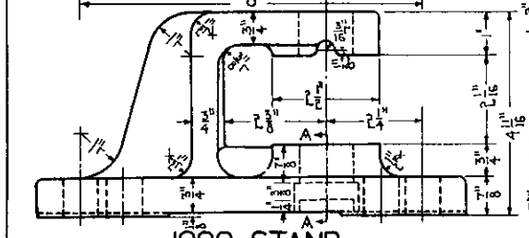


10012-THREE ARM CRANK NO SET
10013- " " " 4" SET IN ARM "A"
FORGED STEEL

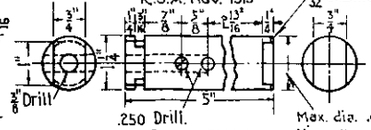
Specification For Test of Cranks.

Each crank shall be tested in tension and compression to a strain of 2500 pounds, which it must stand without a permanent set of more than one thirty second ($\frac{1}{32}$) of an inch or other defects; strain to be applied at right angles to arm and through center of pin hole.

REVISIONS
B-Jan. 19, 1928.
Approved: A.H. Rudd

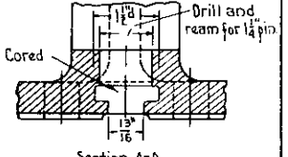


1008-STAND
CAST IRON A.R.A. M-1927.



10014-PIN
C.R. STEEL A.R.A. M-1927.

10010-R.A. CRANK 4" SET IN ARM "A"
10011- " " " 4" " " " "B"
FORGED STEEL



Section A-A of 1008

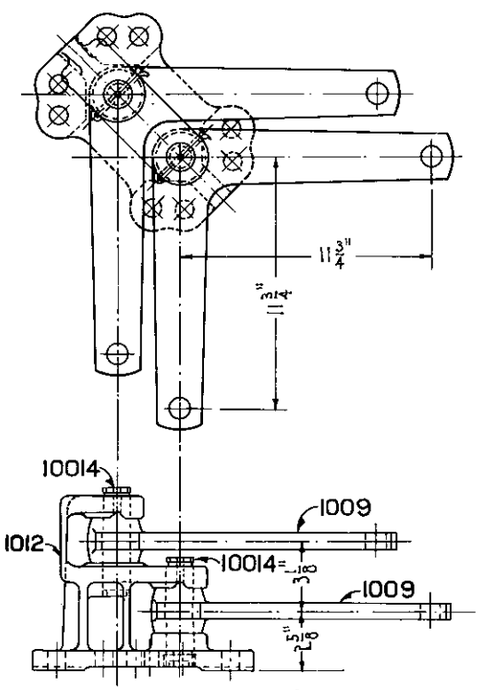
1 SHEET S-106-A

THE PENNSYLVANIA RAILROAD
STANDARD
CRANKS AND STAND
ONE WAY HORIZONTAL

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., Jan 19 1928

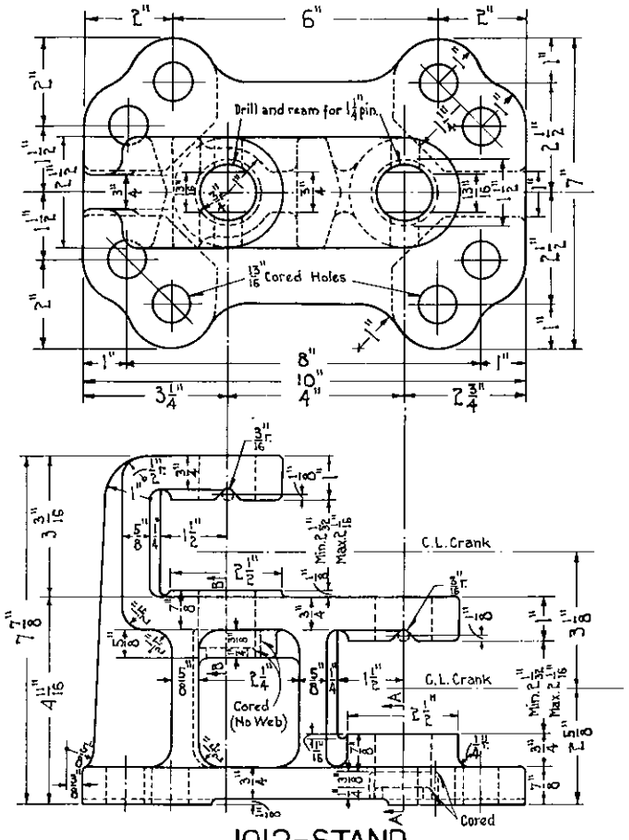
Correct: A.H. Rudd
Chief Signal Engineer

Approved:
Chief Engineer



1011-CRANK AND STAND COMPLETE

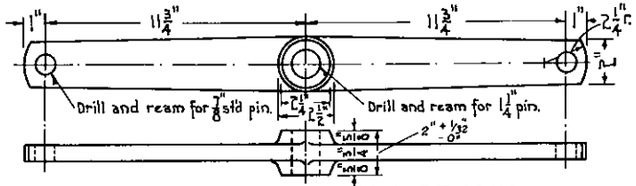
AAR 13934 M-1946 S.C.R. 2A-838



1012-STAND

CAST IRON

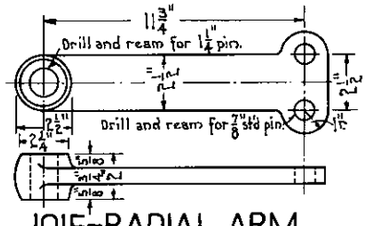
AAR 13931 M-1946



1014-STRAIGHT ARM CRANK

SAE-1020 STEEL

AAR 10073 M-1940 S.C.R. 2A-818



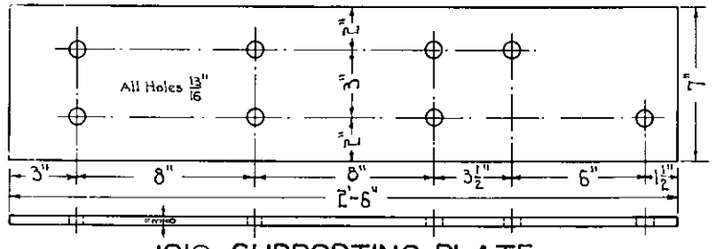
1015-RADIAL ARM

SAE-1020 STEEL

Specification For Test of Cranks

Cranks shall be tested in tension and compression to a strain of 2500 pounds, which it must stand without a permanent set of more than one thirty second ($\frac{1}{32}$) of an inch or other defects; strain to be applied at right angles to arm and through center of pin hole.

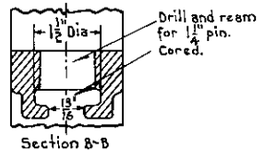
AAR 1007 B M-1940



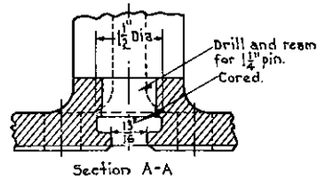
1013-SUPPORTING PLATE

SAE-1020 STEEL

S.C.R. 2A-1770



Section B-B of 1012



Section A-A of 1012

REVISIONS
B- JAN. 19, 1928. Approved: A.H. Rudd
C JANUARY 8, 1938 S.C.R. NUMBERS & AAR REFERENCE NUMBERS ADDED. MINOR CHANGES MADE TO AGREE WITH A.A.R. APPROVED J.B. Rusch

1 SHEET

S-101-C

THE PENNSYLVANIA RAILROAD

STANDARD

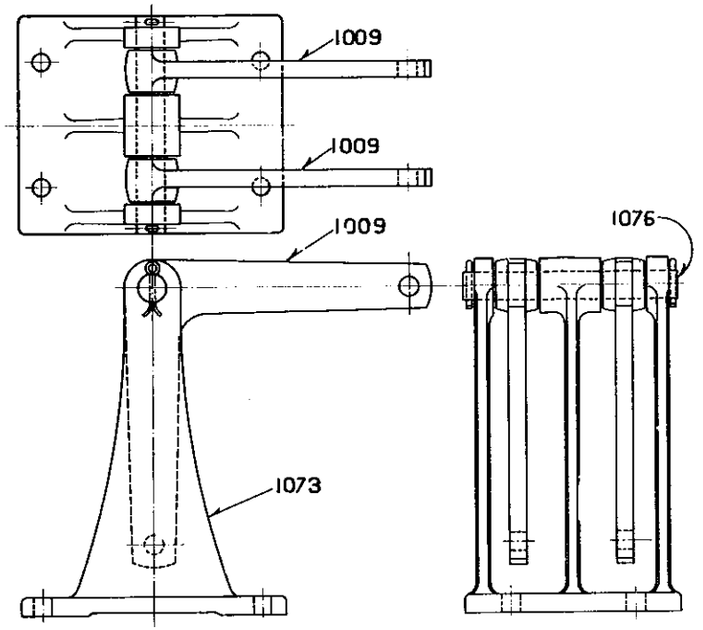
CRANKS AND STAND

TWO WAY HORIZONTAL

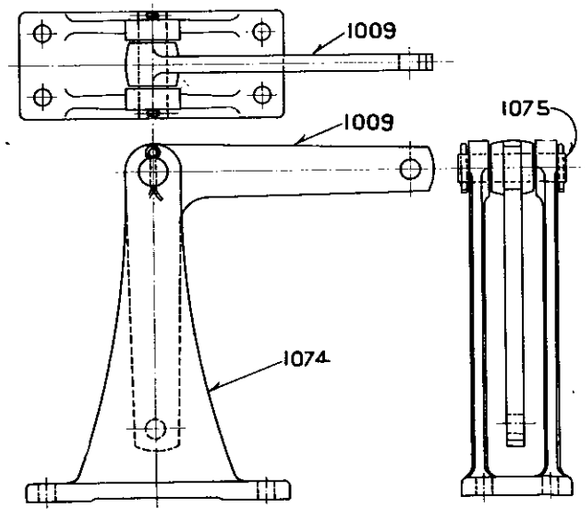
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., AUGUST 2, 1920.

Correct A.H. Rudd Chief Signal Engineer

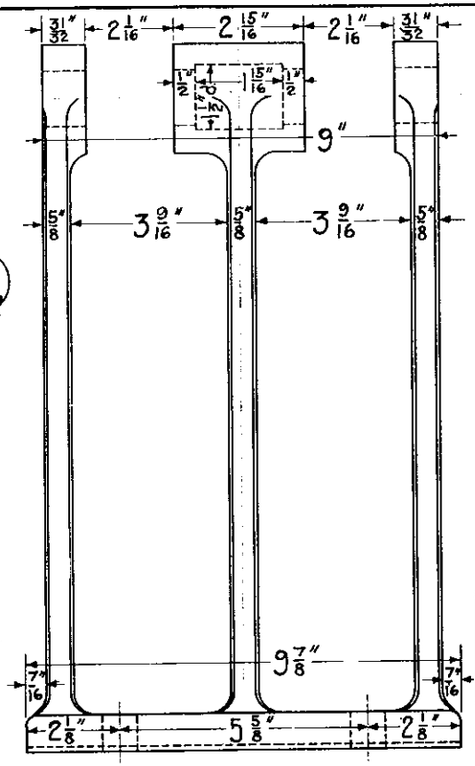
Approved [illegible] Chief Engineer



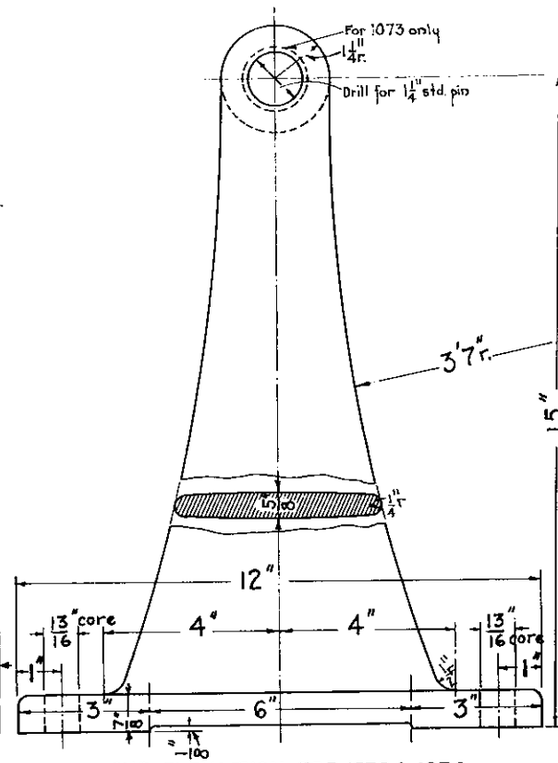
1071 - 2-WAY CRANK COMPLETE



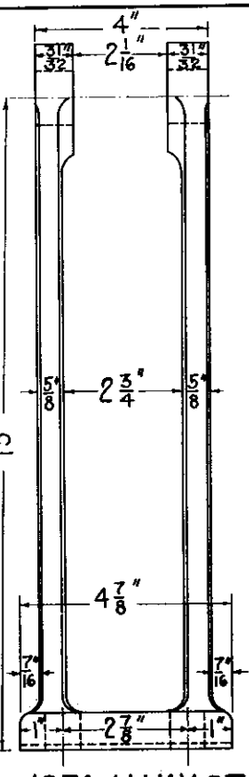
1072 - 1-WAY CRANK COMPLETE



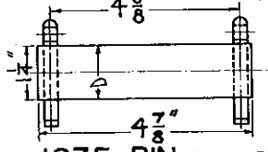
1073 - 2-WAY STAND
CAST IRON



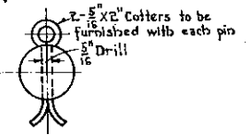
END ELEVATION FOR 1073 & 1074

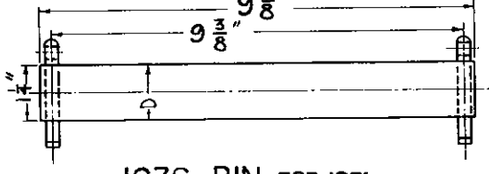


1074 - 1-WAY STAND
CAST IRON

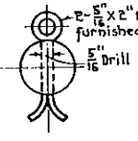


1075 - PIN FOR 1072
STEEL





1076 - PIN FOR 1071
STEEL

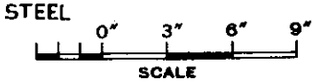


Specification For Test of Cranks

Each crank shall be tested in tension and compression to strain shown in the following table, which it must stand without a permanent set of more than one thirty second (1/32) of an inch or other defects; strain to be applied at right angles to arm and through center of pin hole.

Length of Arm	Pounds Strain
11 3/4" or less	2500
14 1/2"	2000
13"	2200
18"	1800

NOTE - Diameter D Max. .001 less than 125.
" D Min. .003 " " 125.



SCALE
For 1071 & 1072.

SCALE
For 1073, 1074, 1075 & 1076.

1 SHEET

S-107-A

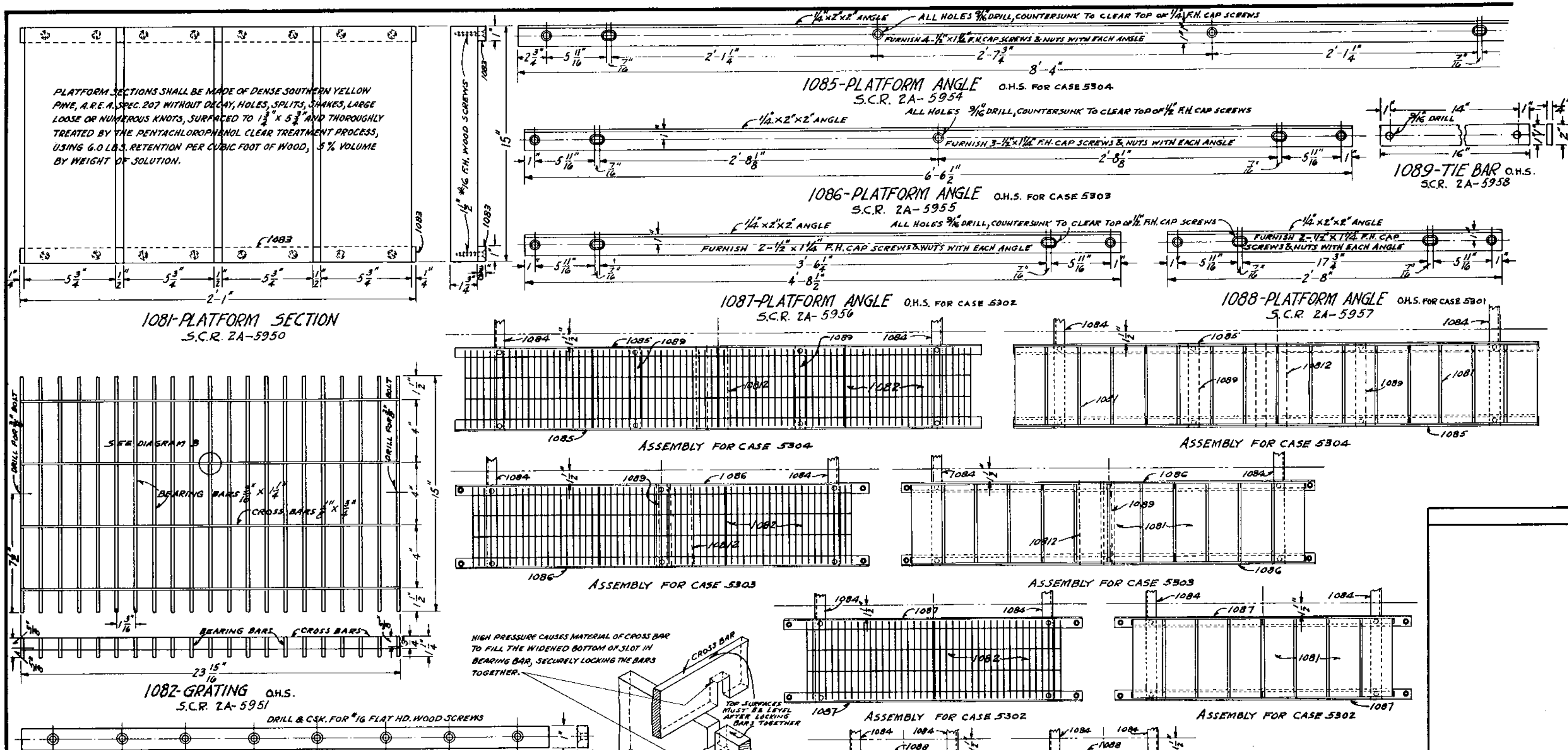
PENNSYLVANIA SYSTEM

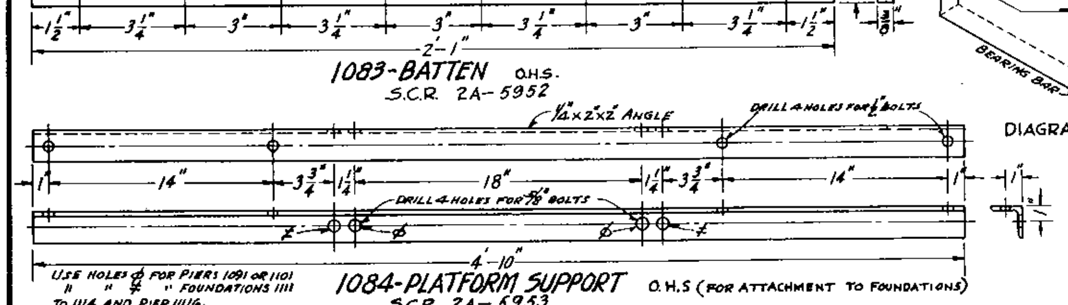
STANDARD
CRANK AND STANDS
ONE AND TWO WAY VERTICAL

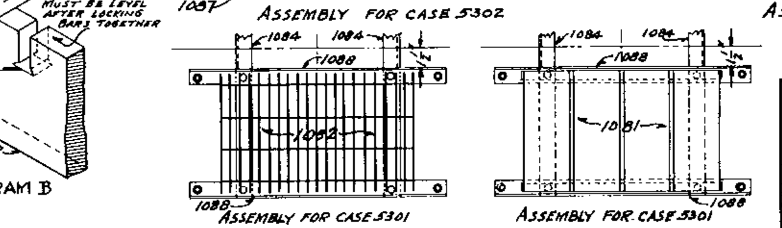
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., JUNE 8 1920

Correct
A. H. Rudd
Chief Signal Engineer

Approved
E. B. Temple
Chief Engineer







NOTES:

1. ALL METAL PARTS SHALL BE HOT DIP GALVANIZED. PARTS SHALL BE ORDERED SEPARATELY BY ITEM NUMBERS 1081 TO 1089, PLATFORM BEING ASSEMBLED IN THE FIELD.
2. PLATFORMS SHALL BE SECURED TO ANGLES WITH HOOK BOLTS OR OTHERWISE IN A MANNER SUITABLE TO MEET CONDITIONS IN THE FIELD.
3. PLATFORMS FOR CASES 5303 AND 5304 SHALL BE PROVIDED WITH CENTER SUPPORT 10812.
4. AFTER INSTALLATION, PLATFORMS SHALL BE PAINTED SAME COLOR AS INSTRUMENT CASE.

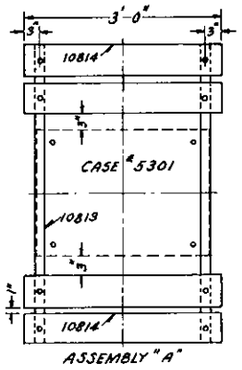
SHEET 1 OF 2 — S-108-A

THE PENNSYLVANIA RAILROAD
STANDARD
PLATFORMS
FOR INSTRUMENT CASES

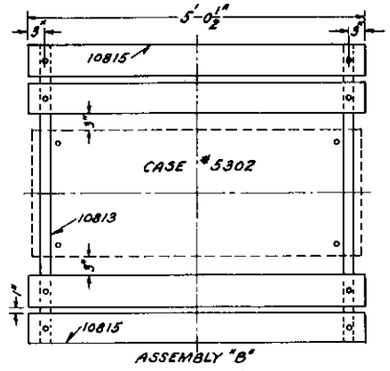
OFFICE OF CHIEF ENGINEER — PHILA., PA. JUNE 7, 1951

Approved H. G. Salmonson — Assistant Chief Engineer-Signals

Approved [signature] — Chief Engineer



ASSEMBLY "A"



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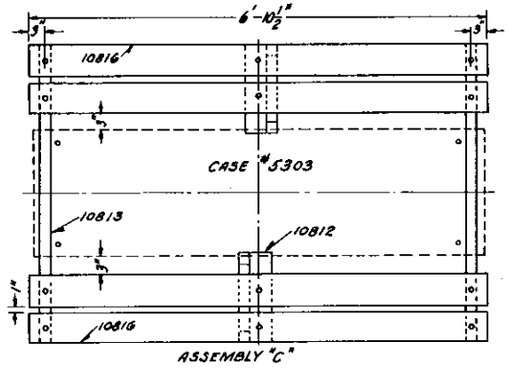

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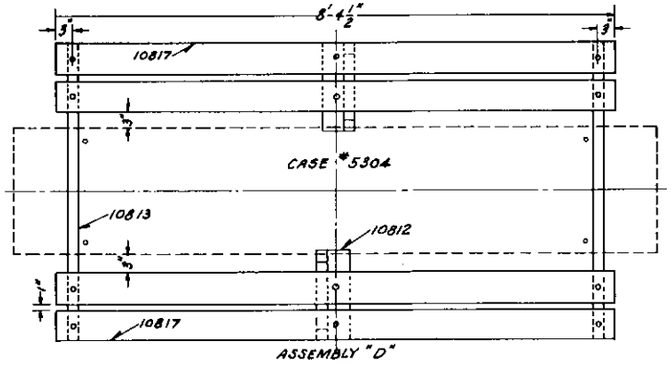

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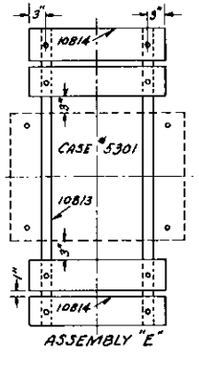
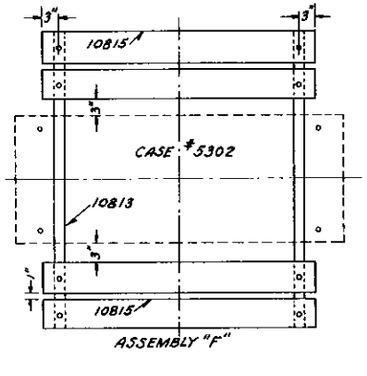


ASSEMBLY "E"



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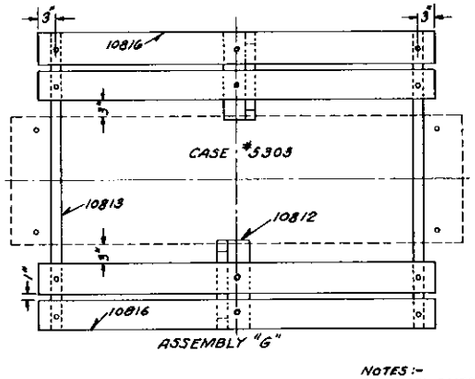
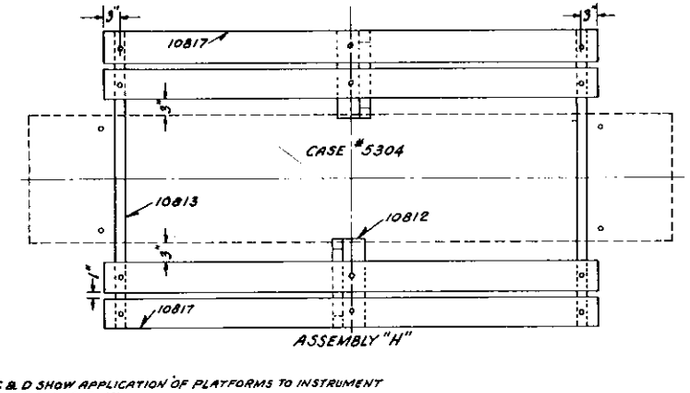
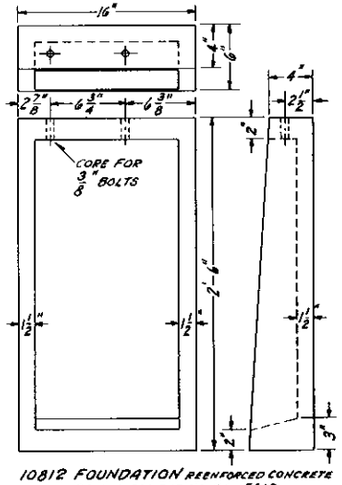


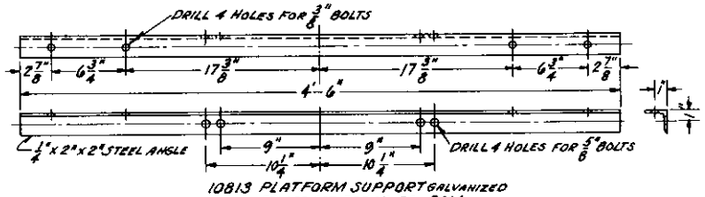
ASSEMBLY "G"



ASSEMBLY "H"



10812 FOUNDATION REENFORCED CONCRETE
STORES CAT. REF. NO. 2A-5613



10813 PLATFORM SUPPORT GALVANIZED
STORES CAT. REF. NO. 2A-5614

10814 PLATFORM PLANK L = 3'-0"
STORES CAT. REF. NO. 2A-5615
10815 PLATFORM PLANK L = 5'-0 1/2"
STORES CAT. REF. NO. 2A-5616
10816 PLATFORM PLANK L = 6'-10 1/2"
STORES CAT. REF. NO. 2A-5617
10817 PLATFORM PLANK L = 8'-4 1/2"
STORES CAT. REF. NO. 2A-5618

NOTES:-

1. ASSEMBLIES A, B, C & D SHOW APPLICATION OF PLATFORMS TO INSTRUMENT CASE FOUNDATIONS DRAWING S-111.
2. ASSEMBLIES E, F, G & H SHOW APPLICATION OF PLATFORMS TO INSTRUMENT CASE FOUNDATIONS DRAWINGS S-109 AND S-110.
3. PLATFORM PLANKS 10814, 10815, 10816 & 10817 SHALL BE DRILLED IN THE FIELD FOR 3/8" x 2 1/2" CARRIAGE BOLTS.
4. USE PLATFORM PLANKS 10814, 10815, 10816 & 10817 AS SHOWN FOR INSTRUMENT CASE FOUNDATIONS DRAWING S-111. FOR INSTRUMENT CASE FOUNDATIONS DRAWINGS S-109 AND S-110 LOCATE LEFT ENDS OF PLANKS AS INDICATED, CUT RIGHT END AS SHOWN AND DRILL FOR 3/8" x 2 1/2" CARRIAGE BOLTS.
5. PLATFORM PLANKS SHALL BE MADE OF DENSE SOUTHERN YELLOW PINE, A.R.E.A. SPEC. 207, WITHOUT DECAY, HOLES, SPLITS, SHAKES, LARGE, LOOSE OR NUMEROUS KNOTS, SURFACED TO 1 3/4" x 5 3/4" AND THOROUGHLY TREATED BY THE PENTACHLOROPHENOL - CLEAR - TREATMENT - PROCESS, USING 6.0 LBS. RETENTION PER CUBIC FOOT OF WOOD, 5% VOLUME BY WEIGHT OF SOLUTION.
6. FOUNDATION 10812 WHERE USED SHALL BE FIRMLY EMBEDDED IN THE GROUND SUFFICIENTLY FOR PLANKS TO HAVE BEARING ON IT.
7. AFTER INSTALLATION, PLATFORMS SHALL BE PAINTED SAME COLOR AS THE INSTRUMENT CASE.

REVISIONS

SHEET 2 OF 2

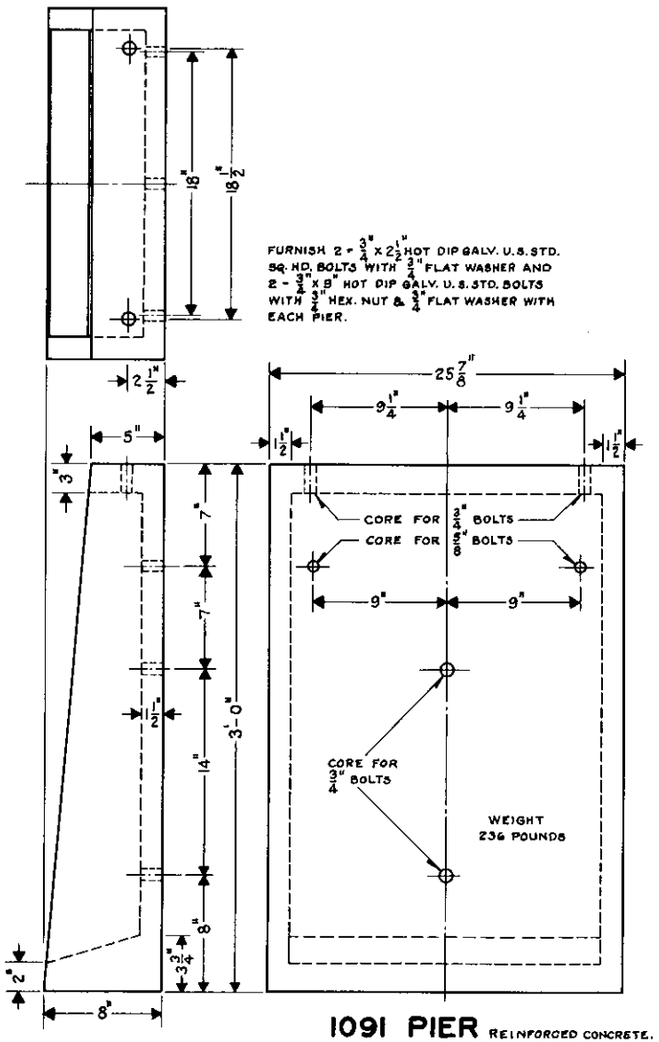
S-108-A

THE PENNSYLVANIA RAILROAD
STANDARD
PLATFORMS
FOR INSTRUMENT CASES

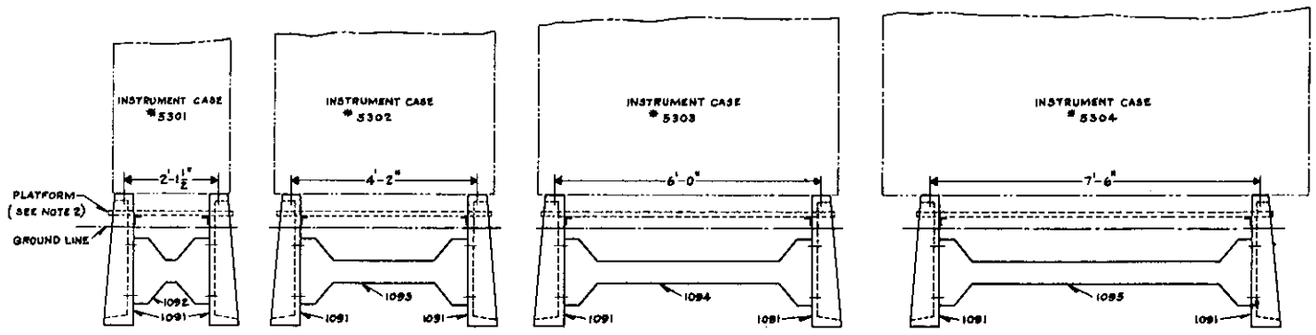
OFFICE OF CHIEF ENGINEER, PHILA., PA., JUNE 7, 1951

Approved
W. G. Salmonson
Assistant Chief Engineer-Signals

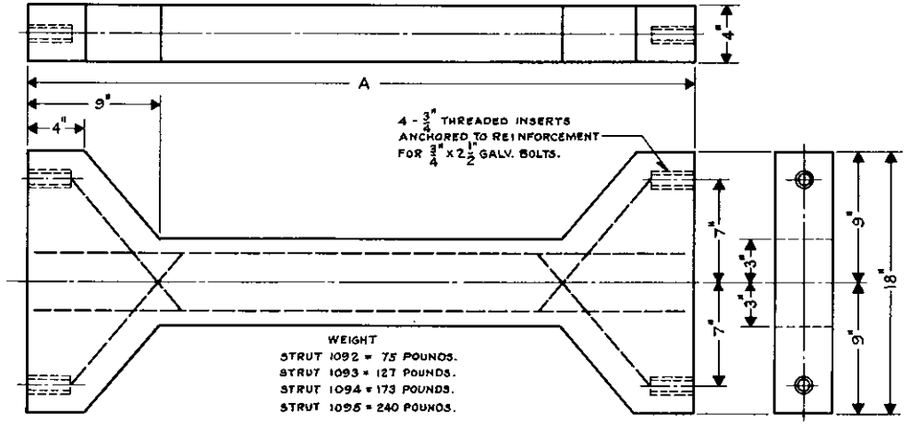
Approved
J. Rossmassler
Chief Engineer



1091 PIER REINFORCED CONCRETE.
STORES CAT. REF. NO. 2A-5791



APPLICATIONS OF FOUNDATIONS.



WEIGHT
STRUT 1092 = 75 POUNDS.
STRUT 1093 = 127 POUNDS.
STRUT 1094 = 173 POUNDS.
STRUT 1095 = 240 POUNDS.

REINFORCED CONCRETE.

1092 STRUT FOR CASE 5301 A = 1'-8 1/2".
STORES CAT. REF. NO. 2A-5792

1093 STRUT FOR CASE 5302 A = 3'-9".
STORES CAT. REF. NO. 2A-5793

1094 STRUT FOR CASE 5303 A = 5'-7".
STORES CAT. REF. NO. 2A-5794

1095 STRUT FOR CASE 5304 A = 7'-1".
STORES CAT. REF. NO. 2A-5795

NOTE :-
1. FOUNDATIONS ARE SHIPPED KNOCKED-DOWN AND ARE TO BE ASSEMBLED IN THE FIELD.
2. ORDER PLATFORM SUPPORTS, PLATFORM ANGLES AND GRATINGS IN ACCORDANCE WITH CURRENT ISSUE OF PLAN S-111.
3. FOUNDATIONS SHALL BE MADE OF PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATION.
4. COARSE AGGREGATE SHALL CONSIST OF 3/4 INCH MAXIMUM SIZE STONE OR GRAVEL.
5. NOT LESS THAN 6 SACKS OF CEMENT SHALL BE USED PER CUBIC YARD OF CONCRETE.
6. WATER CEMENT RATIO TO PRODUCE A COMPRESSIVE STRENGTH OF 2500 POUNDS PER SQUARE INCH AFTER 28 DAYS SHALL BE USED.
7. BOLTS SHALL BE PAINTED WITH ASPHALT PAINT BEFORE ASSEMBLY.

REVISIONS

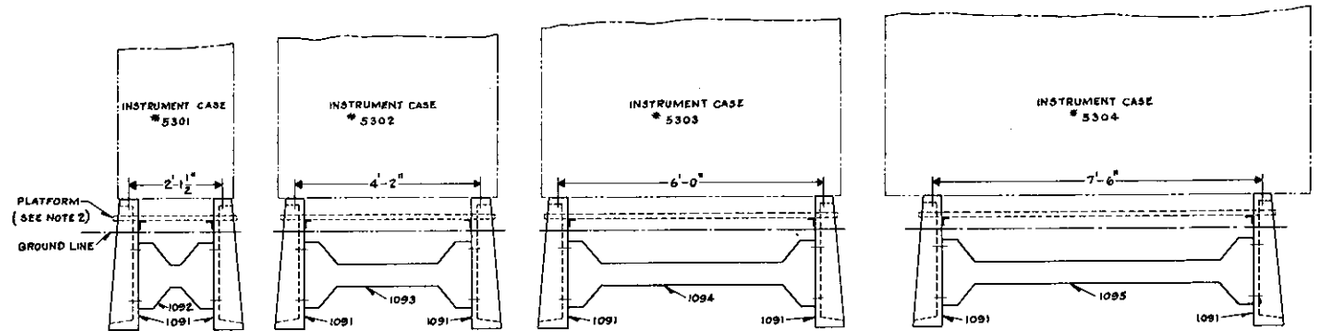
1 SHEET

S-109-A

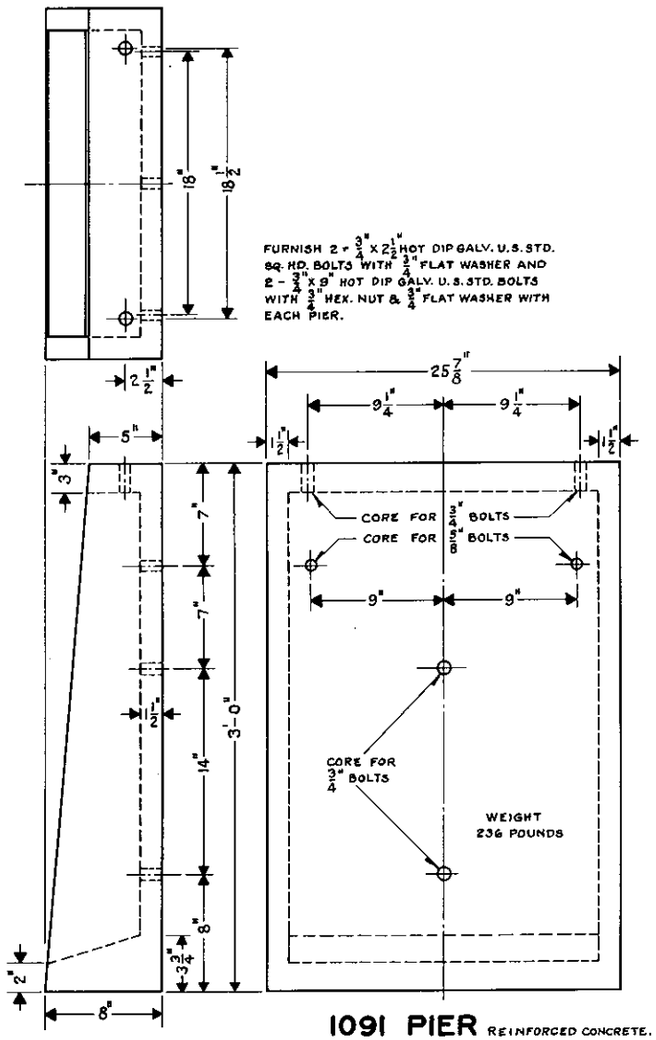
THE PENNSYLVANIA RAILROAD
STANDARD
FOUNDATION
PRECAST CONCRETE
FOR INSTRUMENT CASES
OFFICE OF CHIEF ENGINEER, PHILA., PA.,

Approved H.C. Griffith
Assistant Chief Engineer-T.C.&S.

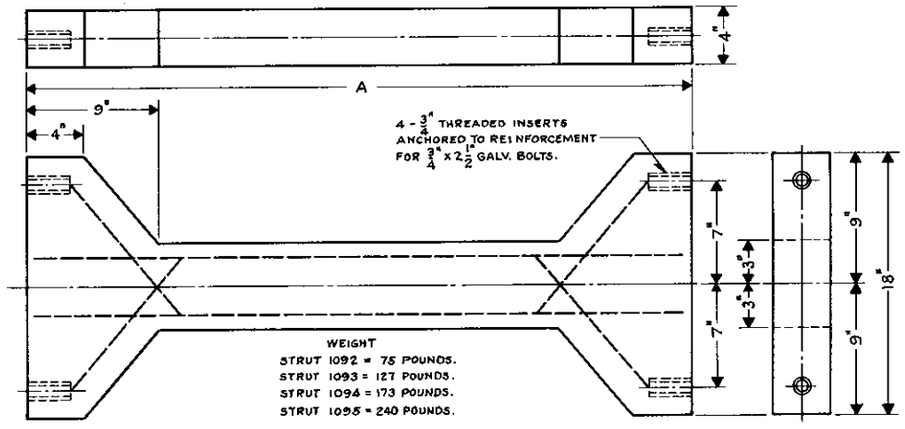
Approved J.T. Rennie
Chief Engineer



APPLICATIONS OF FOUNDATIONS.



1091 PIER REINFORCED CONCRETE.
STORES CAT. REF. NO. 2A-5791



WEIGHT
STRUT 1092 = 75 POUNDS.
STRUT 1093 = 127 POUNDS.
STRUT 1094 = 173 POUNDS.
STRUT 1095 = 240 POUNDS.
REINFORCED CONCRETE.

1092 STRUT FOR CASE 5301 A = 1'-8½".
STORES CAT. REF. NO. 2A-5792

1093 STRUT FOR CASE 5302 A = 3'-9".
STORES CAT. REF. NO. 2A-5793

1094 STRUT FOR CASE 5303 A = 5'-7".
STORES CAT. REF. NO. 2A-5794

1095 STRUT FOR CASE 5304 A = 7'-1".
STORES CAT. REF. NO. 2A-5795

NOTE :-
1. FOUNDATIONS ARE SHIPPED KNOCKED-DOWN AND ARE TO BE ASSEMBLED IN THE FIELD.
2. ORDER PLATFORM SUPPORTS, PLATFORM ANGLES AND PLATFORMS IN ACCORDANCE WITH CURRENT ISSUE OF PLAN S-108.
3. FOUNDATIONS SHALL BE MADE OF PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATION.
4. COARSE AGGREGATE SHALL CONSIST OF ¾ INCH MAXIMUM SIZE STONE OR GRAVEL.
5. NOT LESS THAN 6 SACKS OF CEMENT SHALL BE USED PER CUBIC YARD OF CONCRETE.
6. WATER CEMENT RATIO TO PRODUCE A COMPRESSIVE STRENGTH OF 2500 POUNDS PER SQUARE INCH AFTER 28 DAYS SHALL BE USED.
7. BOLTS SHALL BE PAINTED WITH ASPHALT PAINT BEFORE ASSEMBLY.
8. WHERE GROUND CONDITIONS ARE FAVORABLE, STRUT MAY BE OMITTED.
9. BOTTOM OF CASE SHALL BE APPROX. 10 IN. ABOVE TOP OF GROUND.

REVISIONS
B APRIL 10, 1951 NOTES 8 AND 9 ADDED TO PLAN. APPROVED W. J. Salmonson

1 SHEET

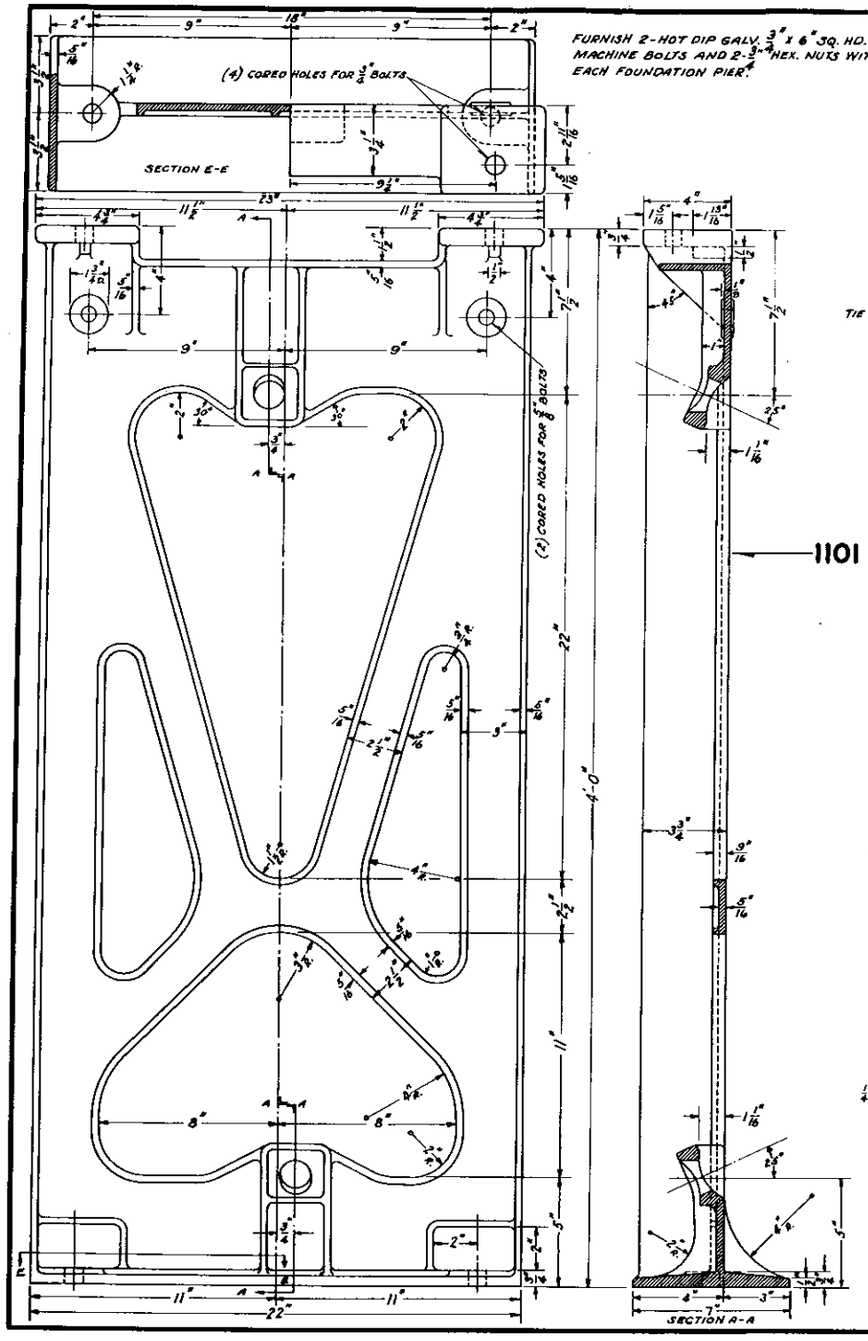
S-109-B

THE PENNSYLVANIA RAILROAD
STANDARD
FOUNDATION
PRECAST CONCRETE
FOR INSTRUMENT CASES
OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 30, 1947.

Approved H. C. Griffith
Assistant Chief Engineer - T. C. & S.

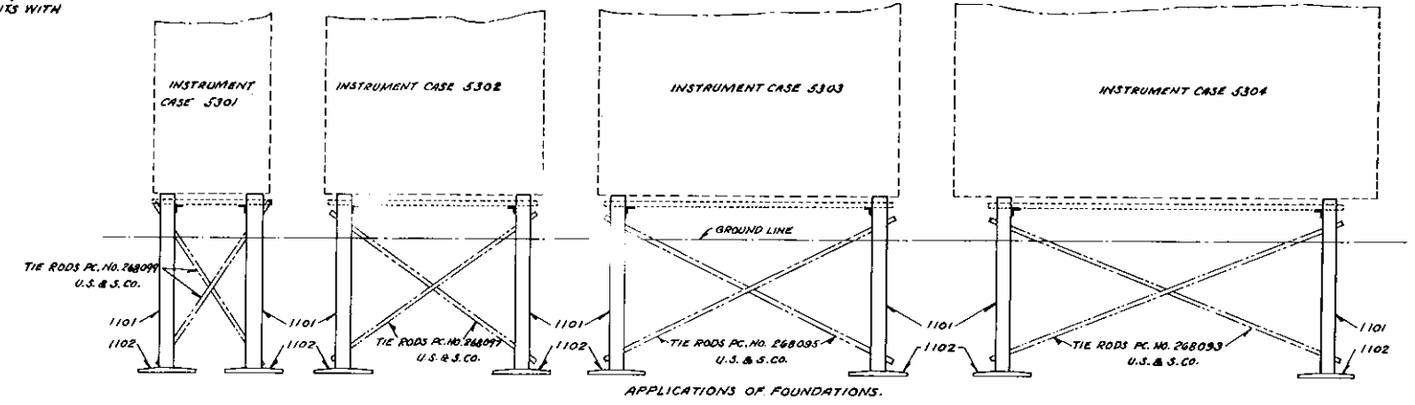
Approved J. T. Emmett
Chief Engineer

FURNISH 2-HOT DIP GALV. $\frac{3}{4}$" x 6" SQ. HD. MACHINE BOLTS AND 2-$\frac{3}{4}$" HEX. NUTS WITH EACH FOUNDATION PIER.



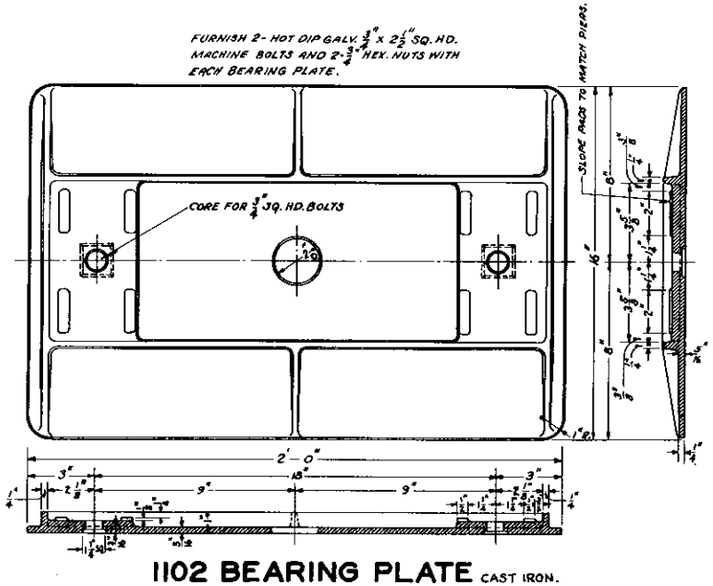
1101 FOUNDATION PIER CAST IRON.

STORES CAT. REF. NO. 2A-5571



APPLICATIONS OF FOUNDATIONS.

FURNISH 2-HOT DIP GALV. $\frac{3}{4}$" x 2$\frac{1}{2}$" SQ. HD. MACHINE BOLTS AND 2-$\frac{3}{4}$" HEX. NUTS WITH EACH BEARING PLATE.



1102 BEARING PLATE CAST IRON.

STORE CAT. REF. NO. 2A-5572

NOTE:-

1. TIE RODS MAY BE ORDERED AND APPLIED TO PIERS, WHERE THE SOIL IS NOT SOLID ENOUGH TO HOLD THE PIERS IN PLACE.
2. ORDER PLATFORM SUPPORTS, PLATFORM ANGLES AND GRATINGS IN ACCORDANCE WITH CURRENT ISSUE OF DRAWING S-111.

REVISIONS

1 SHEET

S-110-B

THE PENNSYLVANIA RAILROAD

STANDARD

FOUNDATION

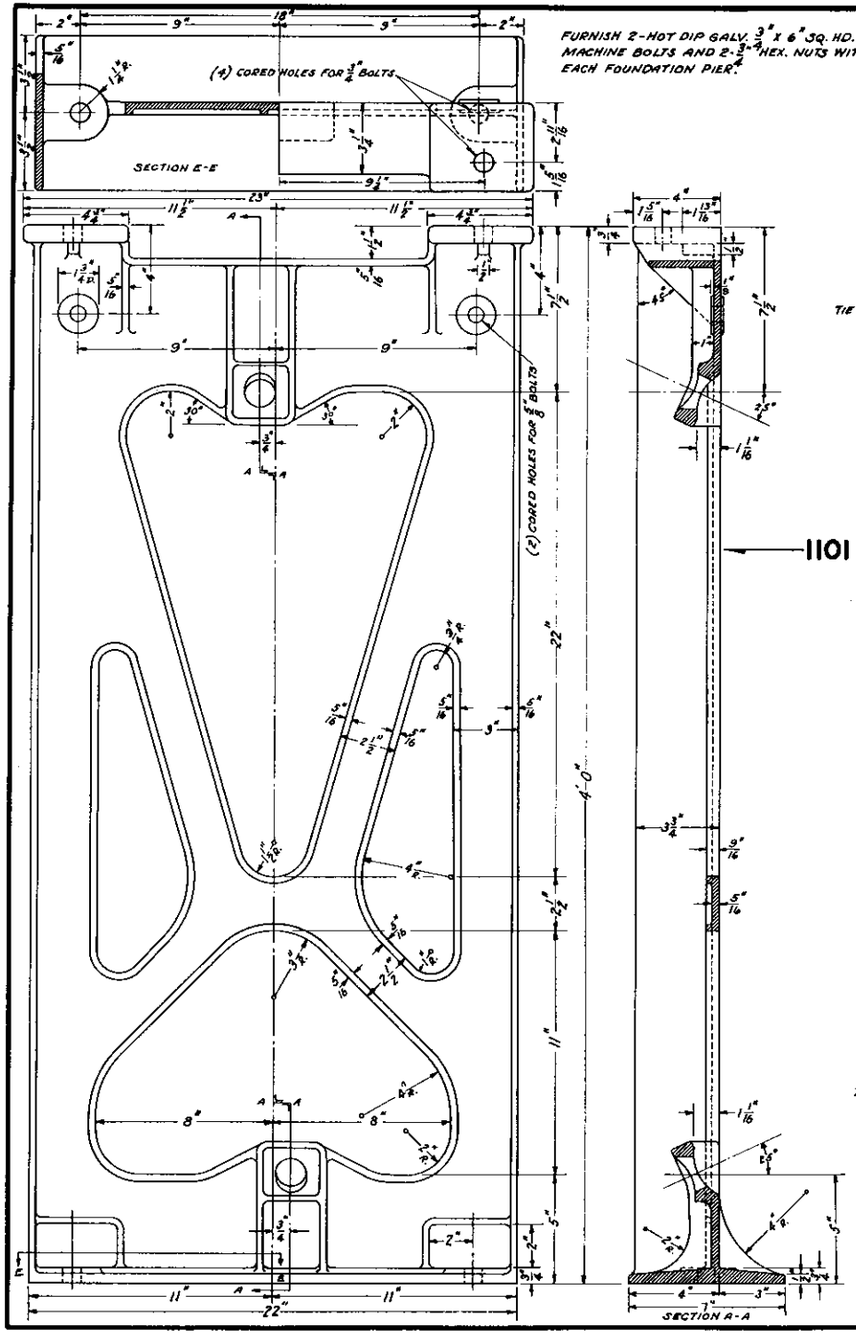
CAST IRON

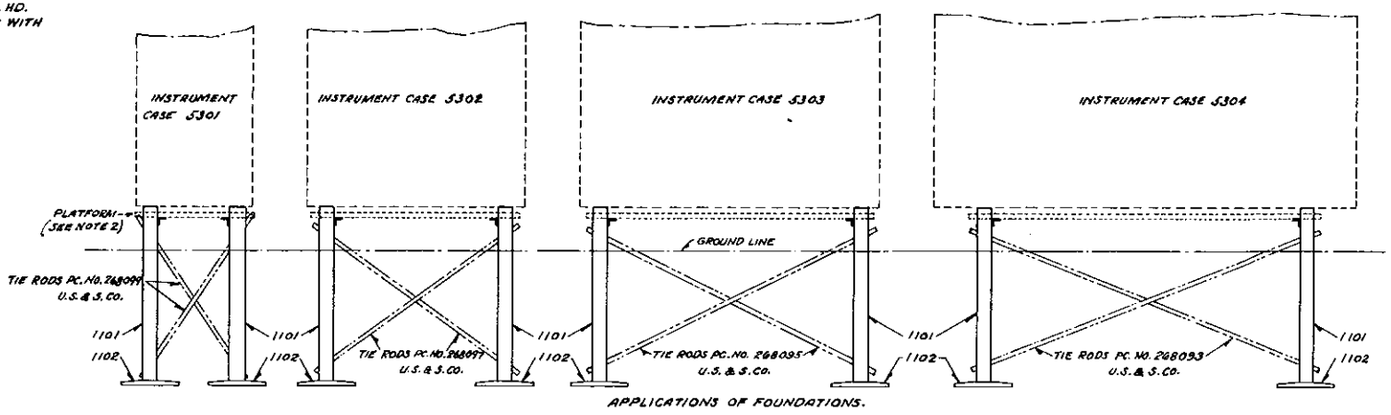
FOR INSTRUMENT CASES

OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 10, 1947.

Approved
Assistant Chief Engineer T. C. & S.

Approved
Chief Engineer

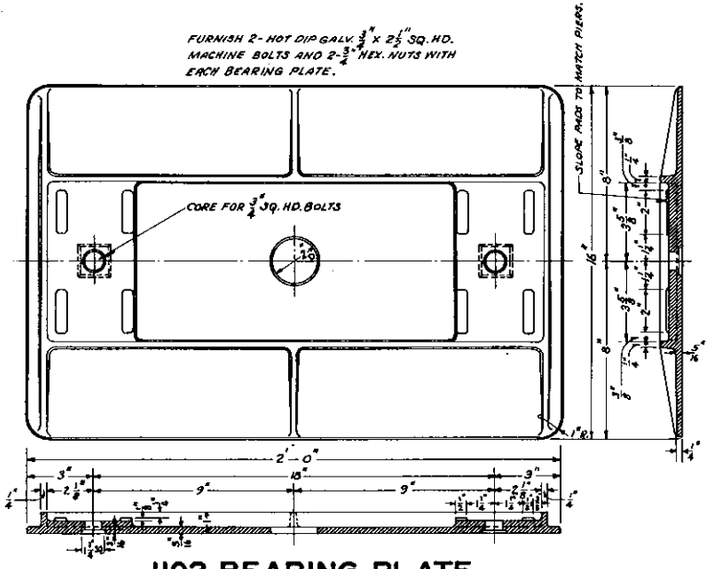




APPLICATIONS OF FOUNDATIONS.

1101 FOUNDATION PIER CAST IRON.

STORES CAT. REF. NO. 2A-5571



1102 BEARING PLATE CAST IRON.

STORE CAT. REF. NO. 2A-5572

NOTE:-

1. TIE RODS MAY BE ORDERED AND APPLIED TO PIERS, WHERE THE SOIL IS NOT SOLID ENOUGH TO HOLD THE PIERS IN PLACE.
2. ORDER PLATFORM SUPPORTS, PLATFORM ANGLES AND GRATINGS IN ACCORDANCE WITH CURRENT ISSUE OF DRAWING S-108.
3. WHERE GROUND CONDITIONS ARE FAVORABLE, BEARING PLATE 1102 MAY BE OMITTED.
4. BOTTOM OF CASE SHALL BE APPROX. 12 INCHES ABOVE THE TOP OF GROUND.

REVISIONS

C. APRIL 11, 1951. NOTES 3 & 4 ADDED TO PLAN.
APPROVED H. J. Balmanno

1 SHEET

S-110-C

THE PENNSYLVANIA RAILROAD

STANDARD

FOUNDATION

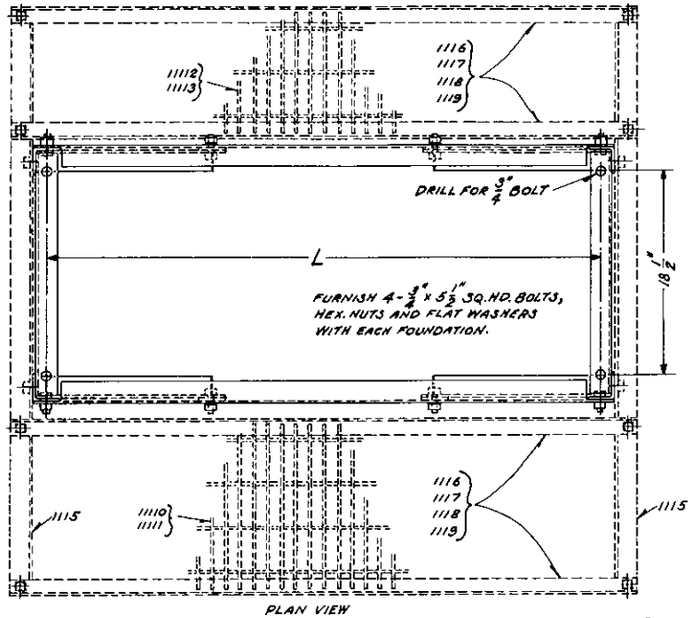
CAST IRON

FOR INSTRUMENT CASES

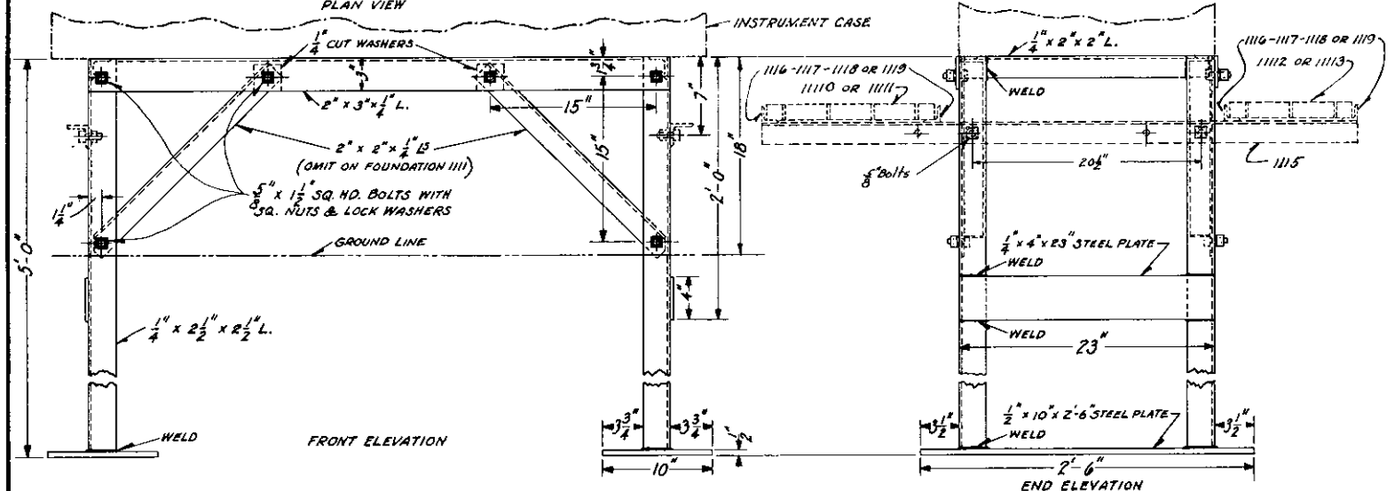
OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 10, 1947.

Approved A. K. Griffith
Assistant Chief Engineer T. C. & S.

Approved J. Rumsey
Chief Engineer



PLAN VIEW



FRONT ELEVATION

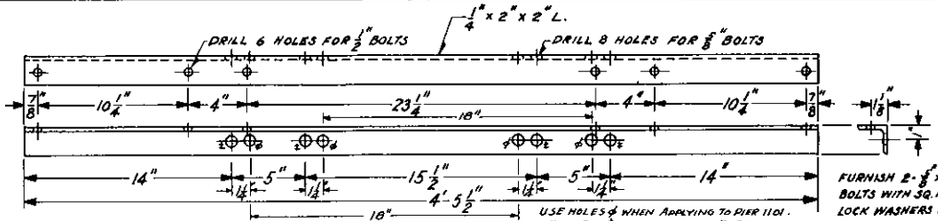
END ELEVATION

1111 FOUNDATION FOR CASE 5301 - L = 2'-1 1/2".
STORES CAT. REF. NO. 2A-5540

1112 FOUNDATION FOR CASE 5302 - L = 4'-2".
STORES CAT. REF. NO. 2A-5541

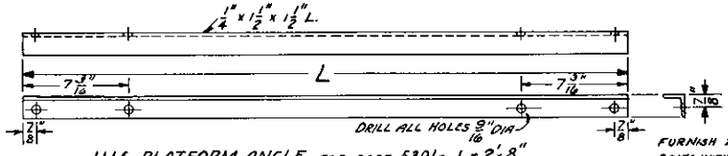
1113 FOUNDATION FOR CASE 5303 - L = 6'-0".
STORES CAT. REF. NO. 2A-5542

1114 FOUNDATION FOR CASE 5304 - L = 7'-6".
STORES CAT. REF. NO. 2A-5543



1115 PLATFORM SUPPORT RIGHT & LEFT HAND
STORES CAT. REF. NO. 2A-5544

FURNISH 2-5/8" x 1 1/2" SQ. HD. BOLTS WITH SQ. NUTS AND LOCK WASHERS WITH EACH PLATFORM SUPPORT.



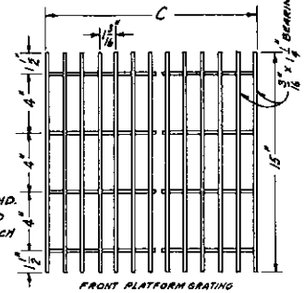
1116 PLATFORM ANGLE FOR CASE 5301 - L = 2'-8"
STORES CAT. REF. NO. 2A-5545

1117 PLATFORM ANGLE FOR CASE 5302 - L = 4'-8 1/2"
STORES CAT. REF. NO. 2A-5546

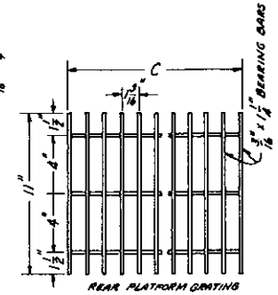
1118 PLATFORM ANGLE FOR CASE 5303 - L = 6'-6 1/2".
STORES CAT. REF. NO. 2A-5547

1119 PLATFORM ANGLE FOR CASE 5304 - L = 8'-0 1/2".
STORES CAT. REF. NO. 2A-5548

FURNISH 2-1/2" x 1 1/2" SQ. HD. BOLTS WITH SQ. NUTS AND LOCK WASHERS WITH EACH PLATFORM ANGLE.



FRONT PLATFORM GRATING



REAR PLATFORM GRATING

11110 GRATING c = 32"
STORES CAT. REF. NO. 2A-5549

11111 GRATING c = 26"
STORES CAT. REF. NO. 2A-5550

11112 GRATING c = 32"
STORES CAT. REF. NO. 2A-5551

11113 GRATING c = 26"
STORES CAT. REF. NO. 2A-5552

FOR FOUNDATION 1111 ORDER 1-1110 AND 1-1112.
" " 1112 " 2-1111 " 2-1113.
" " 1113 " 3-1111 " 3-1113.
" " 1114 " 3-1110 " 3-1112.

NOTE:-

1. ALL PARTS OF FOUNDATIONS, PLATFORM SUPPORTS, PLATFORM ANGLES AND GRATINGS SHALL BE HOT DIP GALVANIZED AFTER FABRICATING AND WELDING, BUT BEFORE BOLTING TOGETHER.
2. CARE MUST BE TAKEN TO INSURE THAT ALL WELDS ARE OF FIRST-CLASS WORKMANSHIP.
3. FOUNDATIONS SHALL BE SHIPPED KNOCK-DOWN AND ASSEMBLED IN THE FIELD.
4. PLATFORM SUPPORTS, PLATFORM ANGLES AND PLATFORM GRATINGS SHALL BE ORDERED SEPARATELY.
5. WHEN INSTALLING FOUNDATIONS, A COATING OF GOOD RUST PREVENTIVE SHALL BE APPLIED TO ALL PARTS OF FOUNDATION UNDERGROUND AND TO A POINT 3" ABOVE THE GROUND.
6. GRATINGS SHALL BE SECURED TO PLATFORM ANGLES IN A MANNER SUITABLE TO MEET CONDITIONS IN THE FIELD.
7. ALL ANGLES SHALL BE COMMERCIAL O.H.S.

REVISIONS

REDRAWN FROM EXPERIMENTAL PLAN SK-111-D, DATED APR. 2, 1943, LAST REVISED APR. 18, 1946 & REDESIGNED.

REVISED FEBRUARY 24, 47. DIMENSIONS OF PLATFORM ANGLES SLIGHTLY MODIFIED.

1 SHEET

S-111-B

THE PENNSYLVANIA RAILROAD

STANDARD

FOUNDATIONS

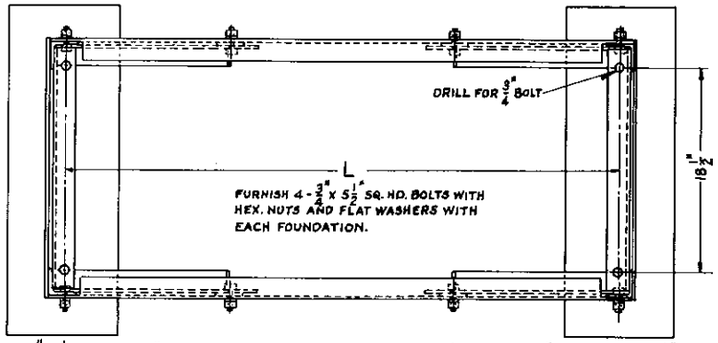
ANGLE IRON

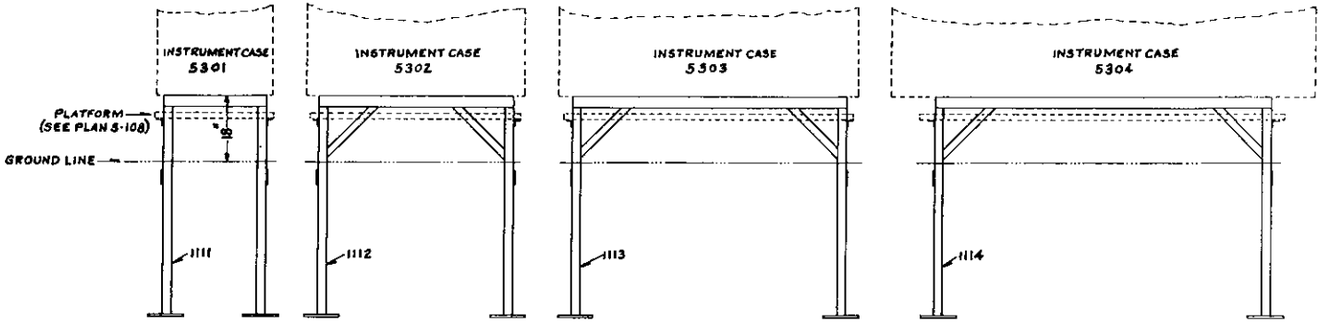
FOR INSTRUMENT CASES

OFFICE OF CHIEF ENGINEER, PHILA., PA., JANUARY 9, 1947.

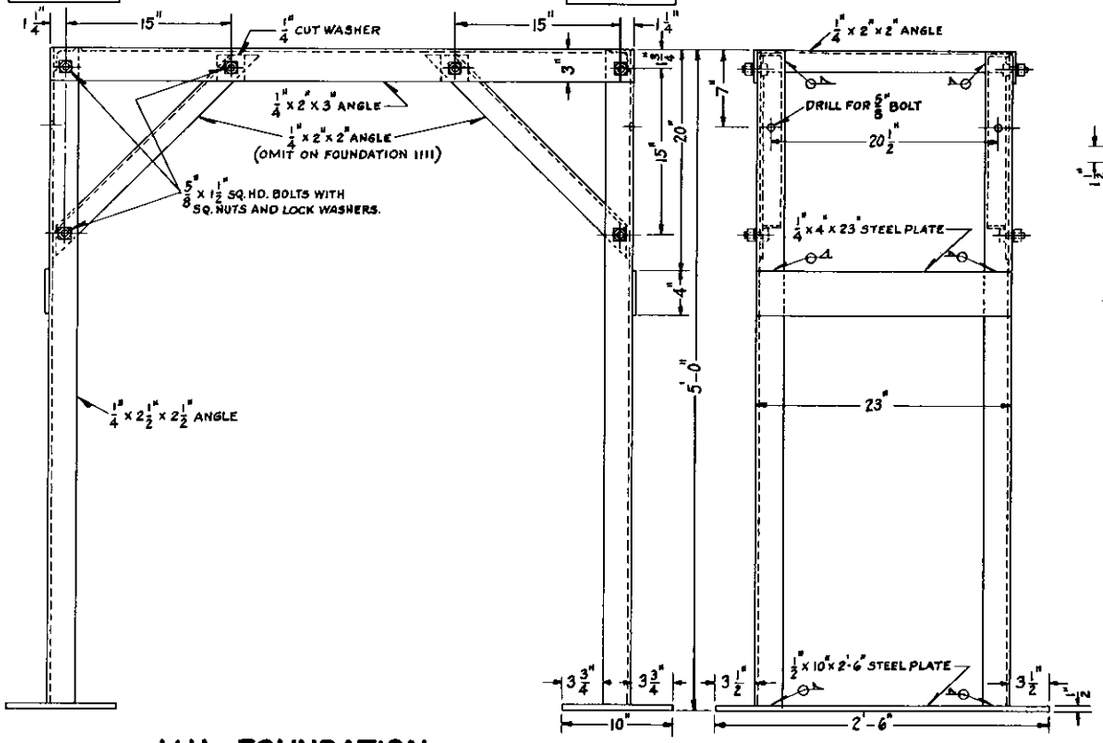
Approved
Assistant Chief Engineer - T.C. & S.

Approved
Chief Engineer





APPLICATION OF FOUNDATIONS

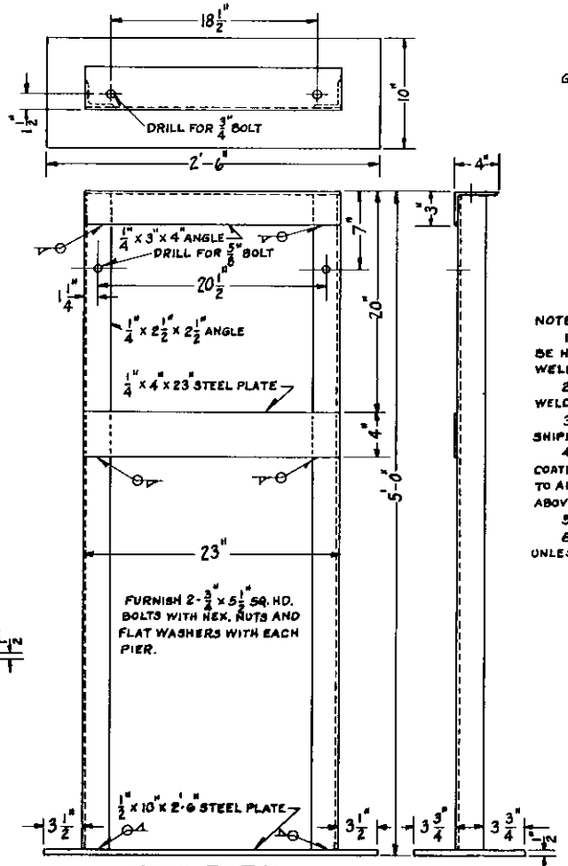


1111 **FOUNDATION** FOR CASE 5301 L = 2'-1 1/2"
STORES CAT. REF. NO. 2A-5540

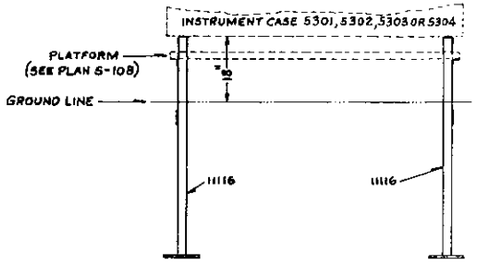
1112 **FOUNDATION** FOR CASE 5302 L = 4'-2"
STORES CAT. REF. NO. 2A-5541

1113 **FOUNDATION** FOR CASE 5303 L = 6'-0"
STORES CAT. REF. NO. 2A-5542

1114 **FOUNDATION** FOR CASE 5304 L = 7'-8"
STORES CAT. REF. NO. 2A-5543



11116 PIER 2 REQUIRED FOR EACH CASE
STORES CAT. REF. NO. 2A-1426



APPLICATION OF PIERS

NOTE :-

1. ALL PARTS OF FOUNDATIONS AND PIERS SHALL BE HOT DIP GALVANIZED AFTER FABRICATING AND WELDING, BUT BEFORE BOLTING TOGETHER.
2. CARE MUST BE TAKEN TO INSURE THAT ALL WELDS ARE OF FIRST-CLASS WORKMANSHIP.
3. FOUNDATIONS 1111, 1112, 1113 AND 1114 SHALL BE SHIPPED KNOCKED-DOWN AND ASSEMBLED IN THE FIELD.
4. WHEN INSTALLING FOUNDATIONS AND PIERS, A COATING OF A GOOD RUST PREVENTIVE SHALL BE APPLIED TO ALL PARTS UNDERGROUND AND TO A POINT 3 INCHES ABOVE THE GROUND.
5. ALL ANGLES SHALL BE COMMERCIAL O.H.S.
6. ALL WELDS SHOWN ARE 5/16" FILLET WELDS UNLESS SPECIFIED OTHERWISE.

REVISIONS

REDRAWN FROM APPROVED PLAN S-111-B, DATED JAN. 9, 1947, LAST REVISED FEB. 24, 1947. PLATFORMS, PLATFORM SUPPORTS AND GRATINGS NOW SHOWN ON S-108. PIER 11116 ADDED TO PLAN.

1 SHEET

S-111-C

THE PENNSYLVANIA RAILROAD

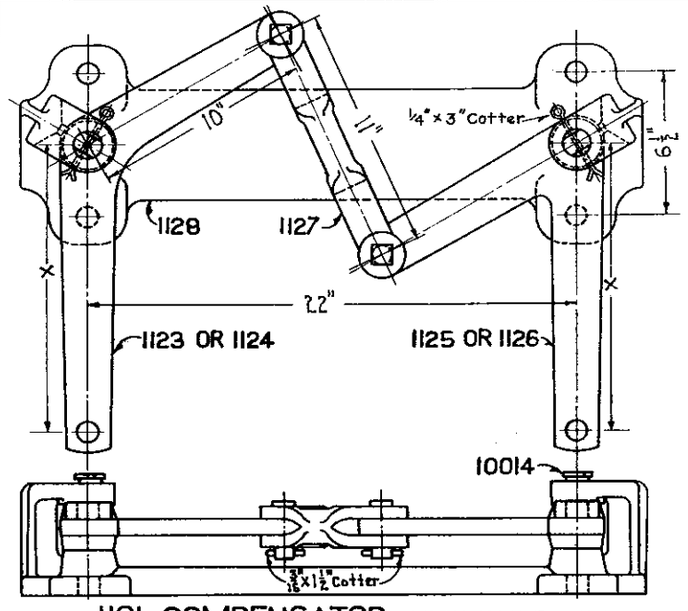
STANDARD

FOUNDATIONS

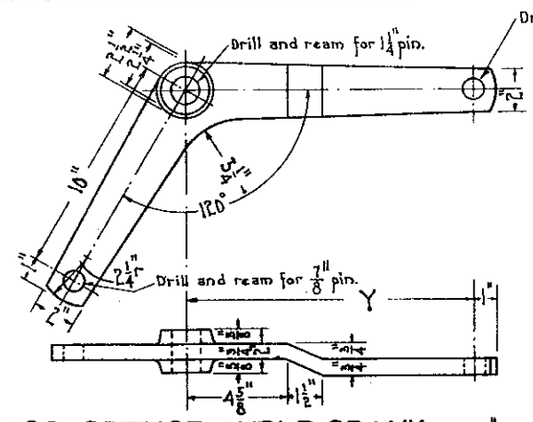
ANGLE IRON
FOR INSTRUMENT CASES
OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 9, 1951

Approved
H. B. Salmonson
Assistant Chief Engineer-Signals

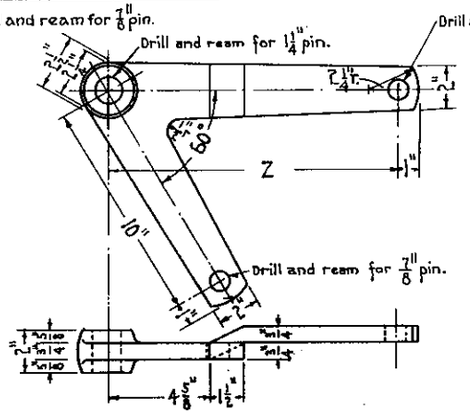
Approved
J. H. Crawford
Chief Engineer



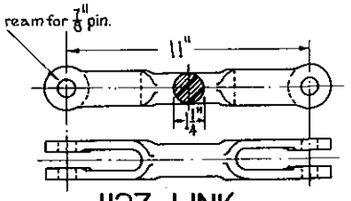
1121-COMPENSATOR WITH 1123 & 1125
1122- " " 1124 & 1126



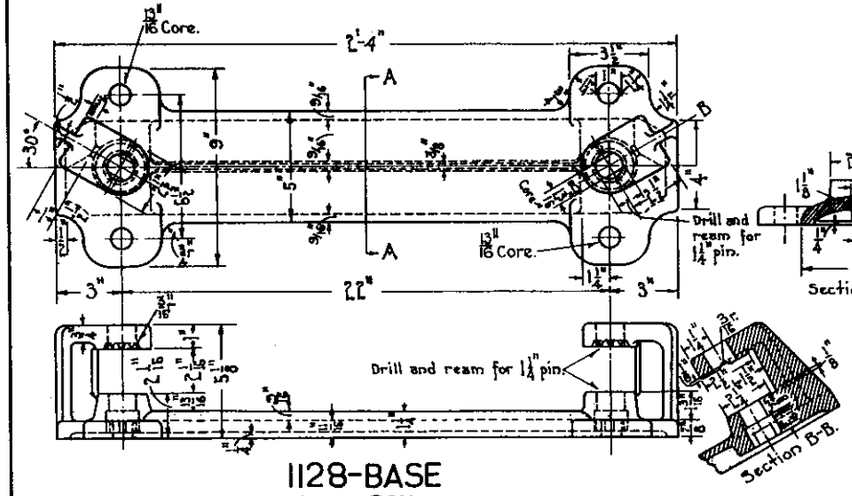
1123-OBTUSE ANGLE CRANK Y=13"
1124- " " " Y=16"
FORGED STEEL



1125-ACUTE ANGLE CRANK Z=13"
1126- " " " Z=16"
FORGED STEEL



1127-LINK
O.H. STEEL



1128-BASE
CAST IRON
A.R.A.-MAR.1927.

Specifications for Test of Cranks

Each crank shall be tested in tension and compression to strain shown in the following table; which it must stand without a permanent set of more than one thirty second ($\frac{1}{32}$) of an inch or other defects; strain to be applied at right angles to arm and through center of pin.

Length of Arm	Pounds Strain
11¾" or less.	2500
13"	2200
16"	1800

REVISIONS
8-FEBRUARY 9, 1928.
APPROVED:

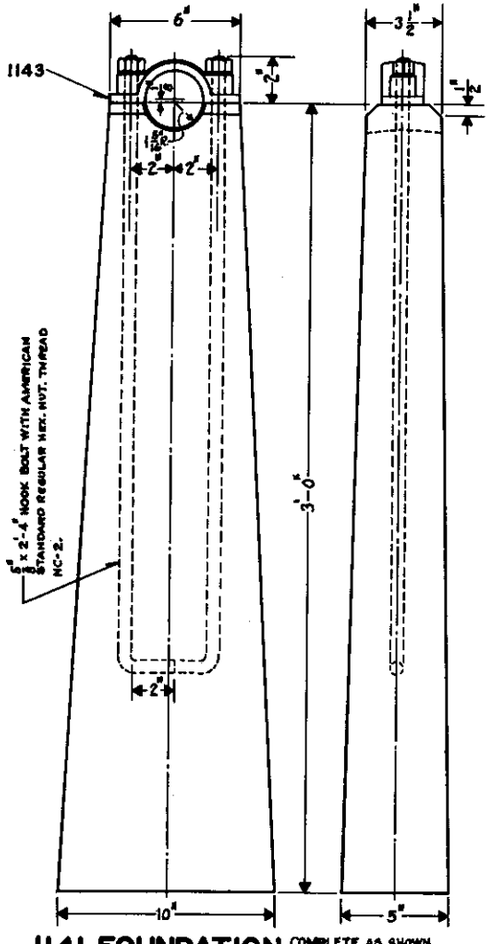
1 SHEET

S-112-B

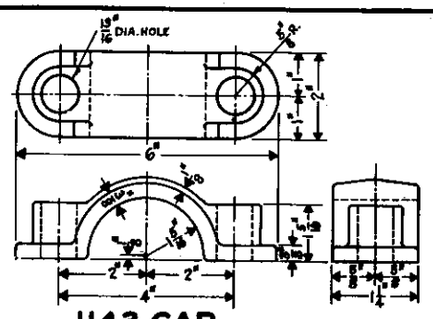
THE PENNSYLVANIA RAILROAD
STANDARD
PIPE COMPENSATOR
ONE-WAY HORIZONTAL
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., AUGUST 2, 1920.

Correct:
Chief Signal Engineer

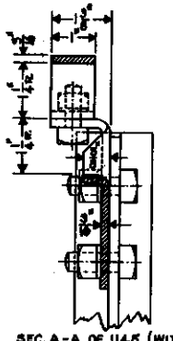
Approved:
Chief Engineer



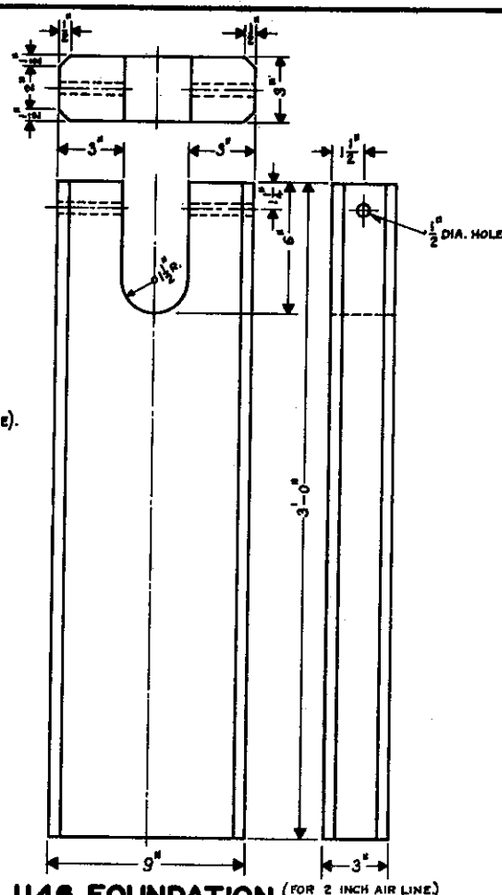
1141 FOUNDATION COMPLETE AS SHOWN. (FOR 2 INCH AIR LINE)
CONCRETE.
STORES CAT. REF. NO. 2A-1047.
A. A. R. 518. SEC. M-1935.



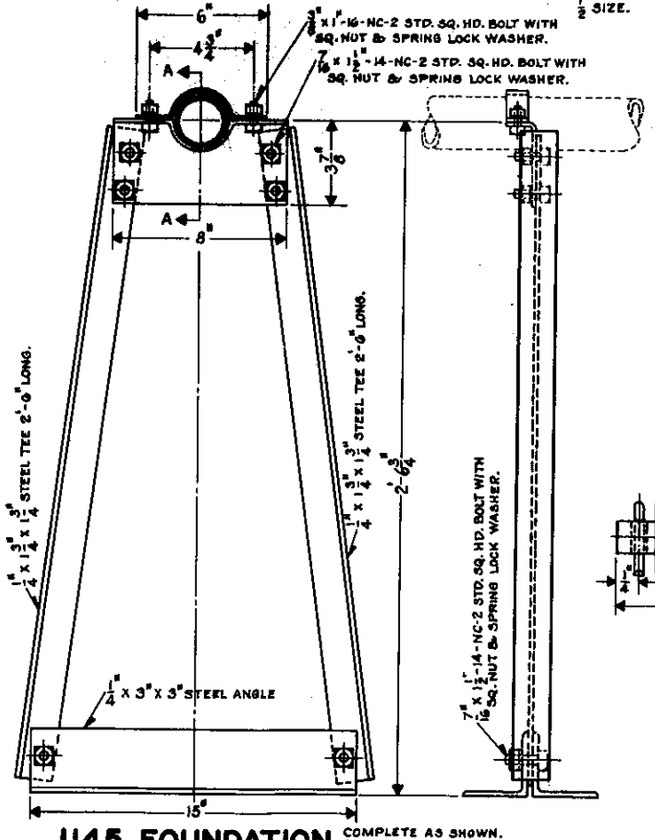
1143 CAP CAST IRON.
STORES CAT. REF. NO. 2A-3591
A. A. R. 518. SEC. M-1935.



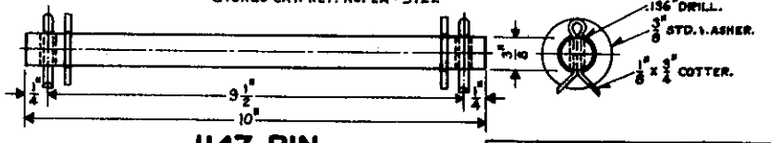
SEC. A-A OF 1145 (WITHOUT PIPE).
½ SIZE.



1146 FOUNDATION (FOR 2 INCH AIR LINE)
ELASTITE.
STORES CAT. REF. NO. 2A-5121.



1145 FOUNDATION COMPLETE AS SHOWN. (FOR 2 INCH AIR LINE)
STORES CAT. REF. NO. 2A-3593.



1147 PIN COMPLETE AS SHOWN.
O. H. S.
STORES CAT. REF. NO. 2A-5121.

NOTE:-
1. FOUNDATIONS SHALL BE NOT LESS THAN TWO (2) FEET UNDERGROUND.
2. FOUNDATIONS SHALL BE SPACED APPROXIMATELY TWELVE (12) FEET APART ON TANGENT.
3. CONCRETE SHALL BE IN ACCORDANCE WITH SPECIFICATION C. E. 77, (CLASS B) PROPORTIONING PER PARA. 306.
4. ALL PARTS OF FOUNDATION 1145 SHALL BE HOT DIP GALVANIZED.
5. PIN 1147 FOR USE WITH FOUNDATION 1146.

REVISIONS

REDRAWN FROM APPROVED PLAN S-114-C, DATED JAN. 31, 1941. LAST REVISED JULY 15, 1941. FOLLOWING CHANGES MADE. CONCRETE FOUNDATION 1142 AND CAP 1144 FOR 3 W. AIR LINE REMOVED. ELASTITE FOUNDATION 1146 AND PIN 1147 ADDED.

1 SHEET

S-114-D

THE PENNSYLVANIA RAILROAD

STANDARD

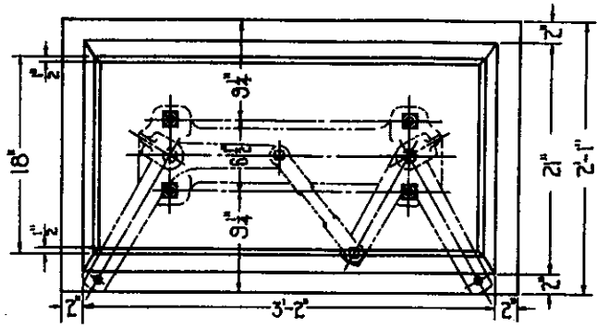
FOUNDATIONS

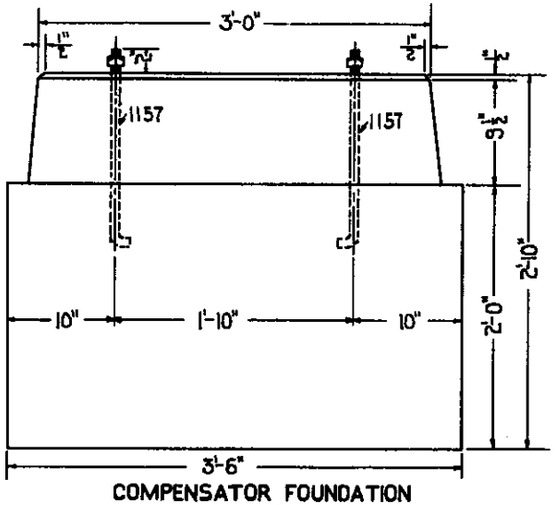
AIR LINE

OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 24, 1943.

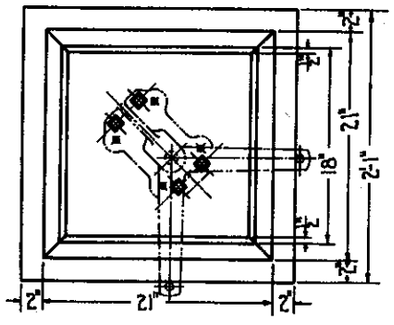
Approved
W. C. Stanton
Assistant Chief Engineer-Signals

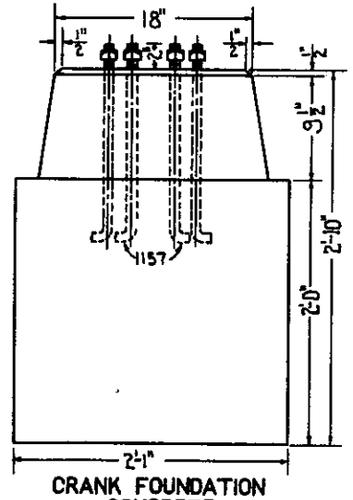
Approved
Chief Engineer





COMPENSATOR FOUNDATION
CONCRETE





CRANK FOUNDATION
CONCRETE

NOTE:

1. FOREMEN SHOULD USE THEIR BEST JUDGMENT AS TO THE PROPER DEPTH OF FOUNDATIONS, BEING GOVERNED BY LOCAL CONDITIONS. FOUNDATIONS SHOWN ARE ADAPTABLE TO GOOD SOLID GROUND.
2. THE TOP SURFACE SHALL BE SLIGHTLY SLOPING AWAY FROM MECHANISM TO PROVIDE ADEQUATE DRAINAGE.
3. CONCRETE SHALL BE IN ACCORDANCE WITH A.R.A. SIGNAL SECTION SPECIFICATION 1111.

REVISIONS

11-22-20. Crank Stand formerly shown parallel with Foundation.
Approved:- A.H. Rudd
C- November 23, 1927.
Approved:- A.H. Rudd
D- JULY 11, 1934.
Approved:- A.H. Rudd

1 SHEET

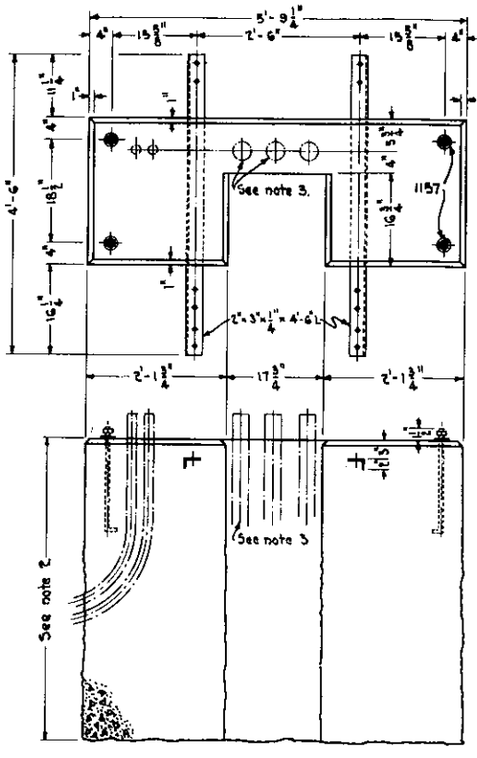
S-116-D

THE PENNSYLVANIA RAILROAD
STANDARD
FOUNDATIONS FOR COMPENSATORS AND CRANKS

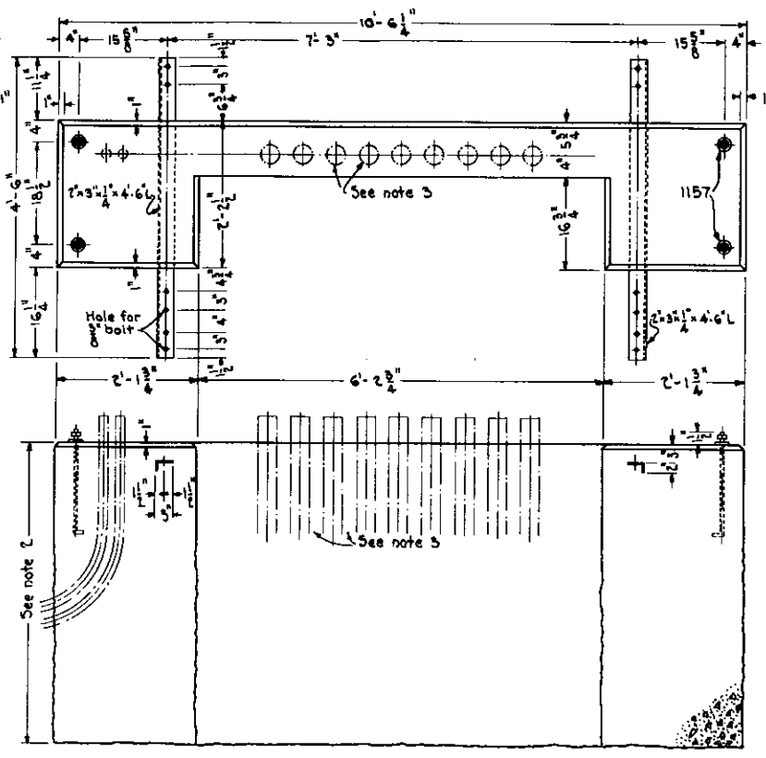
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., AUGUST 2, 1920

Correct
A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer



1171 – FOUNDATION
(FOR USE WITH CASE "A" - PLAN S-530)



1172 – FOUNDATION
(FOR USE WITH CASE "B" - PLAN S-530)

NOTES:

1. CONCRETE SHALL BE IN ACCORDANCE WITH A.A.R. SIGNAL SECTION SPEC. 1111.
2. FOUNDATION SHALL BE NOT LESS THAN 3'-6" UNDERGROUND. FACING SHALL EXTEND NOT LESS THAN 6" BELOW GROUND LINE.
3. NUMBER, SIZE, LOCATION AND TERMINATION OF DUCTS TO BE DETERMINED BY LOCAL REQUIREMENTS. SPARE DUCTS FOR FUTURE ADDITIONS SHOULD BE GIVEN CONSIDERATION.

REVISIONS

1 SHEET

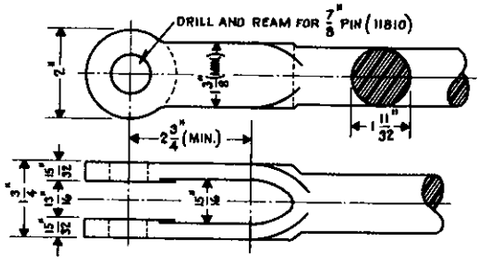
S-117-A

THE PENNSYLVANIA RAILROAD
STANDARD
FOUNDATIONS
FOR INSTRUMENT CASES

Office of Chief Signal Engineer, Phila., Pa., July 12, 1935.

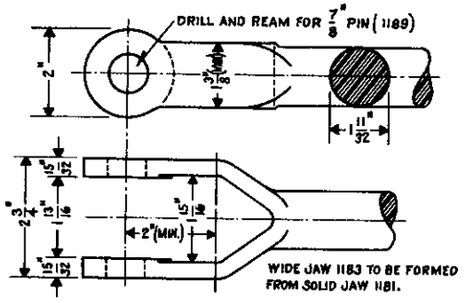
Approved: A. H. Rudd
Chief Signal Engineer

Approved:
Chief Engineer



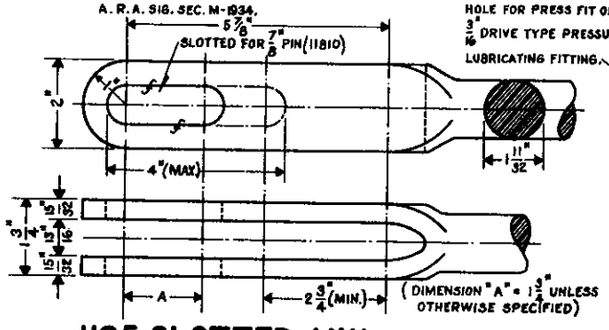
1181 SOLID JAW.

O. H. STEEL.
A. R. A. SIG. SEC. M-1934.



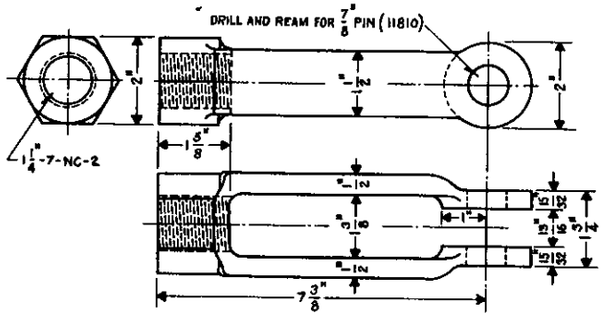
1183 WIDE JAW.

O. H. STEEL.
A. R. A. SIG. SEC. M-1934.



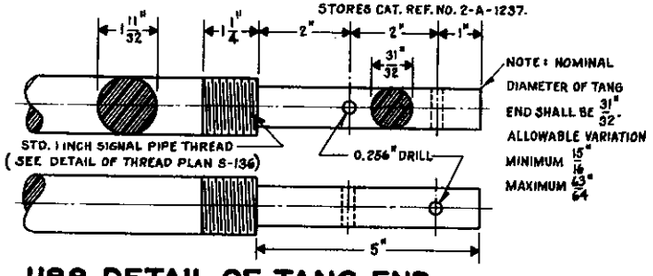
1185 SLOTTED JAW.

O. H. STEEL.
A. R. A. SIG. SEC. M-1934.



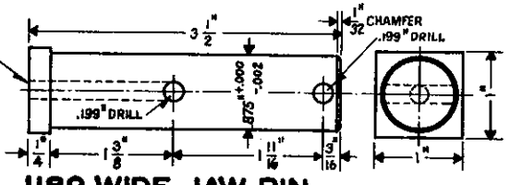
1187 SCREW JAW. O. H. STEEL.

A. R. A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-1237.



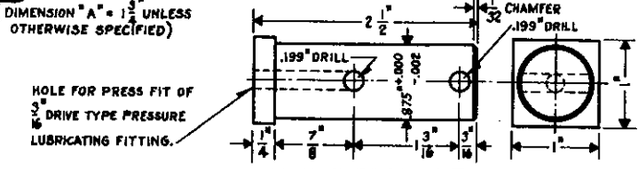
1188 DETAIL OF TANG END.

FOR 1 INCH SIGNAL PIPE.
O. H. STEEL.
A. R. A. SIG. SEC. M-1934.



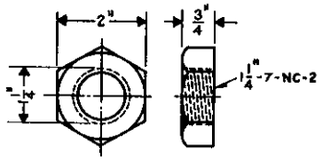
1189 WIDE JAW PIN.

MACHINERY OR C.R. STEEL.
A. A. R. SIG. SEC. M-1935.
STORES CAT. REF. NO. 2-A-1684



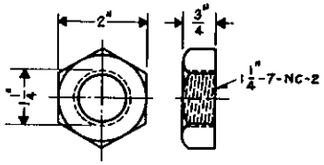
11810 STANDARD JAW PIN.

MACHINERY OR C. R. STEEL.
A. A. R. SIG. SEC. M-1935
STORES CAT. REF. NO. 2-A-1685



11811 JAM NUT. RIGHT HAND THREAD.

O. H. STEEL. COLD PUNCHED.
A. R. A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-1593.



11812 JAM NUT. LEFT HAND THREAD.

O. H. STEEL. COLD PUNCHED.
A. R. A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-1592

NOTE:

1. REMOVE SHARP EDGES FROM ALL HOLES IN PINS 1189 AND 11810.
2. FURNISH ONE 3/16" × 1 1/2" COTTER WITH EACH PIN 1189 AND 11810.
3. IF LUBRICATING FITTING IS REQUIRED WITH PINS 1189 AND 11810, SPECIFY ON REQUISITION.

REVISIONS
REDRAWN FROM APPROVED PLAN S-118-A, DATED JUNE 4, 1920 AND REVISED.

1 SHEET

S-118-B

THE PENNSYLVANIA RAILROAD

STANDARD

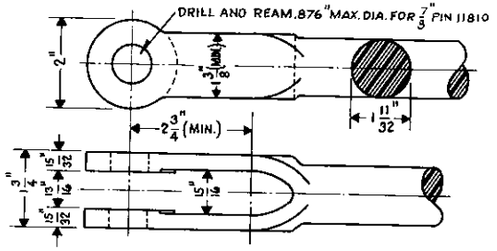
SCREW AND SOLID JAWS

DETAILS

OFFICE OF CHIEF ENGINEER, PHILA., PA. MAY 20, 1940.

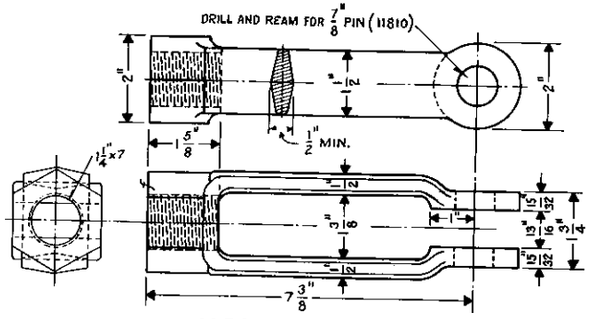
Approved
Assistant Chief Engineer-Signals

Approved
Chief Engineer



1181 SOLID JAW SAE-1020 STEEL

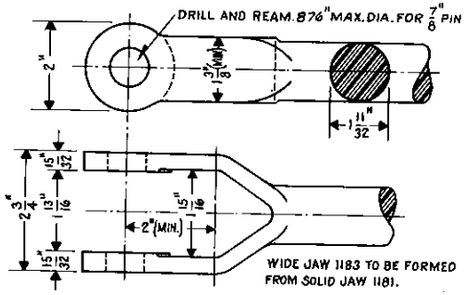
AAR 10161 M-1955



1187 SCREW JAW SAE-1020 STEEL

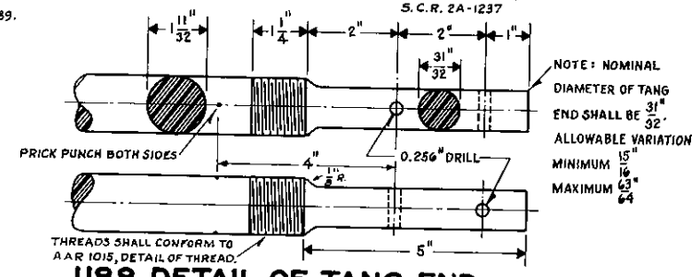
AAR 10164 M-1955

S.C.R. 2A-1237



1183 WIDE JAW SAE-1020 STEEL

AAR 10162 M-1955

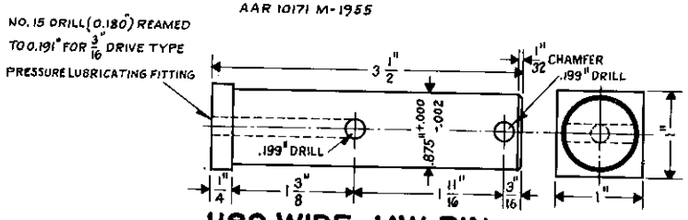


1188 DETAIL OF TANG END

FOR 1 INCH SIGNAL PIPE.

SAE-1020 STEEL

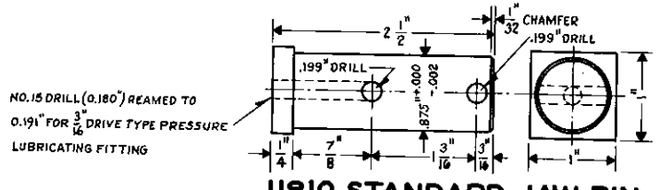
AAR 10171 M-1955



1189 WIDE JAW PIN.

SAE-1112 STEEL

AAR 10106 M-1944 SCR 2A-1684



11810 STANDARD JAW PIN

SAE-1112 STEEL

AAR 10105 M-1944 S.C.R. 2A-1685

NOTE:

1. REMOVE SHARP EDGES FROM ALL HOLES IN PINS 1189 AND 11810.
2. FURNISH ONE 3/16" x 1 1/2" COTTER WITH EACH PIN 1189 AND 11810.
3. FURNISH ONE 3/16" DRIVE TYPE PRESSURE LUBRICATING FITTING (S.C.R. 23-1729) WITH EACH PIN 1189 AND 11810.

REVISIONS
REDRAWN FROM APPROVED PLAN S-118-A, DATED JUNE 4, 1920 AND REVISED.
C JANUARY 10, 1958 PARTS 1185, 11811 & 11812 OBSOLETED. AAR REF. NO'S. ADDED AND MINOR CHANGES MADE TO AGREE WITH AAR. APPROVED J. D. Kuriel C

1 SHEET

S-118-C

THE PENNSYLVANIA RAILROAD

STANDARD

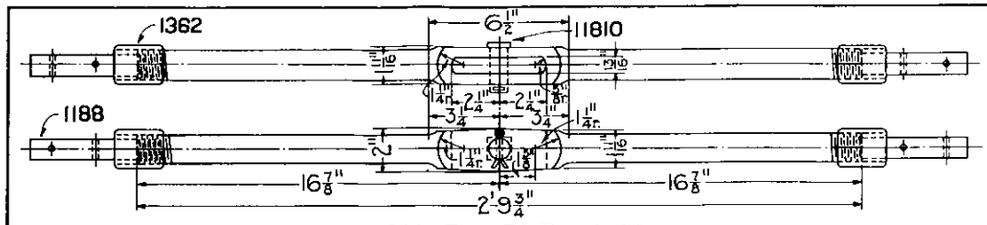
SCREW AND SOLID JAWS

DETAILS

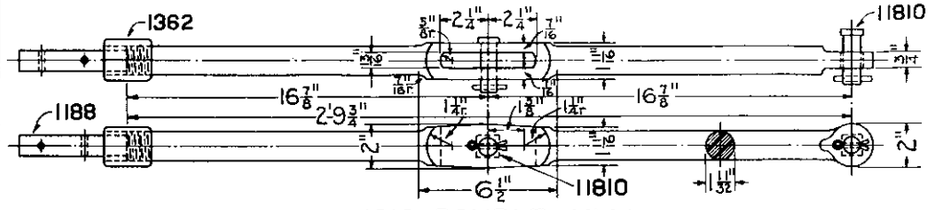
OFFICE OF CHIEF ENGINEER, PHILA., PA. MAY 20, 1940.

Approved N. K. Johnston Assistant Chief Engineer-Signals

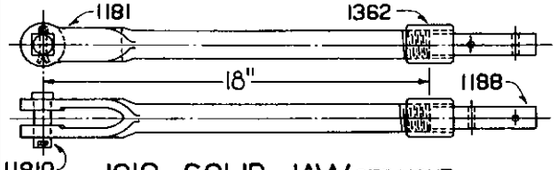
Approved W. S. Gregg Chief Engineer



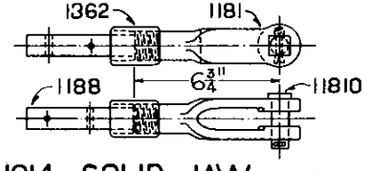
1211—DOUBLE JAW.



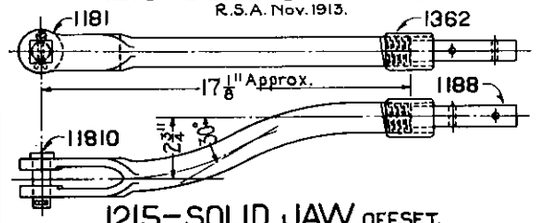
1212—DOUBLE JAW.



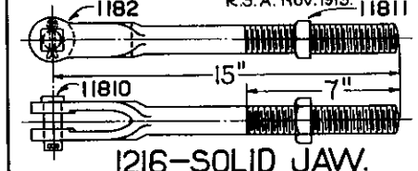
1213—SOLID JAW STRAIGHT.
R.S.A. Nov. 1913.



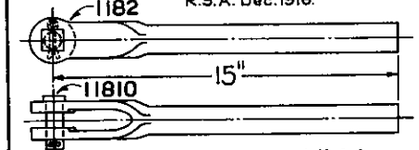
1214—SOLID JAW SHORT.



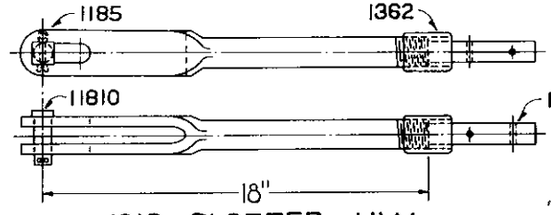
1215—SOLID JAW OFFSET.
R.S.A. Nov. 1913.



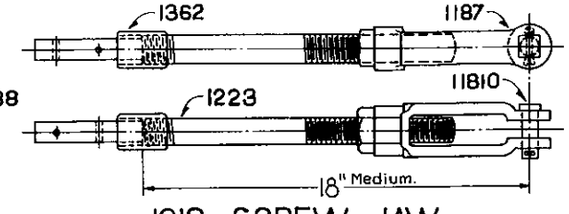
1216—SOLID JAW.
R.S.A. Dec. 1916.



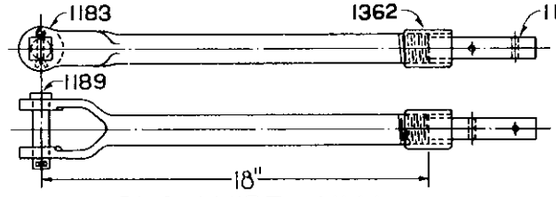
1217—SOLID JAW. R.S.A. Dec. 1916.



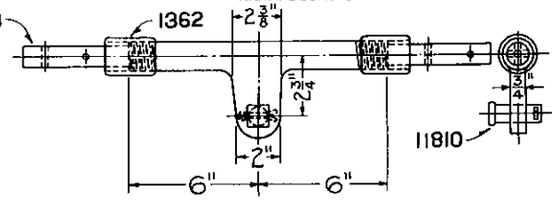
1218—SLOTTED JAW.
R.S.A. Nov. 1913.



1219—SCREW JAW.
R.S.A. Dec. 1916.



12110—WIDE JAW.
R.S.A. Nov. 1913.



12111—LUG
R.S.A. Sept. 1816.

REVISIONS.

SCALE
For all parts.

1 SHEET

S-121-A

PENNSYLVANIA SYSTEM

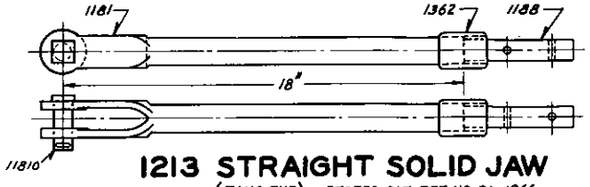
STANDARD

JAWS AND LUGS

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., AUGUST 2, 1920

Correct
Chief Signal Engineer

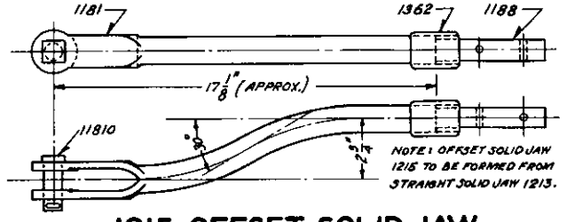
Approved
Chief Engineer



1213 STRAIGHT SOLID JAW

(TANG END) STORES CAT. REF. NO. 2A-1246

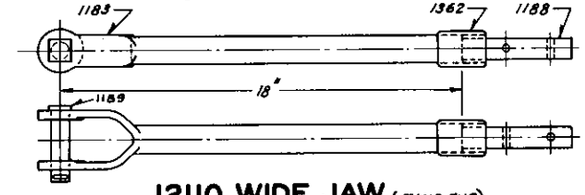
SAE-1020 STEEL FORGED. AAR SIG. SEC. M-1941.



1215 OFFSET SOLID JAW

(TANG END) STORES CAT. REF. NO. 2A-1250

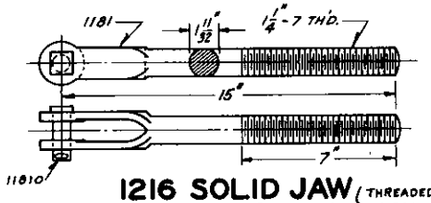
SAE-1020 STEEL FORGED. AAR SIG. SEC. M-1941.



12110 WIDE JAW (TANG END)

STORES CAT. REF. NO. 2A-1254

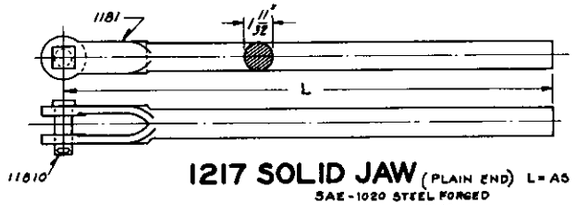
SAE-1020 STEEL FORGED. AAR SIG. SEC. M-1941.



1216 SOLID JAW (THREADED END)

SAE-1020 STEEL FORGED.

STORES CAT. REF. NO. 2A-1247 AAR SIG. SEC. M-1940

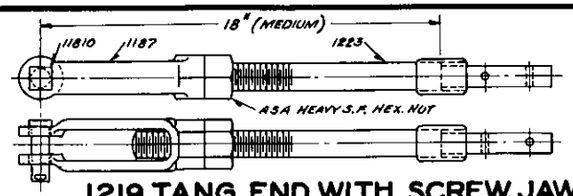


1217 SOLID JAW (PLAIN END) L = AS ORDERED

SAE-1020 STEEL FORGED

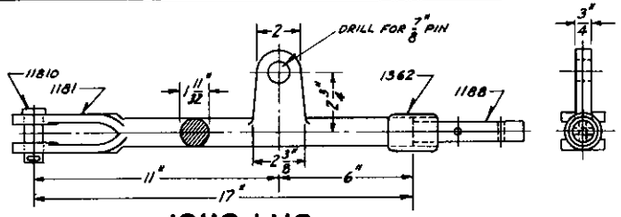
STORES CAT. REF. NO. 2A-1248

SIMILAR TO A.A.R. SIG. SEC. M-1940



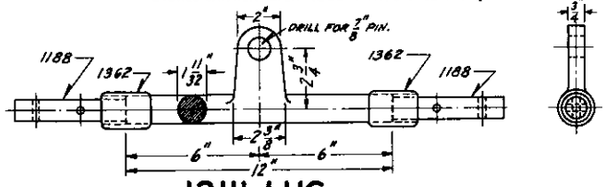
1219 TANG END WITH SCREW JAW

STORES CAT. REF. NO. 2A-1238 A.A.R. SIG. SEC. M-1940.



12112 LUG SAE-1020 STEEL FORGED.

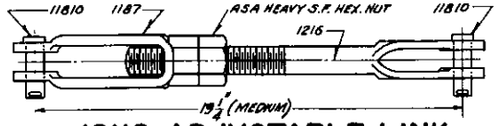
STORES CAT. REF. NO. 2A-5680



12111 LUG SAE-1020 STEEL FORGED.

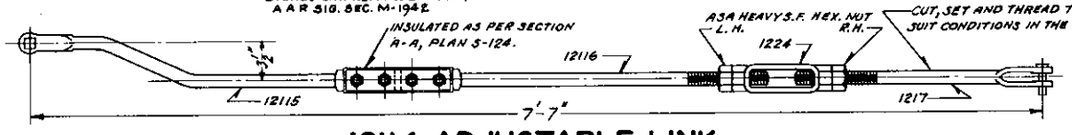
STORES CAT. REF. NO. 2A-1454

A.A.R. SIG. SEC. M-1942



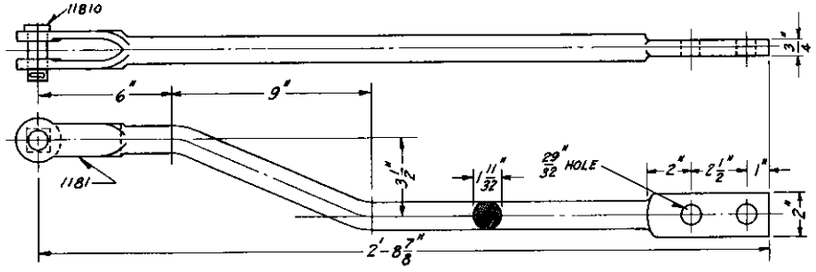
12113 ADJUSTABLE LINK

AAR SIG. SEC. M-1940 STORES CAT. REF. NO. 2A-5681



12114 ADJUSTABLE LINK INSULATED

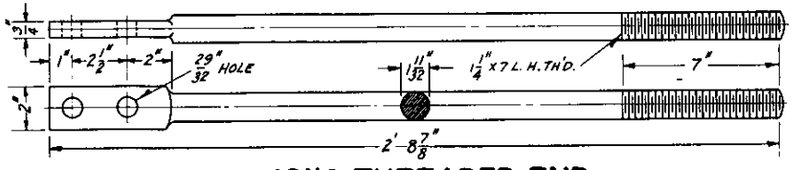
STORES CAT. REF. NO. 2A-5682



12115 OFFSET SOLID JAW

STORES CAT. REF. NO. 2A-5683

SAE-1020 STEEL FORGED.



12116 THREADED END

STORES CAT. REF. NO. 2A-5684

SAE-1020 STEEL FORGED.

REVISIONS

REDRAWN FROM APPROVED DRAWING S-121-A, DATED AUGUST 2, 1920 AND REVISED. FORMER ITEMS 1211, 1212, 1214, 1218 REMOVED FROM DRAWING.

1 SHEET

S-121-B

THE PENNSYLVANIA RAILROAD

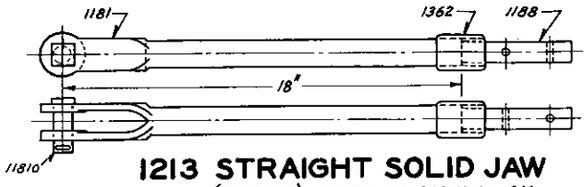
STANDARD

JAWS, LUGS AND LINKS

OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 30, 1948.

Approved H.C. Griffith
Assistant Chief Engineer - T.C. & S.

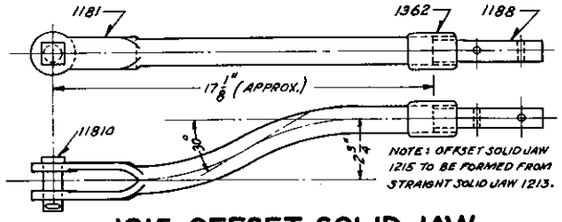
Approved J.T. Emmett
Chief Engineer



1213 STRAIGHT SOLID JAW

(TANG END) STORES CAT. REF. NO. 2A-1246

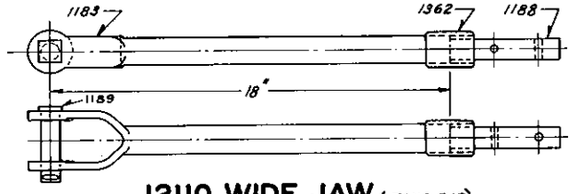
SAE-1020 STEEL FORGED. AAR SIG. SEC. M-1941.



1215 OFFSET SOLID JAW

(TANG END) STORES CAT. REF. NO. 2A-1250

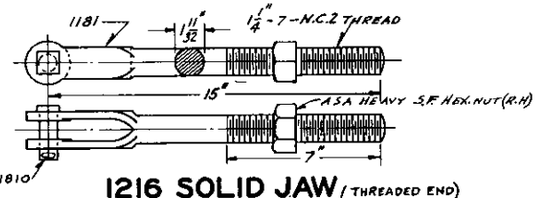
SAE-1020 STEEL FORGED. AAR SIG. SEC. M-1941.



12110 WIDE JAW (TANG END)

STORES CAT. REF. NO. 2A-1254

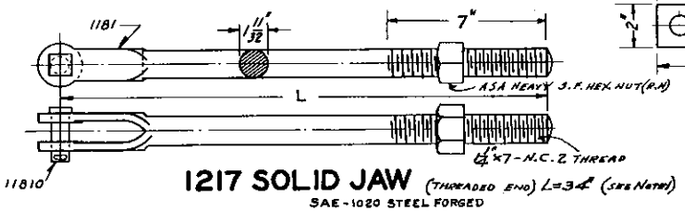
SAE-1020 STEEL FORGED. AAR SIG. SEC. M-1941.



1216 SOLID JAW (THREADED END)

SAE-1020 STEEL FORGED.

STORES CAT. REF. NO. 2A-1247 AAR SIG. SEC. M-1940

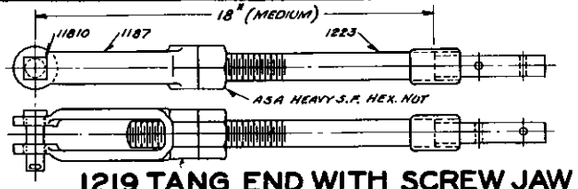


1217 SOLID JAW (THREADED END) L=34" (SEE NOTE 1)

SAE-1020 STEEL FORGED

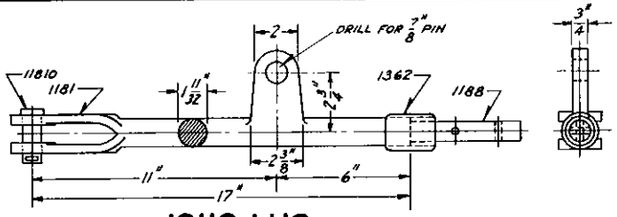
STORES CAT. REF. NO. 2A-1248

SIMILAR TO A.A.R SIG. SEC. M-1940



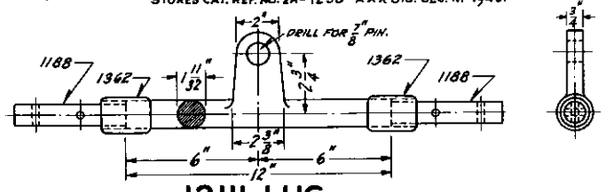
1219 TANG END WITH SCREW JAW

STORES CAT. REF. NO. 2A-1238 A.A.R SIG. SEC. M-1940.



12112 LUG SAE-1020 STEEL FORGED.

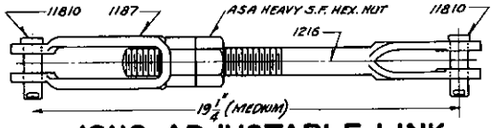
STORES CAT. REF. NO. 2A-5680



12111 LUG SAE-1020 STEEL FORGED.

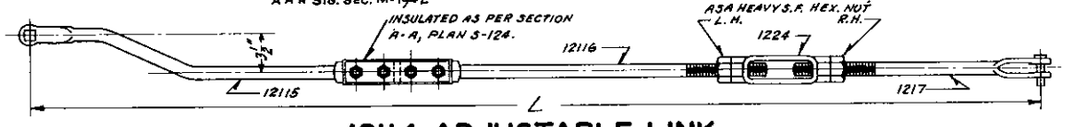
STORES CAT. REF. NO. 2A-1454

A.A.R SIG. SEC. M-1942



12113 ADJUSTABLE LINK

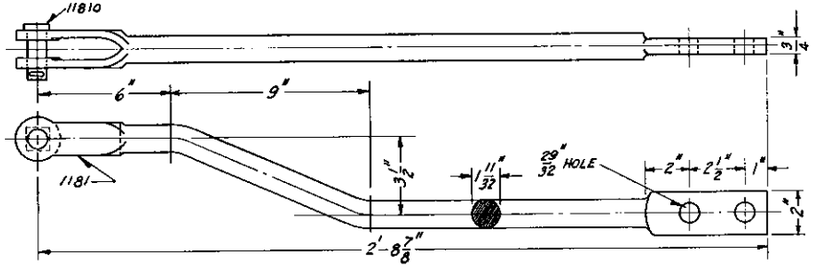
AAR SIG. SEC. M-1940 STORES CAT. REF. NO. 2A-5681



12114 ADJUSTABLE LINK INSULATED

STORES CAT. REF. NO. 2A-5682

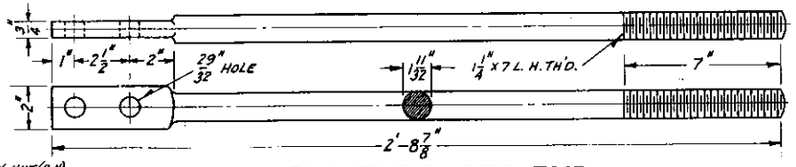
(SPECIFY LENGTH L WHEN ORDERING)



12115 OFFSET SOLID JAW

STORES CAT. REF. NO. 2A-5683

SAE-1020 STEEL FORGED.



12116 THREADED END

STORES CAT. REF. NO. 2A-5684

SAE-1020 STEEL FORGED.

NOTES:

1. IF LENGTH L=34" FOR 1217 WILL NOT SUIT LOCAL CONDITIONS, SPECIFY DESIRED LENGTH WHEN ORDERING.
2. LUBRICATING FITTINGS TO BE FURNISHED WITH PINS 1189 AND 11810.

REVISIONS
REDRAWN FROM APPROVED DRAWING S-121-A, DATED AUGUST 2, 1920 AND REVISED. FORMER ITEMS 1211, 1212, 1214, 1218 REMOVED FROM DRAWING.
C-APRIL 17-1951 THREAD ADDED TO 1217. 1" A.S.A. NUT ADDED TO 1216 AND 1217. LENGTH IN FEET REMOVED FROM 1214 AND L SUBSTITUTED. NOTES 1 AND 2 ADDED.
APPROVED: H. G. Salmonson

1 SHEET

S-121-C

THE PENNSYLVANIA RAILROAD

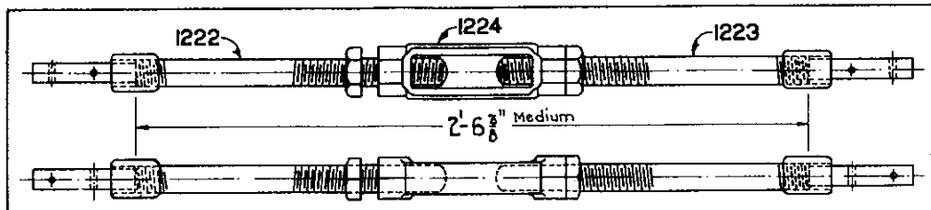
STANDARD

JAWS, LUGS AND LINKS

OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 30, 1948.

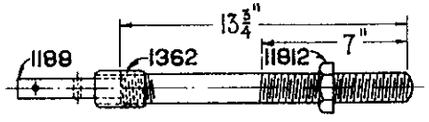
Approved H C Griffith
Assistant Chief Engineer - T.C.&S.

Approved J W Brazier
Chief Engineer



1221-P.A. SCREW COMPLETE

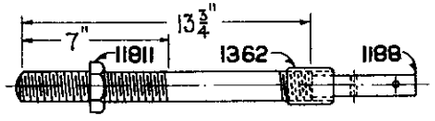
R.S.A. Feb. 1914.



1222-THREADED TANG END

L.H. THREAD

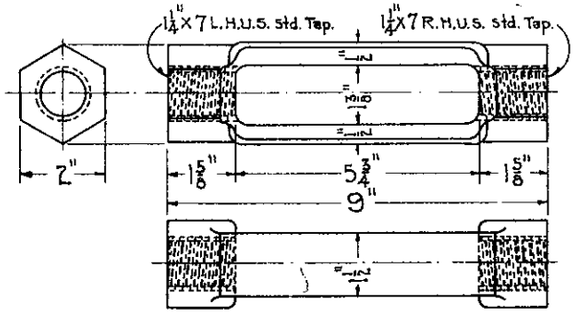
R.S.A. Dec. 1916.



1223-THREADED TANG END

R.H. THREAD

R.S.A. Dec. 1916.



1224-P.A. TURNBUCKLE

FORGED STEEL

R.S.A. Feb. 1914.

REVISIONS

1 SHEET

S-122-A

PENNSYLVANIA SYSTEM

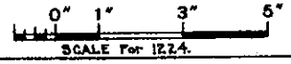
STANDARD

PIPE ADJUSTING SCREW

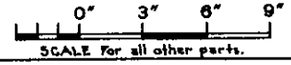
OFFICE OF CHIEF SIGNAL ENGINEER. PHILA., PA., AUGUST 4, 1920.

Correct A.N. Reed
Chief Signal Engineer

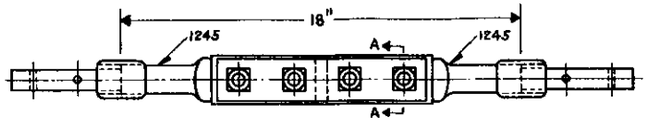
Approved
Chief Engineer



SCALE For 1224.

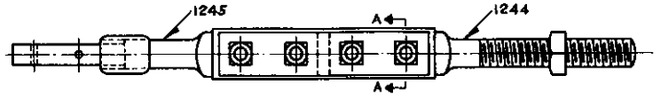


SCALE For all other parts.



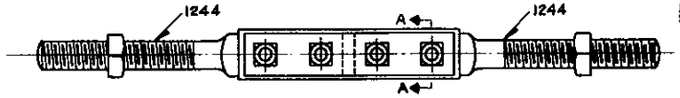
1241 TANG ENDS.

A.R.A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-4150



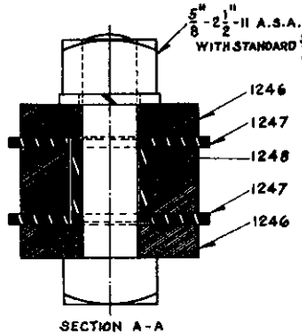
1242 TANG AND THREADED ENDS.

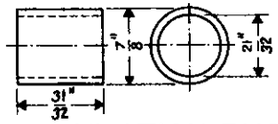
A.R.A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-4151



1243 THREADED ENDS.

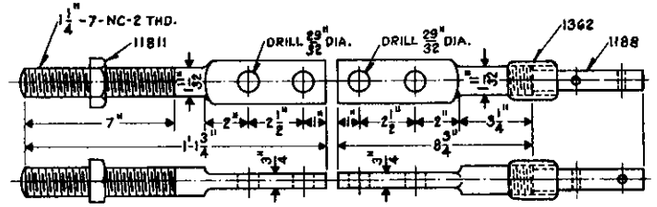
A.R.A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-4152





1248 INSULATION BUSHING.

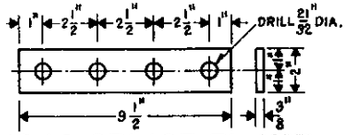
FIBRE.
A.R.A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-4157



1244 THREADED END. 1245 TANG END.

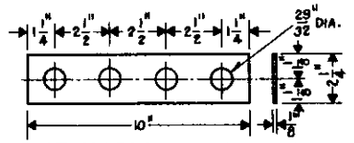
O.H. STEEL.
A.R.A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-4153

O.H. STEEL.
A.R.A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-4154



1246 SPLICE PLATE.

O.H. STEEL.
A.R.A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-4155



1247 INSULATION PLATE.

FIBRE
A.R.A. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2-A-4156

NOTE:
1. FIBRE SHALL BE IN ACCORDANCE WITH A.A.R. SIGNAL SECTION SPECIFICATION NO. 13.

REVISIONS

1 SHEET

S-124-A

THE PENNSYLVANIA RAILROAD

STANDARD

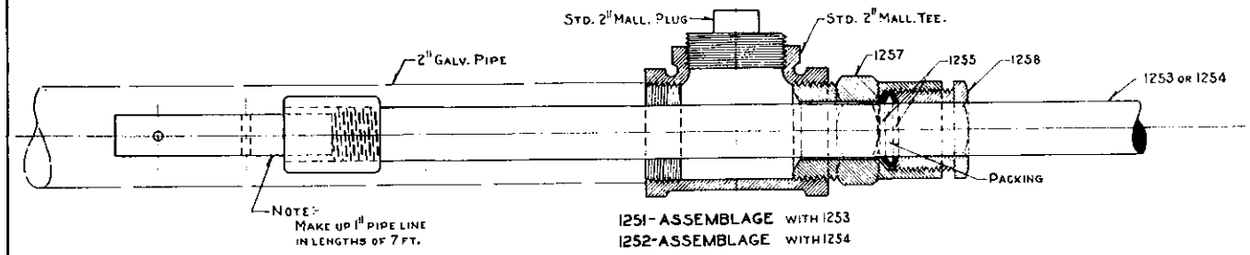
PIPE LINE INSULATION

ONE INCH SIGNAL PIPE

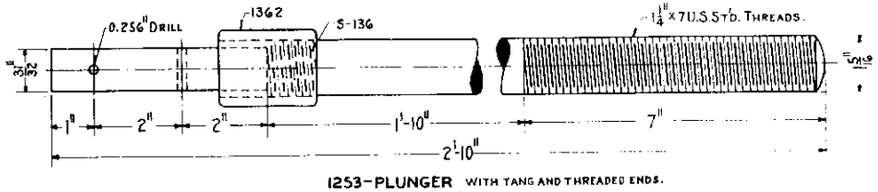
OFFICE OF CHIEF ENGINEER, PHILA., PA., MAY 20, 1940.

Approved
N. C. Stanton
Assistant Chief Engineer-Signals

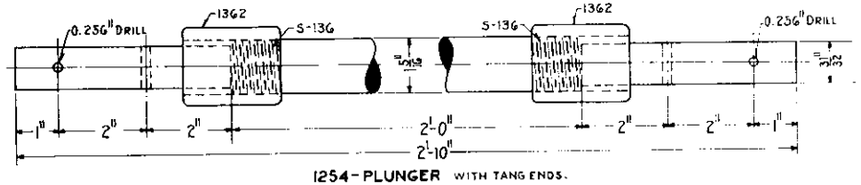
Approved
W. W. Wiggin
Chief Engineer



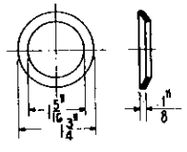
1251 - ASSEMBLAGE WITH 1253
1252 - ASSEMBLAGE WITH 1254



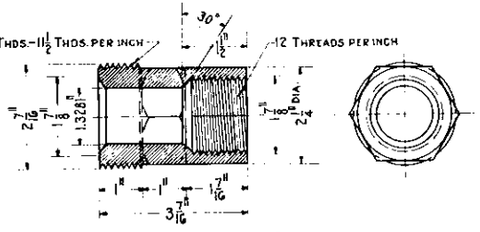
1253 - PLUNGER WITH TANG AND THREADED ENDS.
COLD ROLLED STEEL



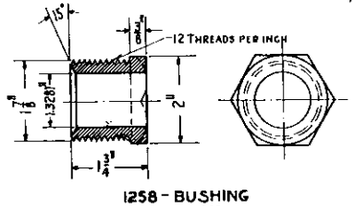
1254 - PLUNGER WITH TANG ENDS.
COLD ROLLED STEEL



1255 - GASKET
LEATHER



1257 - EXTENSION GLAND
MALLEABLE IRON



1258 - BUSHING
CAST BRASS

NOTE:
STUFFING BOXES SHALL NOT BE USED INSIDE OF BUILDINGS.

A.R.A.-M 1926.

REVISIONS.
REDRAWN FROM APPROVED PLAN S-125-A DATED 8-20-26 AND REVISED.
C- FEBRUARY 9, 1928. APPROVED: A.K. Rudd

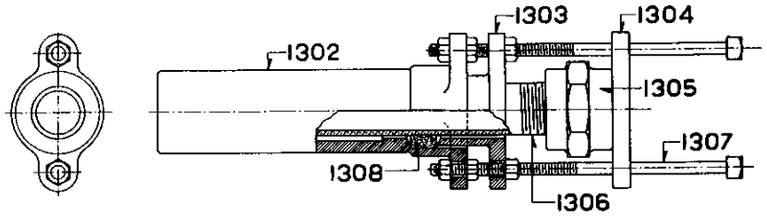
1 SHEET

S-125-C

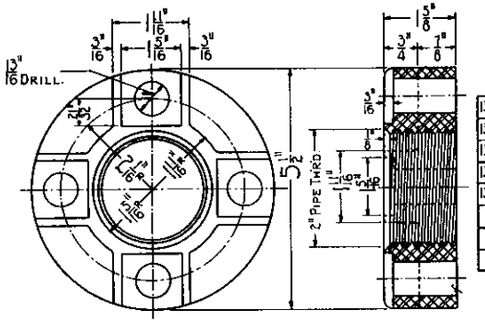
THE PENNSYLVANIA RAILROAD
STANDARD
STUFFING BOX FOR 1" PIPE
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., APR. 20, 1925

Approved
A.K. Rudd
Chief Signal Engineer

Approved
Chief Engr.

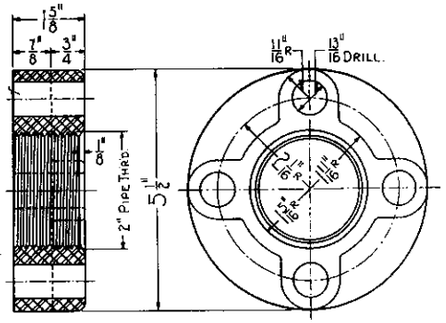


1301–EXPANSION JOINT FOR 2" PIPE.

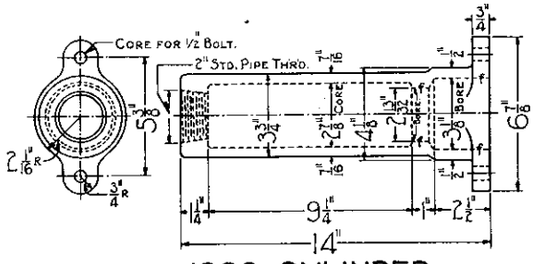


FLANGE UNION ORDERING REFERENCE.	
1309	FLANGE, BOLT HEAD SIDE.
1310	" NUT SIDE.
1311	GASKET.
1312	BOLT.
1313	FLANGE UNION COMPLETE, 1309, 1310, 1311 & 1312

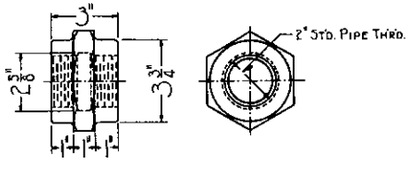
1309–FLANGE.
M.I.



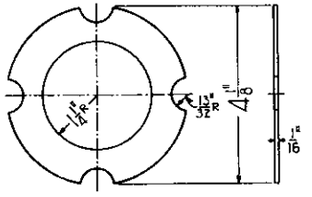
13010–FLANGE
M.I.



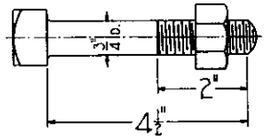
1302–CYLINDER.
C.I.



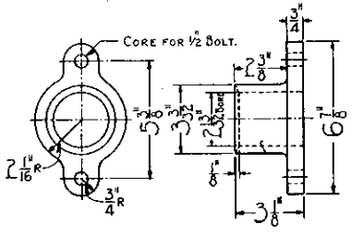
1305–NUT.
C.I.



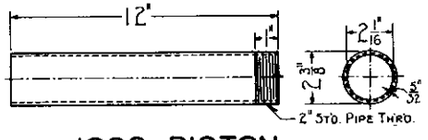
13011–GASKET.
LEAD.



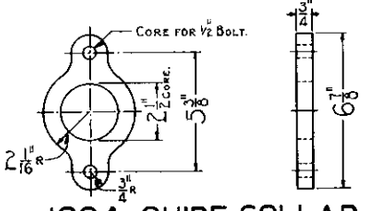
13012–BOLT.
O.H.S.



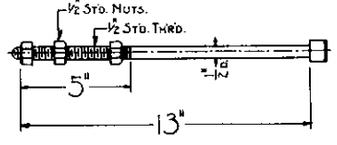
1303–GLAND.
C.I.



1306–PISTON.
BRASS.



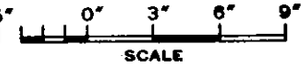
1304–GUIDE COLLAR.
C.I.



1307–GUIDE BOLT.
W.I.

1308–3/8" ASBESTOS PACKING.

SCALE
FOR 1309-13010-13011 & 13012.



SCALE
FOR ALL OTHER PARTS.

REVISIONS.

REDRAWN FROM APPROVED PLANS S-130-A & S-131-A DATED 6-30-21, AND REVISED.

1 SHEET

S-130-B

PENNSYLVANIA SYSTEM

STANDARD

EXPANSION JOINT AND FLANGE UNION

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., AUGUST 2, 1922

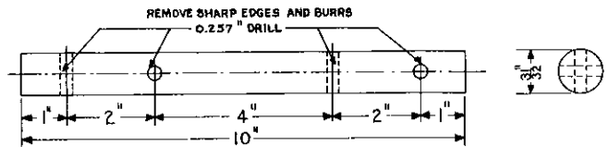
Correct

Chief Signal Engineer

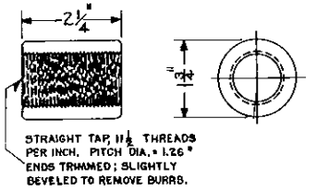
Approved

Chief Engineer

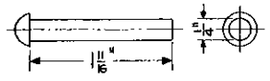
H.E.N.



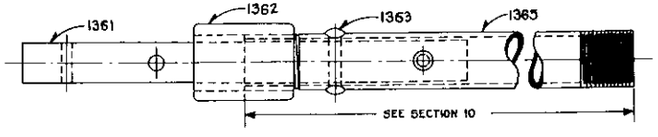
1361 – PLUG



1362 – COUPLING

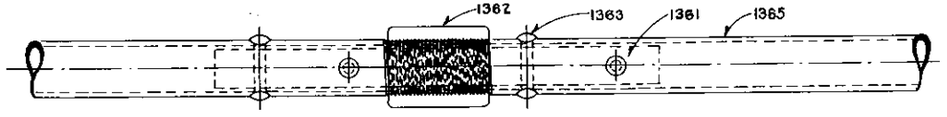


1363 – RIVET

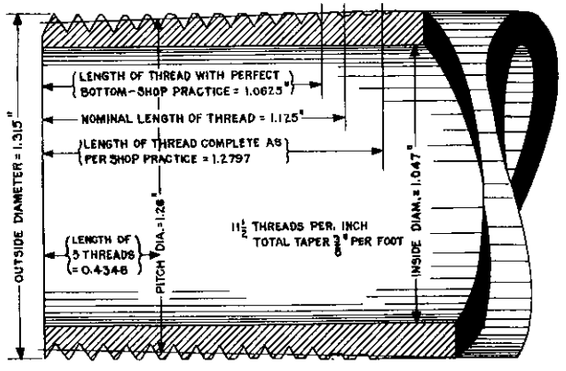


1364 – STANDARD SIGNAL PIPE

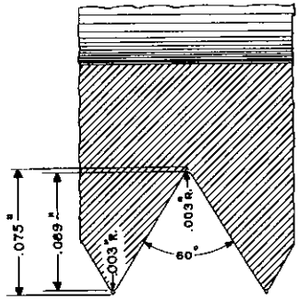
1365 – PIPE ONLY



JOINT ASSEMBLAGE



DETAIL OF THREAD



SECTION OF PERFECT THREAD

NOTE:-
THE OUTSIDE DIAMETER OF THE PIPE (1.315") IS SUCH THAT THEORETICALLY NO PERFECT THREADS WOULD BE MADE.
IN PRACTICE HOWEVER, THE DIE WHEN CUTTING THE THREAD, ROLLS UP THE METAL SUFFICIENTLY TO FORM TWO (2) PERFECT THREADS AT THE END OF THE PIPE; THE OUTSIDE DIAMETER OF A PERFECT THREAD BEING 1.3155".

J.E.R.

SPECIFICATION

1. PURPOSE:
   (a) The purpose of this specification is to provide welded steel pipe for signals and interlocking.
2. DRAWINGS:
   (a) The drawing forms an essential part hereof.
3. CHEMICAL PROPERTIES:
   (a) The steel shall conform to the following requirements as to chemical composition:
   Phosphorus, not more than 0.11 per cent.
   Copper, 0.20 per cent. to 0.35 per cent.
4. PHYSICAL PROPERTIES AND TESTS:
   (a) The steel shall conform to the following minimum requirements as to tensile properties:
   Tensile strength, 50,000 lbs. per sq. in.
   Yield point, 30,000 lbs. per sq. in.
   Elongation in 8 in., 18 per cent.
   (b) The yield point shall be determined by the drop of the beam of the testing machine.
   (c) Weights, dimensions and hydrostatic pressure shall be as follows:

Pipe	
External	1.315"
Internal	1.047"
Thickness	0.134"
Weight per ft.	1.712 lbs.
Hydrostatic pressure	700. lbs.
Coupling	
External	1.750"
Length	2.250"
Weight	0.688 lbs.

   (d) The outside diameter (Section 4-c) at any point shall not vary more than 1/64 in. from the size specified.
   (e) The inside diameter (Section 4-c) of all pipe must be large enough to receive a steel plug 63/64 inch in diameter for a distance of 6 in.
   (f) The weight of the pipe and couplings (Section 4-c) shall not vary more than 5 per cent. from that specified.
   (g) The pipe shall be tested at the mill to the hydrostatic pressure specified in Section 4-c.
   (h) A sufficient length of pipe shall stand being bent through 90 deg. around a cylindrical mandrel the diameter of which is 12 times the nominal diameter of the pipe, without developing cracks at any portion and without opening the weld.
   (i) A piece of pipe 1 ft. long will be selected at random and be subjected to a flattening test by hammering the piece until the opposite sides are within the thickness of the wall from each other; the piece shall show no cracks in the steel except at the weld.
   (j) Specimens:
      1. Test specimens shall consist of sections cut from a pipe.
      2. Tension test specimens shall be longitudinal.
      3. All specimens shall be tested cold.
   (k) One of each of the tests specified in Section 4 may be made on a length in each lot of 500 or less. Each length shall be subjected to the hydrostatic test.
   (l) If the results of the tests of any lot do not conform to the requirements specified, retests of two additional pipes shall be made, each of which shall conform to the requirements specified.
   (m) Contractor shall give the Purchaser sufficient notice of time when material will be ready for testing.
   (n) Contractor shall provide, at point of production, apparatus and labor for making the required tests under supervision of the Purchaser.
   (o) If tests are to be made at point of production, it shall be so stated. Purchaser will distinctly indicate which of the tests herein specified are to be made and what portion of the material shall be tested.
5. ENDS:
   (a) Ends of pipe must be cut square and two holes drilled 0.257 inch in diameter for two ¼ in. rivets on one end only; first rivet hole shall be drilled 2 in. from the end and the second 2 in. from this and at right angles to it.
6. THREADS:
   (a) Each length of pipe shall have a thread 1⅛ in. long, ⅜ in. total taper per ft., 11½ slightly rounded top and bottom "V" threads to the inch. The threaded portion of the pipe shall be of such diameter as to permit the coupling to be screwed on five turns by hand, with a permissible variation of one turn either way.
7. COUPLINGS:
   (a) Each length of threaded pipe shall be provided with one coupling faced at ends, tapped straight through, having clear cut threads and of such pitch diameter as to make a tight joint. Couplings shall be made of wrought iron or steel.
8. PLUGS:
   (a) Plugs shall be open hearth steel, 10 in. long, 31/32 inch in diameter, drilled 0.257 inch in diameter, for four ¼ in. rivets spacing to be 1 in., 2 in., 4 in., 2 in. and 1 in., the first and third holes to be in the same plane and the second and fourth holes at right angles thereto.
9. RIVETS:
   (a) Rivets must be made of soft iron or steel ¼ inch in diameter and 1-11/16 in. long.
10. LENGTHS:
   (a) The pipe shall be in random lengths of 16 ft. to 22 ft. ("Jointers," which are two pieces coupled together, will be rejected.)
11. MATERIAL AND WORKMANSHIP:
   (a) Material and workmanship shall be first-class in every respect.
12. INSPECTION:
   (a) Purchaser may inspect the material at all stages of manufacture.
   (b) Purchaser may inspect the completed product to determine that the requirements of this specification have been met.
   (c) If the material has not been accepted at point of production and if, upon arrival at destination, it does not meet the requirements of this specification, it may be rejected, and the Contractor, upon request, shall advise the Purchaser what disposition is to be made of the defective material. The Contractor shall pay all freight charges.
   (d) If Purchaser is to make inspection at point of production, it shall be so stated.

REVISIONS
REDRAWN FROM APPROVED PLAN S-136-A, DATED, SEPT. 20, 1920 AND REVISED.

1 SHEET

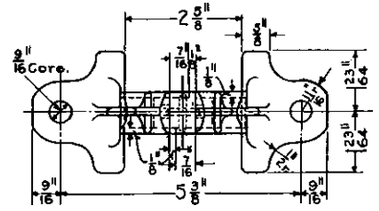
S-136-B

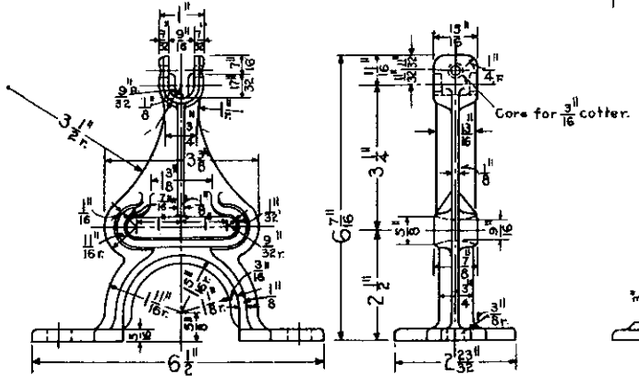
THE PENNSYLVANIA RAILROAD
STANDARD
PIPE
FOR SIGNALS AND INTERLOCKING

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., OCTOBER 18, 1926

Approved _____ Chief Signal Engineer

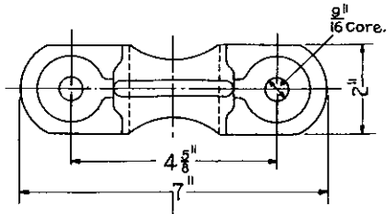
Approved _____ Chief Engineer

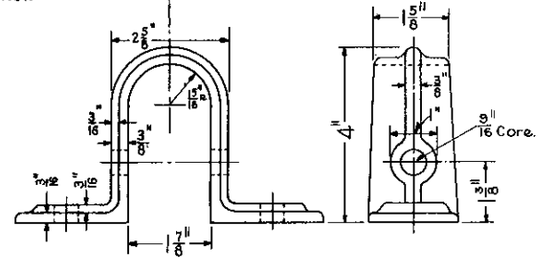




1381 – PIPE CARRIER SIDE

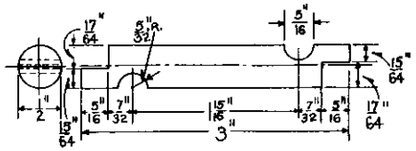
MALL. I.





1382 – STAND

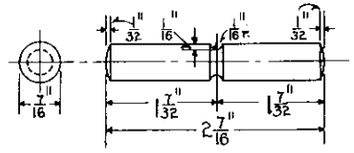
MALL. I.



1383 – TOP ROLLER PIN

O.H. STEEL

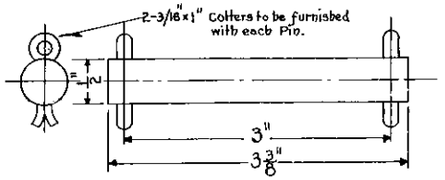
R.S.A.M-1925



1384 – BOTTOM ROLLER PIN

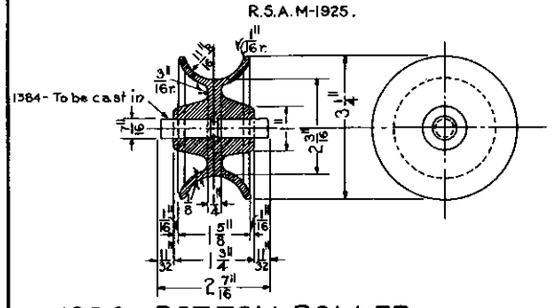
O.H. STEEL.

R.S.A.M-1925



1385 – PIN

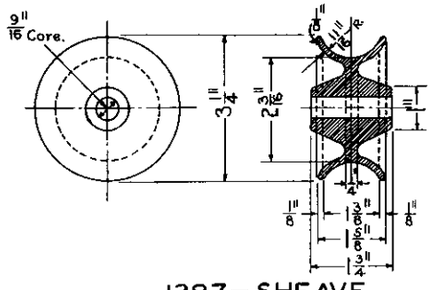
C.R. STEEL



1386 – BOTTOM ROLLER

CAST IRON

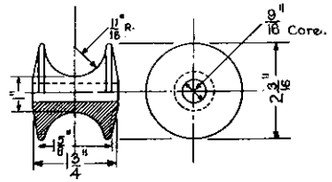
R.S.A.M-1925.



1387 – SHEAVE

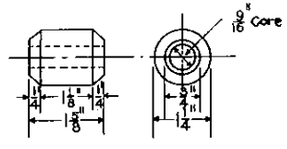
CAST IRON

R.S.A. Dec. 1913



1388 – ROLLER

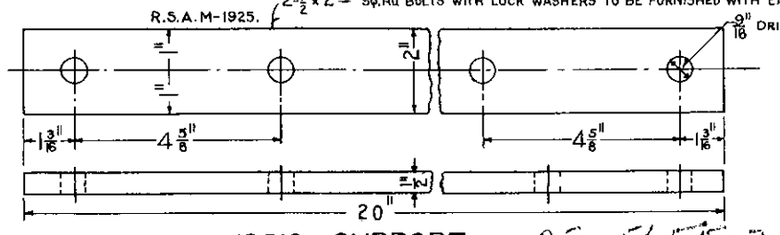
CAST IRON



1389 – TOP ROLLER

CAST IRON

R.S.A.M-1925



13810 – SUPPORT

O.H. STEEL

02-J65503

J.E.R.

REVISIONS.
REDRAWN FROM APPROVED PLAN S-138-B, DATED 8-20-20 LAST REVISED 4-9-25 AND REVISED.
D. MAY 22, 1930. APPROVED:

1 SHEET

S-138-D

THE PENNSYLVANIA RAILROAD

STANDARD

PIPE CARRIER PARTS

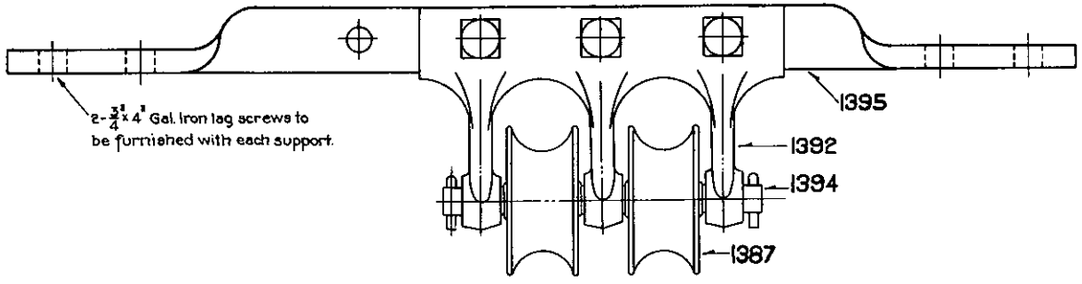
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., NOV. 26, 1926

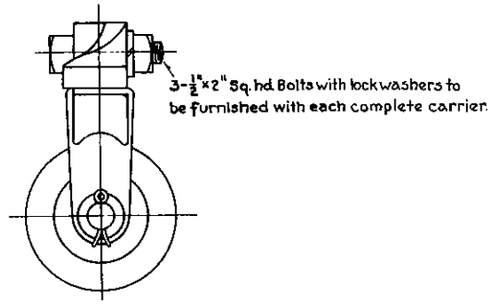
Approved

Chief Signal Engineer

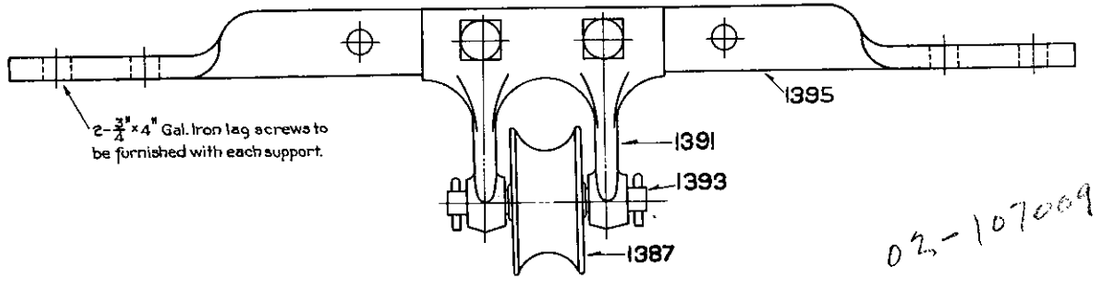
Approved

Chief Engineer

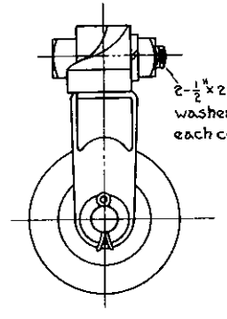




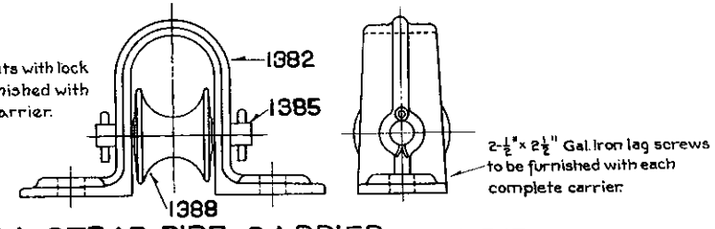
1401- TRANSVERSE PIPE CARRIER TWO-WAY COMPLETE



02-107069

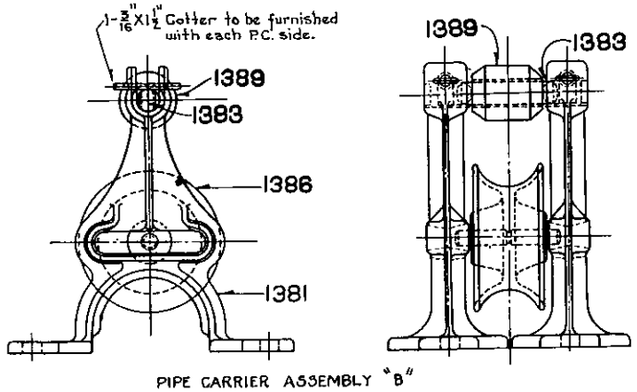


1402- TRANSVERSE PIPE CARRIER ONE-WAY COMPLETE



1404-STRAP PIPE CARRIER COMPLETE

02-107311



PIPE CARRIER ASSEMBLY "B"

REVISIONS
B. NOV. 26, 1928 APPROVED: A.H. Rudd
C. MAY 22, 1930 APPROVED: A.H. Rudd

1 SHEET

S-140-C

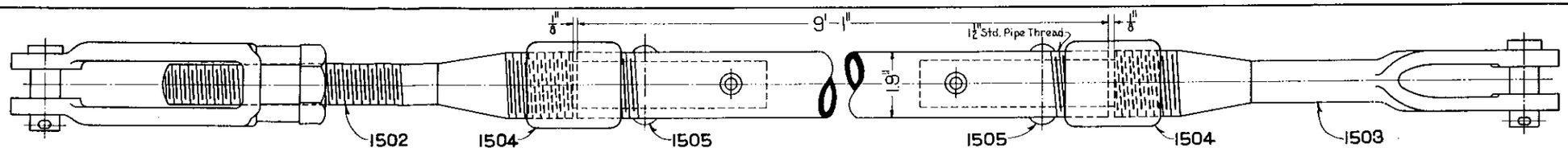
THE PENNSYLVANIA RAILROAD
STANDARD
PIPE CARRIERS

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., MAY 24, 1920

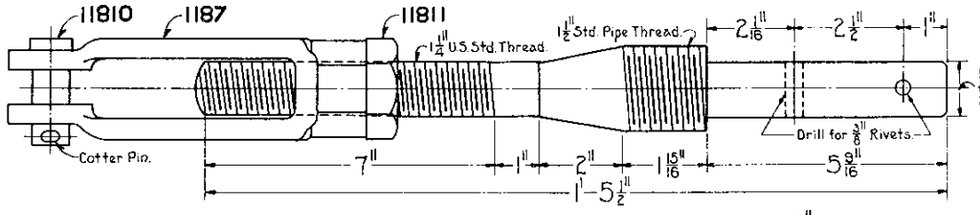
Correct
A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer

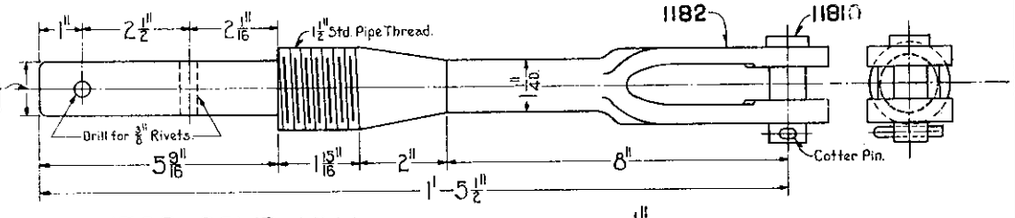
E.&P. 2000 8-15-31



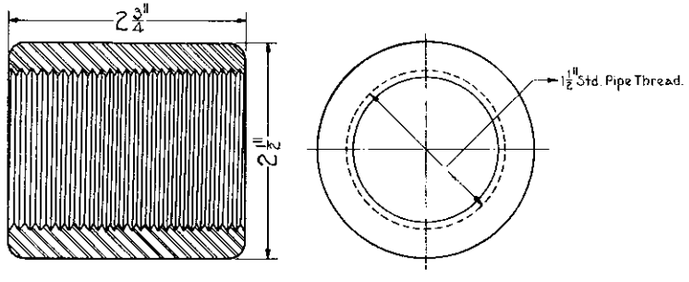
1501—DOWN ROD COMPLETE FOR ROCKING SHAFT & VERTICAL CRANK LEADOUTS.
STEEL OR WROUGHT PIPE.



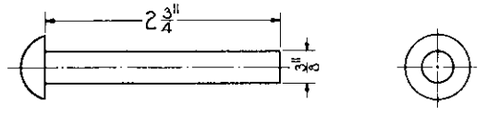
1502—SCREW JAW COMPLETE TANGED FOR 1½" STD. PIPE.
FORGED STEEL.



1503—SOLID JAW COMPLETE TANGED FOR 1½" STD PIPE.
FORGED STEEL.



1504—COUPLING.
WROUGHT IRON.



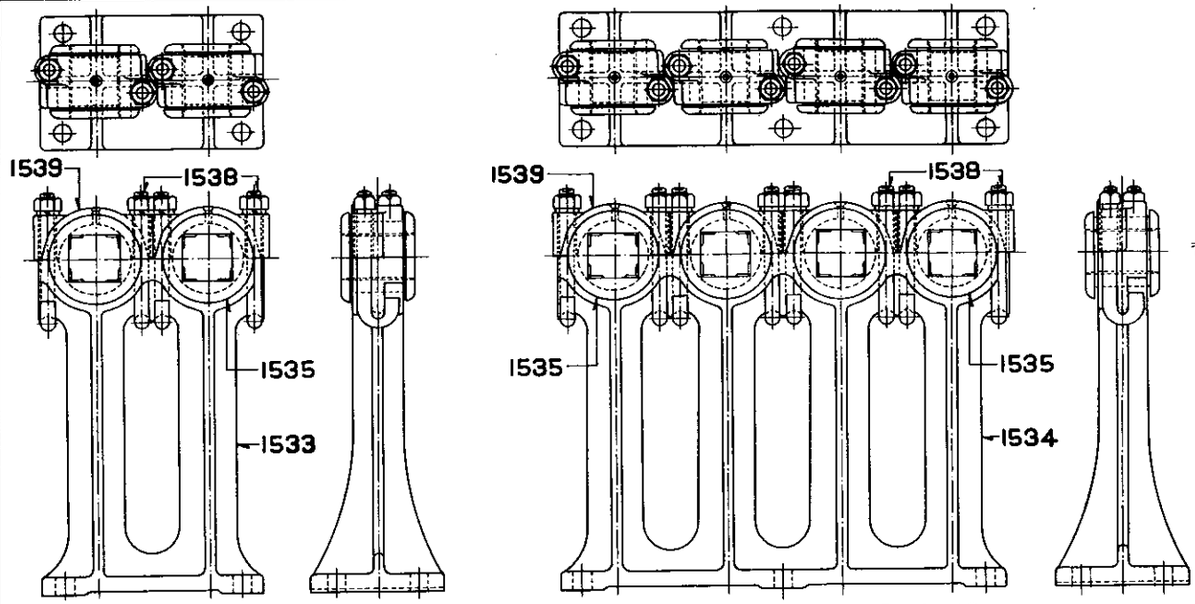
1505—RIVET.
SOFT IRON.

NOTE:-
CONNECT SCREW JAW TO TAIL LEVER OF MACHINE

REVISIONS.
8-MARCH 15-1926.
APPROVED:-

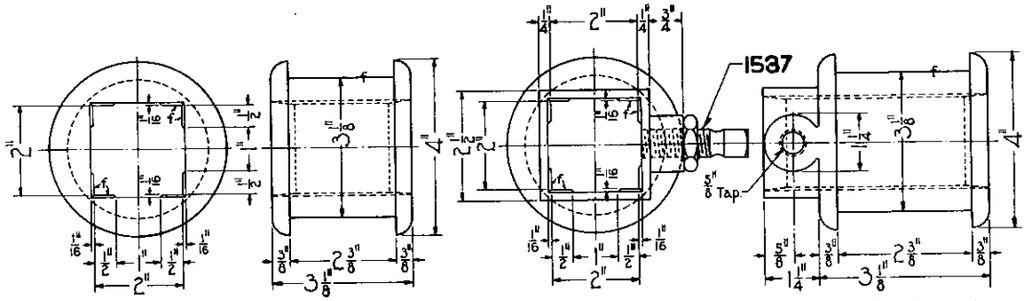
1 SHEET S-150-B

THE PENNSYLVANIA RAILROAD
STANDARD
DOWN ROD
FOR ELECTRO-MECHANICAL INTERLOCKING MACHINES
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., NOV. 1, 1920.
Correct
Chief Signal Engineer
Approved
Chief Engineer



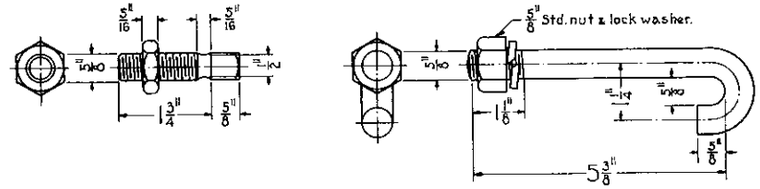
1531—TWO-WAY BEARING COMPLETE.

1532—FOUR-WAY BEARING COMPLETE.



1535—PLAIN JOURNAL.
Malleable Iron.

1536—THRUST JOURNAL.
Malleable Iron.

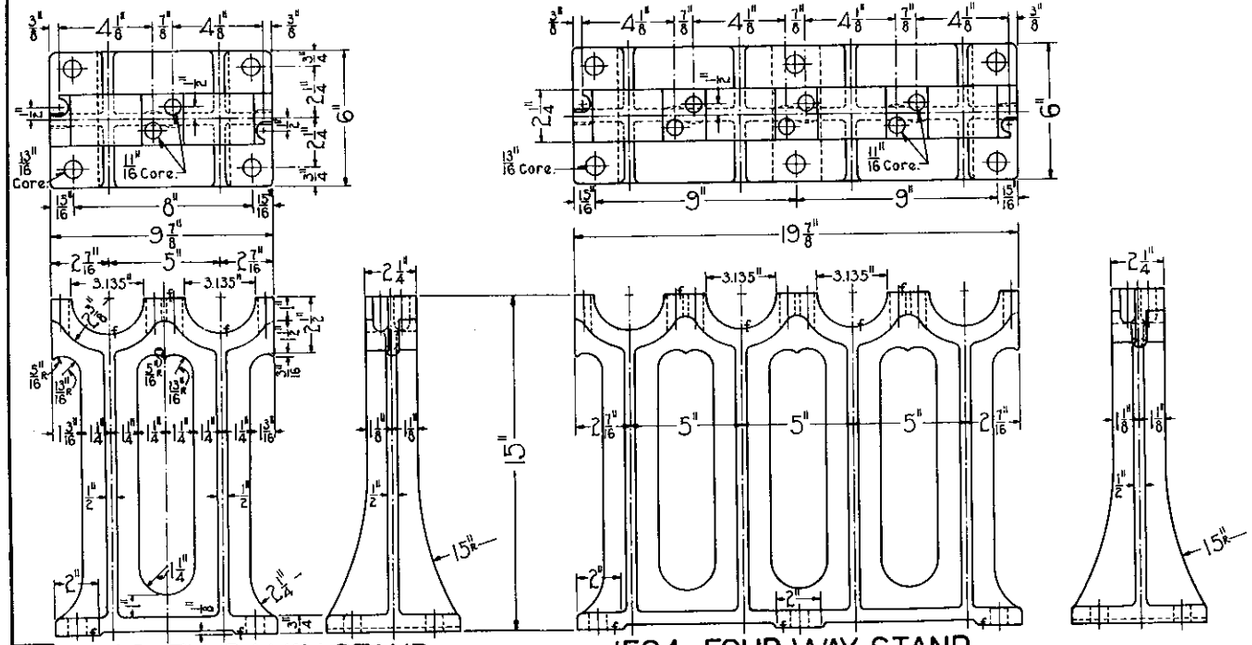


1537—SET SCREW.

1538—HOOK BOLT.

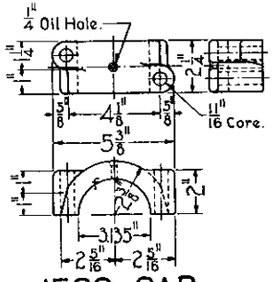
R.S.A. Dec. 1912.

REVISIONS.



1533—TWO-WAY STAND. c.i.

1534—FOUR-WAY STAND. c.i.



1539—CAP.
Cast Iron.

USE TABLE FOR ORDERING COMPLETE BEARINGS.

Order No.	Name.	Required.
1531	2-Way Bearing complete as shown.	1-1533, 2-1539, 4-1538 and 2-1535.
15310	2-Way Bearing complete with Thrust Journal.	1-1533, 2-1539, 4-1538 and 2-1536.
1532	4-Way Bearing complete as shown.	1-1534, 4-1539, 8-1538 and 4-1535.
15320	4-Way Bearing complete with Thrust Journal.	1-1534, 4-1539, 8-1538 and 4-1536.

0" 3" 6" 9"
SCALE
For 1531-1532-1533-1534 & 1539.

0" 1" 3" 5"
SCALE
For all other parts.

1 SHEET

S-153-A

PENNSYLVANIA SYSTEM

STANDARD

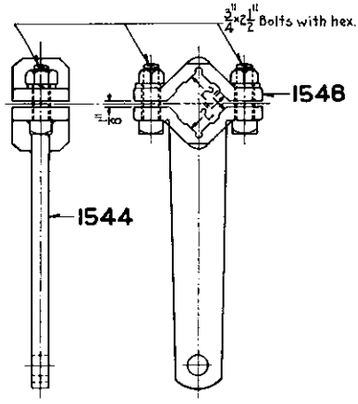
BEARINGS AND PARTS

ROCKER SHAFT

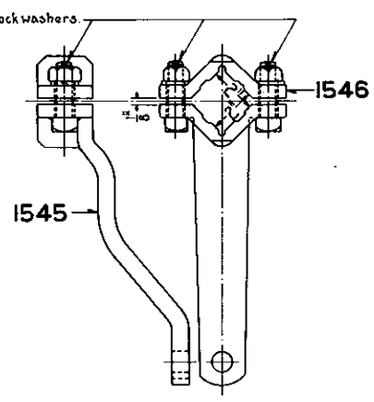
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., SEPT. 2, 1921.

Correct
Chief Signal Engineer.

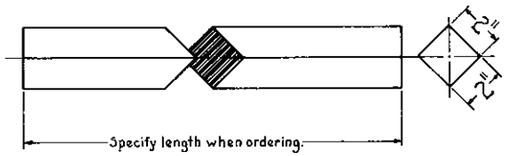
Approved
Chief Engineer.



1541—STRAIGHT ARM COMPLETE.



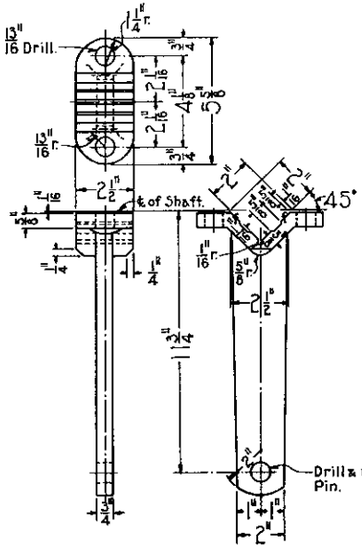
1542—BENT ARM COMPLETE.

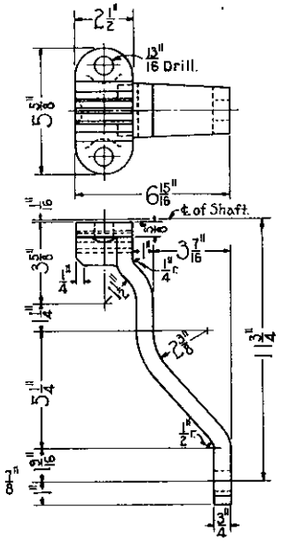


1543—SHAFT.
C. R. S.
R.S.A. Dec. 1912.

Note:-
Hot rolled steel may be used if of exact dimensions.
Maximum distance between arms on Rocker Shaft not to exceed 12'.

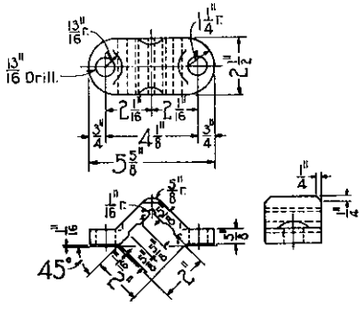
02-E12.506





1544—STRAIGHT ARM. 1545—BENT ARM.

1544-1545-1546 to be Mild Steel Forgings



1546—CAP.

R.S.A. Oct. 1912.
REVISIONS.

1 SHEET S-154-A

PENNSYLVANIA SYSTEM

STANDARD

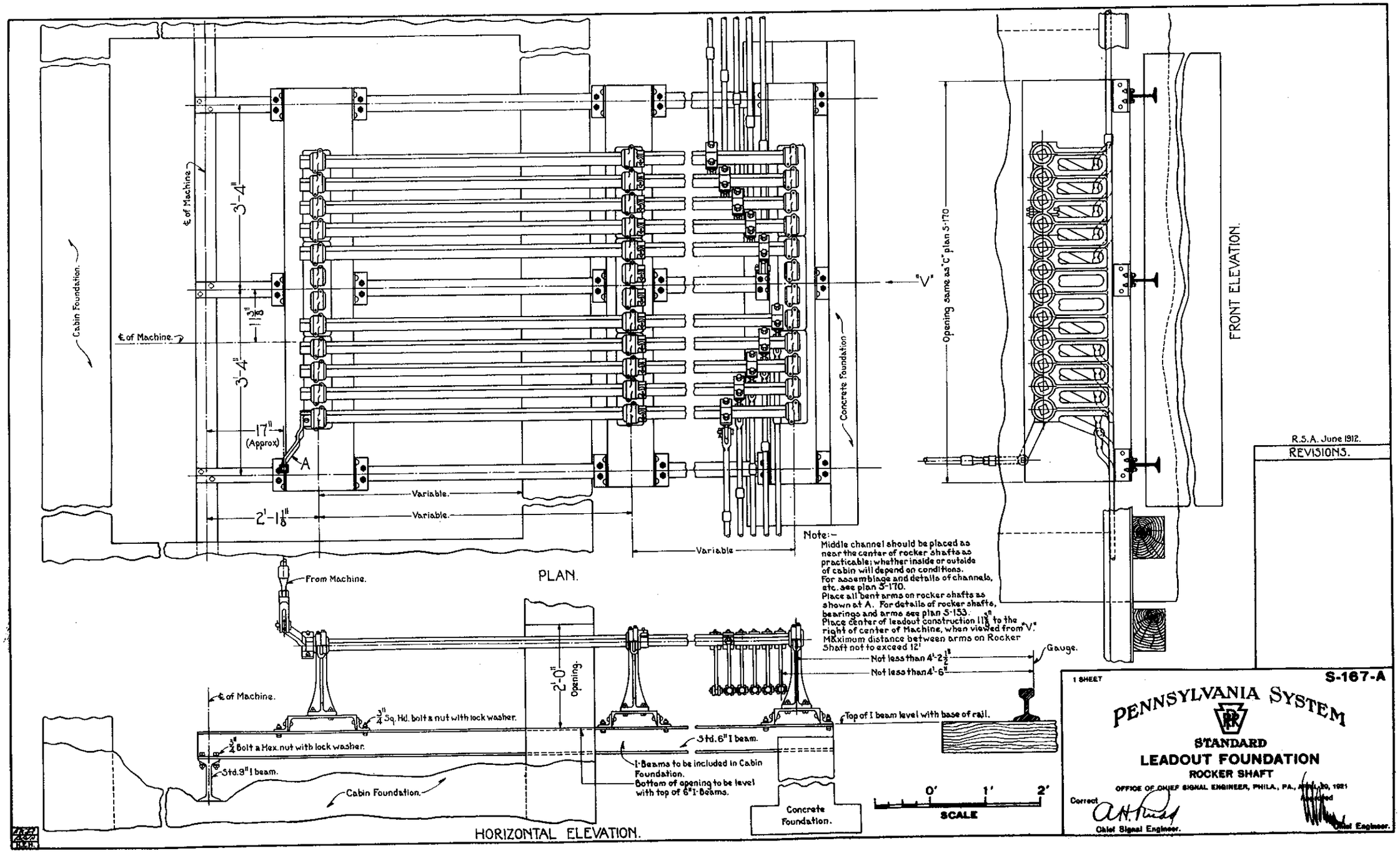
ROCKER SHAFT AND ARMS

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., SEPT. 2, 1921.

Correct
Chief Signal Engineer.

Approved
Chief Engineer

0" 3" 6" 9"
SCALE



Note:-
Middle channel should be placed as near the center of rocker shafts as practicable; whether inside or outside of cabin will depend on conditions.
For assemblage and details of channels, etc. see plan S-170.
Place all bent arms on rocker shafts as shown at A. For details of rocker shafts, bearings and arms see plan S-153.
Place center of leadout construction 1 1/8" to the right of center of Machine, when viewed from "V".
Maximum distance between arms on Rocker Shaft not to exceed 12'

R.S.A. June 1912.

REVISIONS.

1 SHEET

S-167-A

PENNSYLVANIA SYSTEM

STANDARD

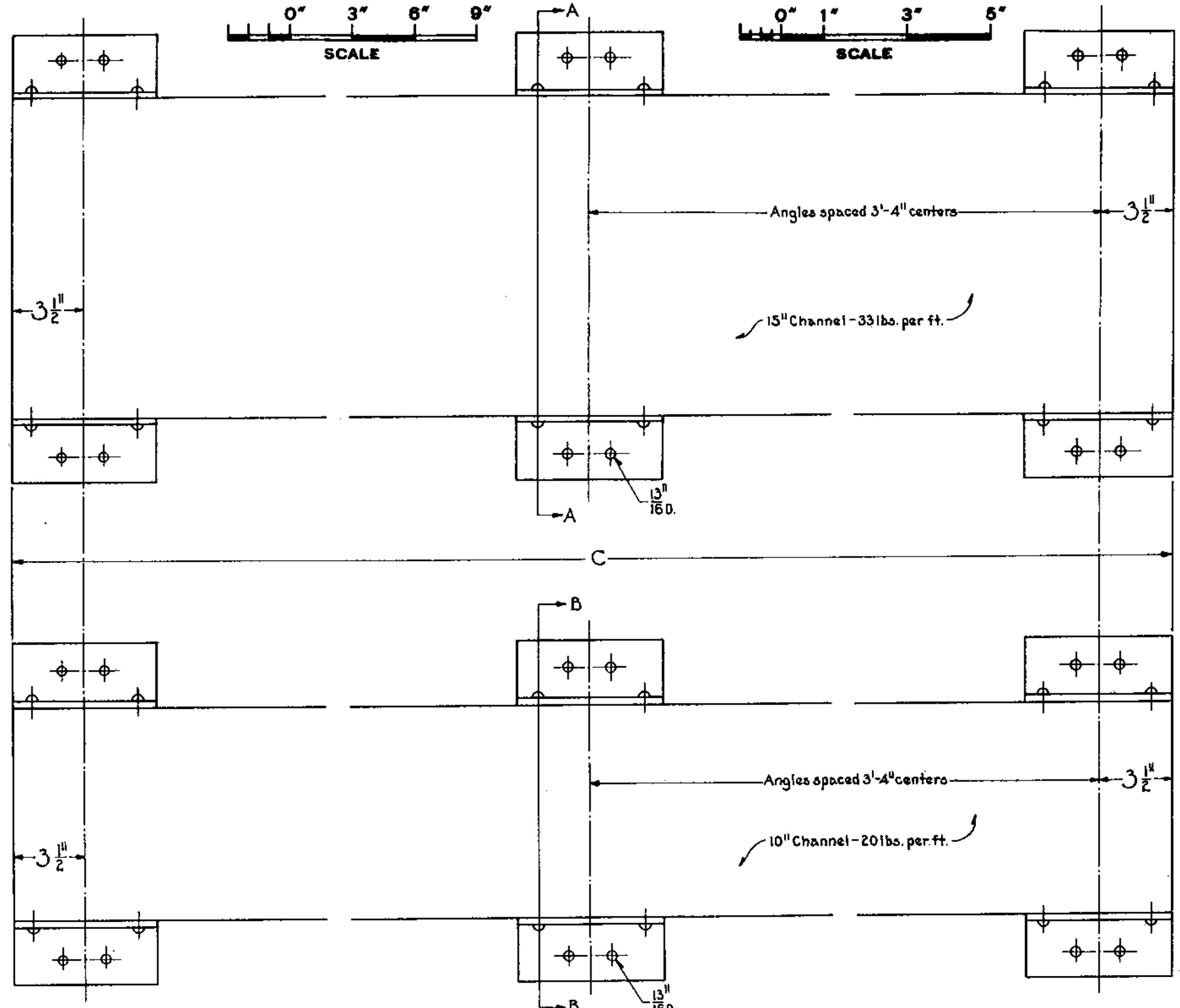
LEADOUT FOUNDATION

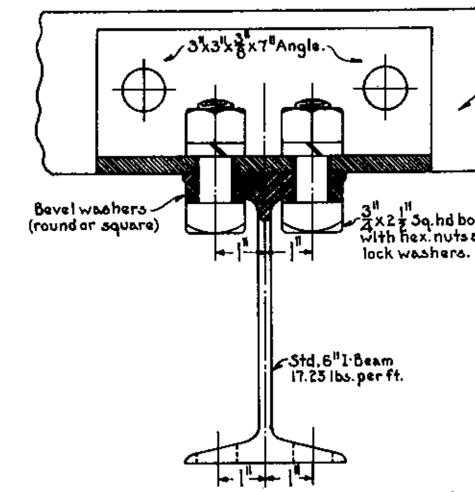
ROCKER SHAFT

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., APRIL 30, 1921

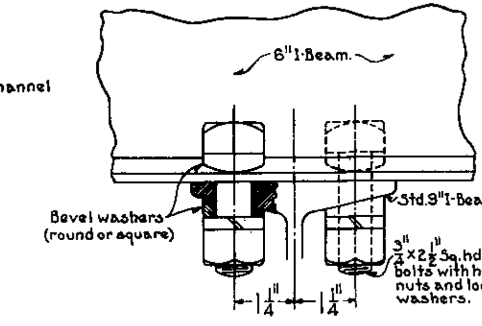
Correct
A.N. Lucas
Chief Signal Engineer.

Approved
Chief Engineer.





METHOD OF SECURING CHANNELS TO 6" I-BEAMS.



METHOD OF SECURING 6" I-BEAM TO 9" I-BEAM.

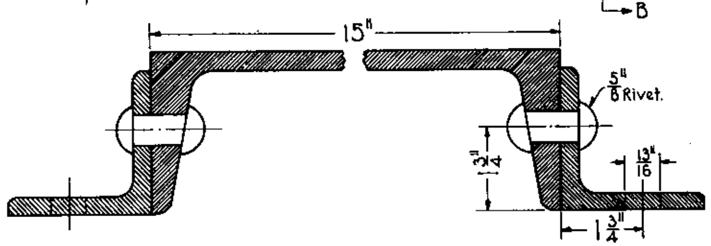
CHANNEL LENGTHS.		
Machine No. of levers	C	Angles 3"x3"x3/8"x7" (for each channel.)
8	3'-11"	4
12	7'-3"	6
16-20	10'-7"	8
24-28	13'-11"	10
32-36	17'-3"	12
40-48-52	23'-11"	16
56-60	27'-3"	18

ASSEMBLAGE.						
Machine.	6" I	∠	10" C	15" C	5/8" Rivets	3/4" Sq. Hd. Bolts.
8	2	12	2	1	24	28
12	3	18	2	1	36	42
16-20	4	24	2	1	48	56
24-28	5	30	2	1	60	70
32-36	6	36	2	1	72	84
40-48-52	8	48	2	1	96	112
56-60	9	54	2	1	108	126

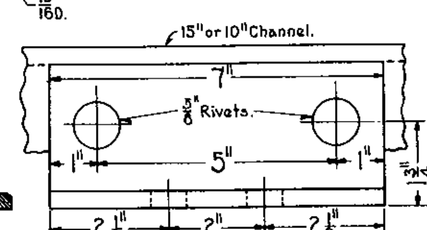
Note:- Each bolt shall be provided with hex. nut, lock washer and special bevel washer.

R.S.A. June 1912.

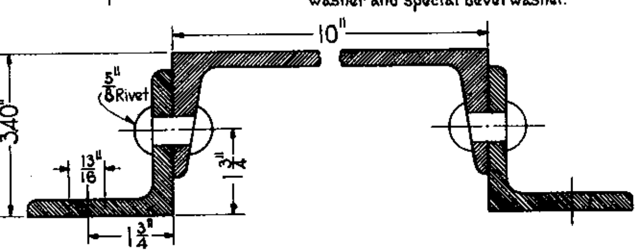
REVISIONS.



SECTION THRU A-A.



METHOD OF SECURING ANGLES TO CHANNELS.



SECTION THRU B-B.

1 SHEET

S-170-A

PENNSYLVANIA SYSTEM

STANDARD

LEADOUT FOUNDATION PARTS

FOR ROCKER SHAFT LEADOUT

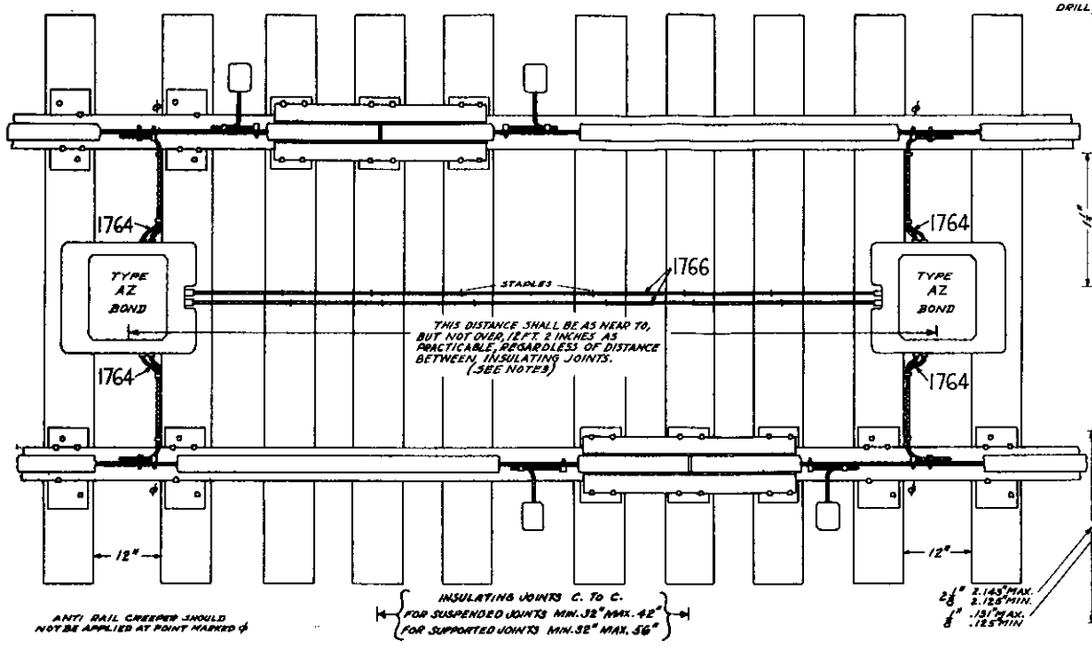
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., APRIL 29, 1921

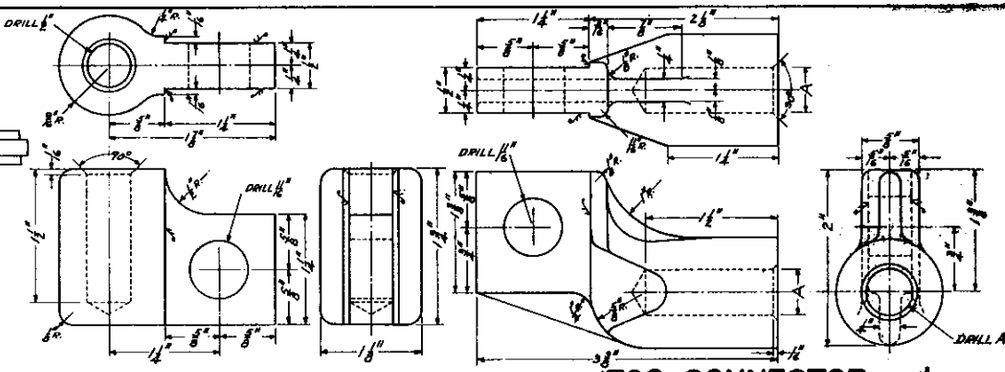
Correct

Chief Signal Engineer.

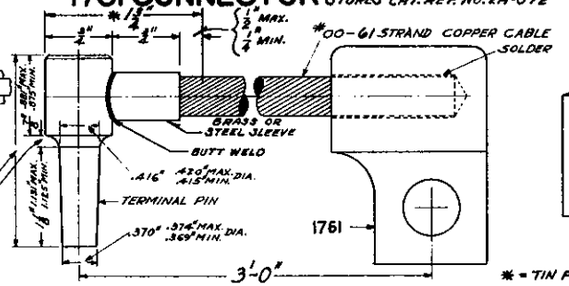
Approved

Chief Engineer.



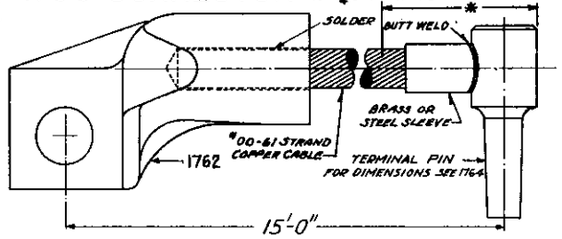


1761-CONNECTOR STORES CAT. REF. NO. 2A-572

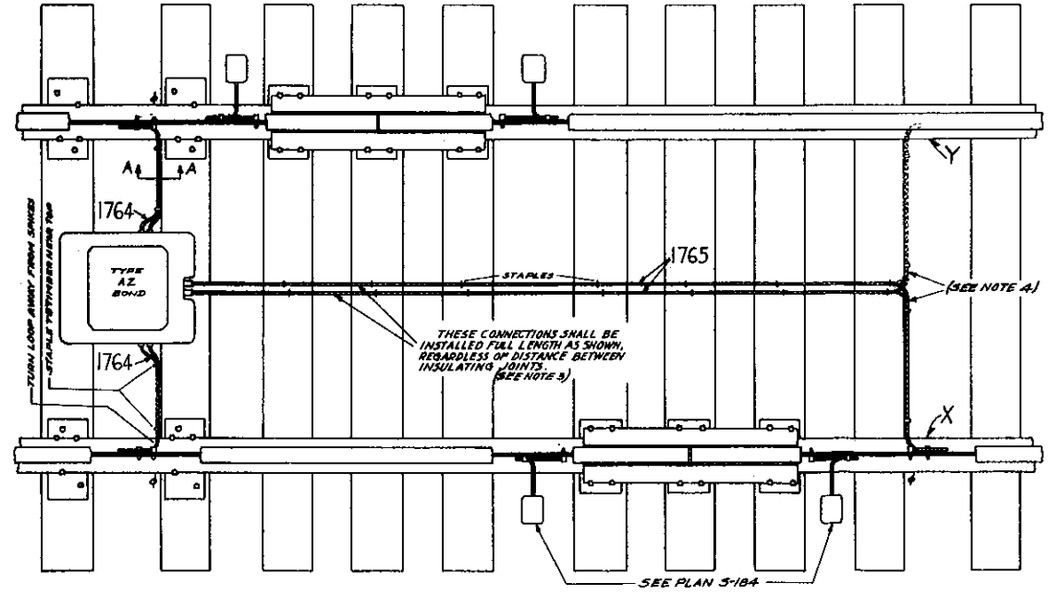


1762-CONNECTOR
1763-CONNECTOR

A = 1" DIA. STORES CAT. REF. NO. 2A-574
A = 3/4" DIA. STORES CAT. REF. NO. 2A-575.

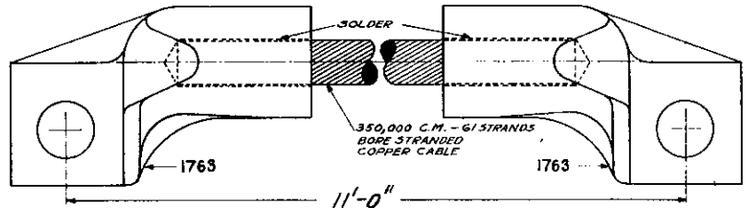


* = TIN PLATE OR GALVANIZE.



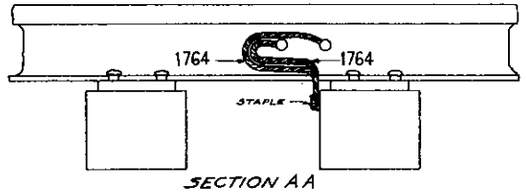
1764-CONNECTION
STORES CAT. REF. NO. 2A-555

1765-CONNECTION
STORES CAT. REF. NO. 2A-596



1766-CONNECTION
STORES CAT. REF. NO. 2A-577

1. CONNECTORS 1761, 1762 AND 1763 SHALL BE MADE OF CAST BRASS TINNED ALL OVER WITH HARD SOLDER.
2. WHERE APPLICABLE, TERMINAL PINS, WELDING AND GALVANIZING SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS SHOWN ON CURRENT ISSUE OF PLAN S-179.
3. WHEN INSTALLING SUFFICIENT SLACK MUST BE LEFT IN CONNECTIONS 1764 AND 1766 TO PREVENT STRAIN ON CONNECTORS.
4. CONNECT 1765 TO RAIL X WHEN X IS POWER RETURN RAIL.
" 1765 " " Y " Y " " " " ".



SECTION AA

REVISIONS
B - MAY 31, 1938 C.O. APPROVED N. C. Stanton
C - APRIL 25, 1942 C.O. APPROVED N. C. Stanton THE FOLLOWING CHANGES MADE:- COPPER CABLE IN CONNECTIONS 1764 & 1765 FORMERLY 37 STRAND. USE OF BRASS FOR SLEEVES AT THE WELD ON TERMINAL PINS ADDED REF. TO C. TO C. OF JOINTS CHANGED. NOTE 2 CHANGED

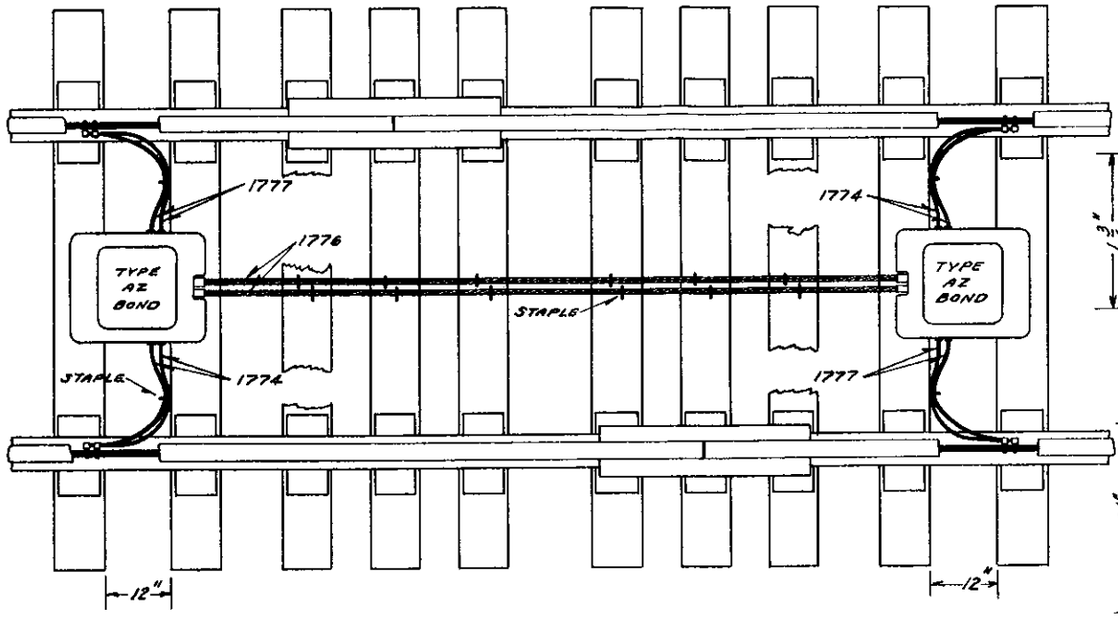
1 SHEET

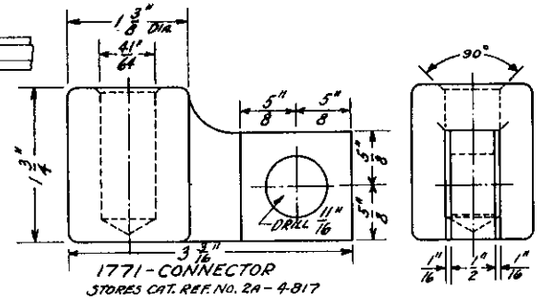
S-176-C

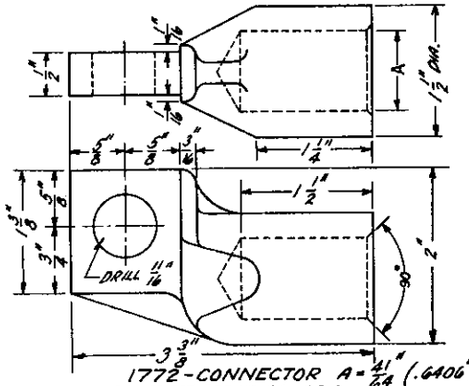
THE PENNSYLVANIA RAILROAD
STANDARD
LAYOUT
FOR TYPE AZ IMPEDANCE BONDS
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., MAY 4, 1937

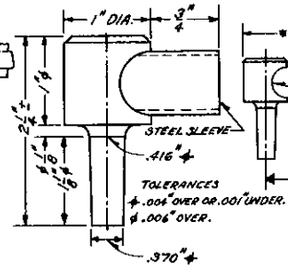
Approved
Chief Signal Engineer

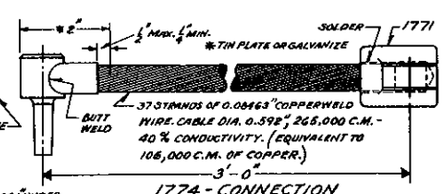
Approved
Chief Engineer

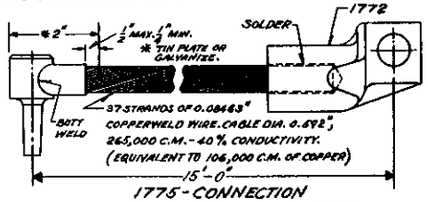


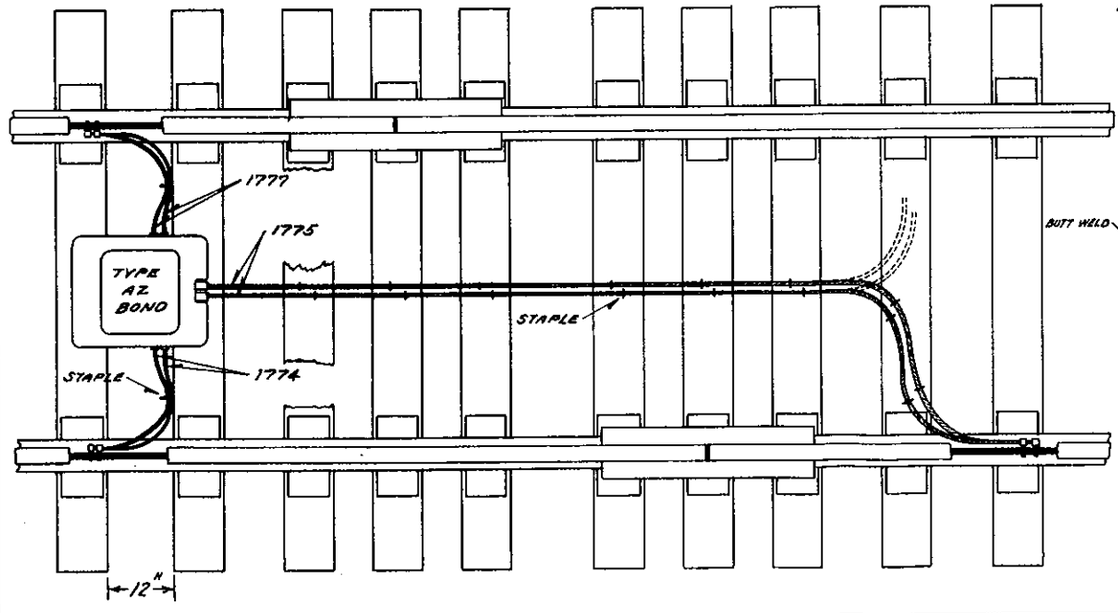


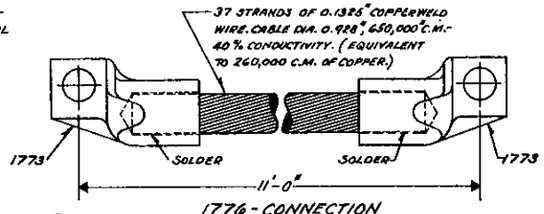


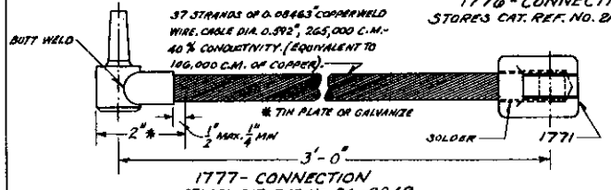












NOTE:-

1. CONNECTIONS SHOWN ON THIS PLAN FOR USE ONLY IN TERRITORY WHERE THEFT IS PREVALENT.
2. FOR ADDITIONAL INFORMATION SEE PLAN NO. S-176.
3. WHERE APPLICABLE, TERMINAL PINS, WELDING AND GALVANIZING SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATIONS SHOWN ON CURRENT ISSUE OF PLAN NO. S-179.
4. CONNECTORS 1771, 1772 & 1773 SHALL BE MADE OF CAST BRASS AND TINNED ALL OVER WITH HARD SOLDER.
5. STEEL SLEEVE SHOWN AT JUNCTION OF CABLE AND TERMINAL ON 1774, 1775 & 1777 MAY BE OMITTED IF NOT REQUIRED BY MANUFACTURER.

REVISIONS

B- AUGUST 10, 1942. C.O.

APPROVED. W. C. Brown
THE FOLLOWING CHANGES WERE MADE: DETAILS OF CONNECTORS AND CONNECTIONS ADDED. STORES CAT. REF. NOS. SHOWN IN NOTES 3, 4 & 5 ADDED.

ISSUED FOR TRIAL INSTALLATIONS

1 SHEET

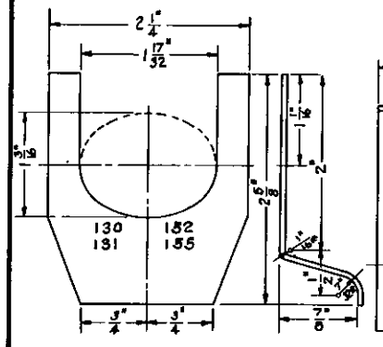
S-177-B

THE PENNSYLVANIA RAILROAD

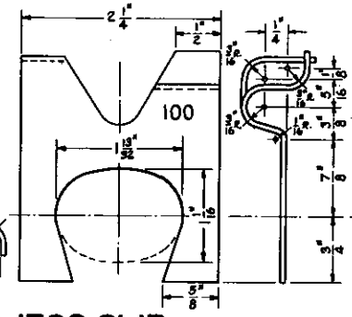
LAYOUT

FOR TYPE AZ IMPEDANCE BONDS

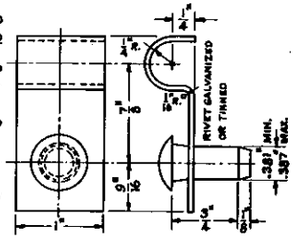
OFFICE OF CHIEF ENGINEER, PHILA., PA., NOV. 15, 1939.



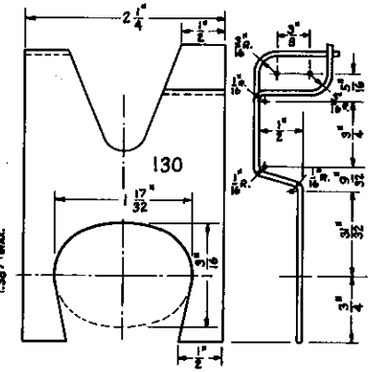
1781 CLIP FOR 130# P.S. RAIL (L-3 BAR), 131# R.E., 152# P.S., & 155# P.S. RAIL.
STORES CAT. REF. NO. 2A- (SEE SKETCH "C")



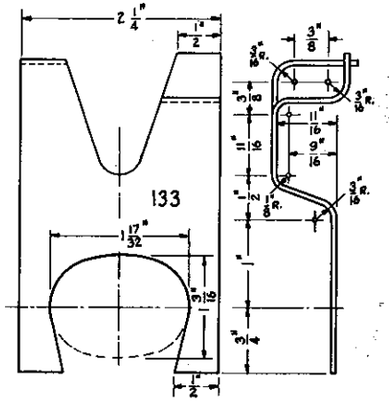
1782 CLIP FOR 100# P.S. RAIL
STORES CAT. REF. NO. 2A-5602



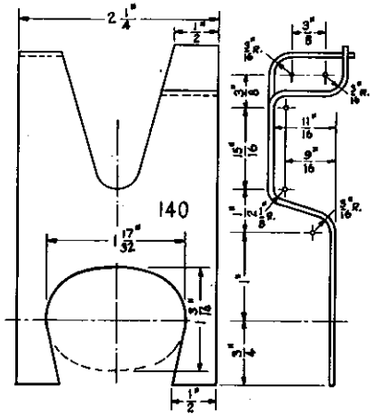
1783 CLIP COMPLETE
STORES CAT. REF. NO. 2A-5603



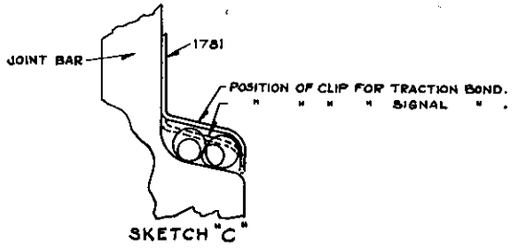
1784 CLIP FOR 130# P.S. RAIL
STORES CAT. REF. NO. 2A-5604



1787 CLIP FOR 133# R.E. RAIL
STORES CAT. REF. NO. 2A-5607



1789 CLIP FOR 140# P.S. RAIL
STORES CAT. REF. NO. 2A-5609



SKETCH "C"

NOTES:-

1. ALL CLIPS SHALL BE MADE OF #15 U.S. STD. GAGE SHEET STEEL.
2. AFTER STAMPING AND FORMING, ALL CLIPS SHALL BE GALVANIZED IN ACCORDANCE WITH A.S.T.M. SPECIFICATION A93-38T.
3. FOR IDENTIFICATION PURPOSES, ALL CLIPS, EXCEPT 1783, SHALL BE STAMPED PLAINLY IN THE METAL AT THE POSITION INDICATED WITH THE WEIGHT OF RAIL. CLIP 1781 TO BE USED WITH 130 LB. RAIL WHERE L-3 JOINT BARS ARE APPLIED, OTHERWISE USE CLIP 1784.
4. CLIP 1785 IS FOR USE, WHEN REQUIRED, TO HOLD BOND WIRES AGAINST WEB OF RAIL.

CLIPS 1782, 1783 & 1784 FORMERLY SHOWN ON PLAN S-179-K, SHEET 1 AND CHANGED TO PROVIDE BETTER FIT.
CLIPS 1781, 1787 & 1789 ADDED.
NOTES AND STORES CAT. REF. NUMBERS ADDED. DWG. S-179-K OBSOLETE.

1 SHEET

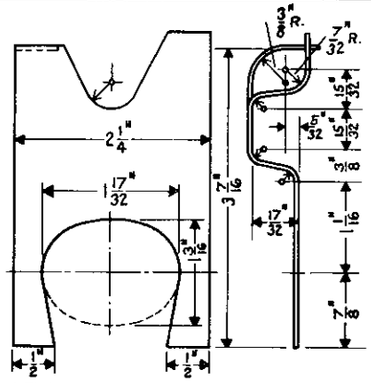
S-178-A

THE PENNSYLVANIA RAILROAD
STANDARD
RAIL BOND CLIPS

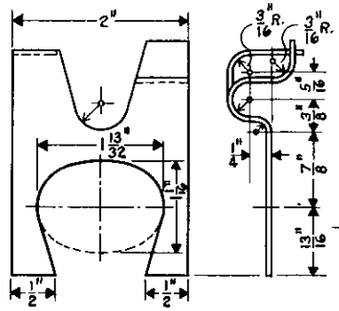
OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 17, 1947.

Approved H C Griffith
Assistant Chief Engineer - T, C & S.

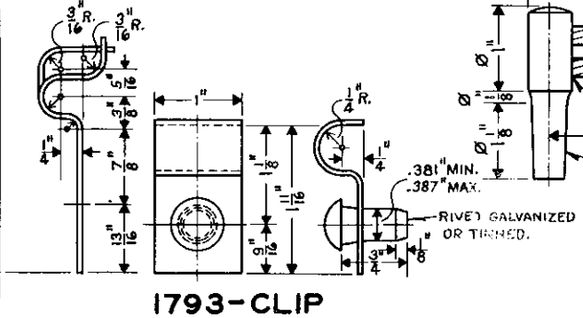
Approved J T Emmett
Chief Engineer



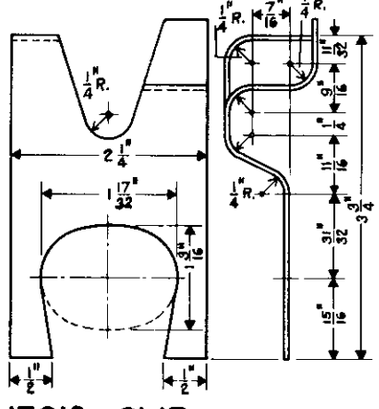
1791 – CLIP FOR 130 LB. P.S. RAIL.
NO. 15 B.W.G. GAL. STEEL.



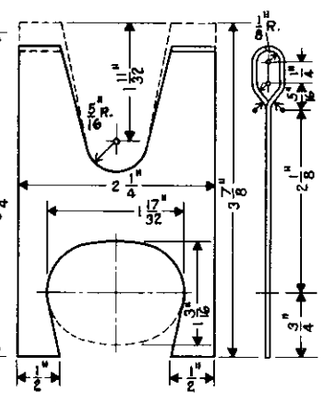
1792 – CLIP FOR 100 LB. RAIL.
NO. 15 B.W.G. GAL. STEEL.



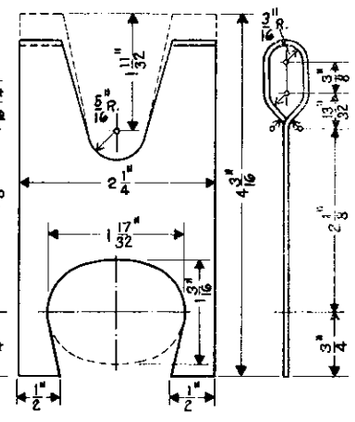
1793 – CLIP
NO. 13 B.W.G. GAL. STEEL.



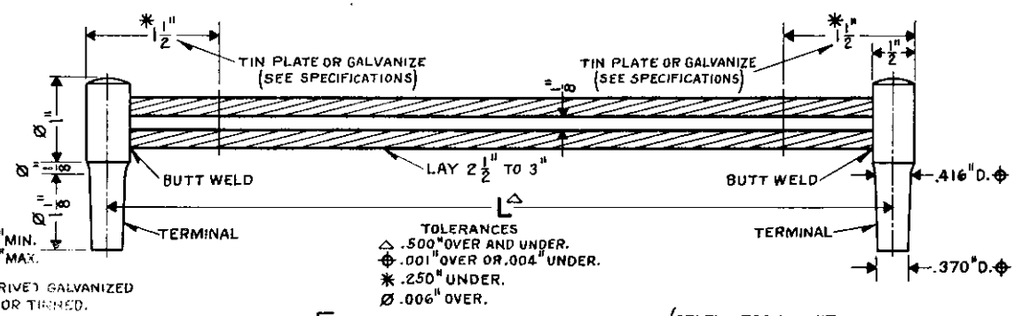
17910 – CLIP FOR 130 LB. P.S. RAIL.
NO. 15 B.W.G. GAL. STEEL.
(FOR USE WITH A.C. TRACTION RAIL BOND.)



17911 – CLIP FOR 131 AND 152 LB. P.S. RAIL.
NO. 15 B.W.G. GAL. STEEL



17912 – CLIP FOR 131 & 152 LB. P.S. RAIL.
NO. 15 B.W.G. GAL. STEEL.
(FOR USE WITH A.C. TRACTION RAIL BOND.)



FOR 24" JOINT BAR	1794 – RAIL BOND	L = 34"	(STEEL STRANDS WITH CENTER STRAND COPPER)
	1795 – " "	L = 34"	(COPPER COVERED STRANDS)
FOR 26" JOINT BAR	1796 – " "	L = 40"	(STEEL STRANDS WITH CENTER STRAND COPPER)
	1797 – " "	L = 40"	(COPPER COVERED STRANDS)
FOR 38½" JOINT BAR	1798 – " "	L = 48"	(STEEL STRANDS WITH CENTER STRAND COPPER)
	1799 – " "	L = 48"	(COPPER COVERED STRANDS)

REVISIONS

REDRAWN FROM APPROVED PLAN S-179-J, DATED OCTOBER 23, 1931 AND REVISED.

FOR SPECIFICATIONS SEE SHEET NO. 2.

S-179-K

THE PENNSYLVANIA RAILROAD

STANDARD

RAIL BONDS AND CLIPS

OFFICE OF ASSISTANT CHIEF ENGINEER-SIGNALS, PHILA., PA., NOV. 4, 1937.

Approved
N. L. Strachan
Assistant Chief Engineer-Signals

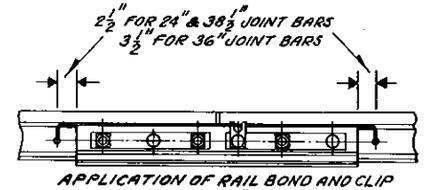
Approved
W. W. Atterbury
Chief Engineer

SPECIFICATION.

1. PURPOSE.
   (a) THE PURPOSE OF THIS SPECIFICATION IS TO PROVIDE REQUIREMENTS FOR RAIL BONDS AND RAIL BOND CLIPS FOR RAILWAY SIGNALLING TRACK CIRCUITS.
2. MATERIAL AND WORKMANSHIP.
   (a) MATERIAL AND WORKMANSHIP SHALL BE FIRST CLASS IN EVERY RESPECT.
3. DESIGN.
   (a) GENERAL CONSTRUCTION AND DIMENSIONS OF RAIL BONDS AND RAIL BOND CLIPS SHALL BE IN ACCORDANCE WITH CURRENT ISSUE OF DWG. S-179.
4. CONDUCTORS.
   (a) CONDUCTORS FOR RAIL BONDS 1794, 1796 AND 1798 SHALL CONSIST OF ONE ANNEALED COPPER WIRE SURROUNDED BY SIX GALVANIZED STEEL WIRES WITH SUCH A LAY THAT THE AXIAL LENGTH OF ONE TURN OF WIRE WILL BE MIN. 2½ IN., MAX. 3 IN.
   (b) CONDUCTORS FOR RAIL BONDS 1795, 1797 AND 1799 SHALL CONSIST OF SEVEN ANNEALED COPPER COVERED WIRES WITH SUCH A LAY THAT THE AXIAL LENGTH OF ONE TURN OF WIRE WILL BE MIN. 2½ IN., MAX. 3 IN.
   (c) CONDUCTORS SHALL BE CYLINDRICAL IN FORM, FREE FROM SCALES, INEQUALITIES, SPLITS AND ALL IMPERFECTIONS.
   (d) COPPER, STEEL AND COPPER COVERED STEEL WIRES SHALL MEET THE FOLLOWING REQUIREMENTS AS TO MECHANICAL AND ELECTRICAL PROPERTIES:-

	STEEL	COPPER	COPPER COVERED STEEL
DIAMETER IN MILS	77 OR 83	77 OR 81	81
BREAKING STRENGTH MIN. LBS. PER SQ. IN.	50,000	38,500	55,000
ELONGATION IN 10 IN. EACH WIRE, MIN. PERCENT	8	25	15
AVER. ELONGATION IN 10 IN. ALL WIRES, MIN. PERCENT	11	--	18
RESISTIVITY, OHMS PER MIL. FT. MAX. AT 68°F.	81.37	10.56	28.59

   (e) DIAMETER OF COPPER WIRE WILL BE 77 MILS WHERE USED WITH 77 MILS STEEL WIRE AND 81 MILS WHERE USED WITH 83 MILS STEEL WIRE.
   (f) COMMERCIAL TOLERANCES FOR DIAMETERS SHALL BE USED.
5. TERMINALS.
   (a) TERMINALS SHALL BE MADE OF OPEN HEARTH STEEL CONTAINING NOT MORE THAN 0.20 PER CENT OF COMBINED CARBON.
   (b) TERMINALS SHALL WITHSTAND BEING DRIVEN THE ENTIRE LENGTH OF THE PIN INTO A HOLE ⅜ IN. IN DIA., DRILLED IN A STEEL PLATE ⅜ IN. THICK, WITHOUT SHOWING A CRACK OR FLAW OF ANY KIND. IN ADDITION THE TERMINAL, AFTER BEING DRIVEN INTO THE STEEL PLATE APPROXIMATELY ONE-HALF ITS LENGTH, SHALL WITHSTAND BENDING AT 90° WITHOUT CRACKING OR SHOWING A FRACTURE OF ANY KIND.
6. WELDING.
   (a) WELDING SHALL BE DONE WITH ELECTRIC DEVICES CAPABLE OF PRODUCING UNIFORMLY GOOD RESULTS. THE WELD SHALL BE SO MADE THAT THE ENDS OF ALL WIRES ARE UNITED DIRECTLY WITH THE TERMINAL TO INSURE A DENSE AND HOMOGENEOUS METAL WHICH SHALL BE FREE FROM BLOW HOLES AFTER FUSION.
7. IDENTIFICATION.
   (a) EACH TERMINAL SHALL BE SO MARKED THAT THE MANUFACTURER CAN BE READILY IDENTIFIED.
8. GALVANIZING AND TINNING.
   (a) AFTER WELDING, TERMINALS OF BONDS 1794, 1796 AND 1798 SHALL BE GALVANIZED IN ACCORDANCE WITH DRAWING, BY THE HOT DIP PROCESS.
   (b) AFTER WELDING, TERMINALS OF BONDS 1795, 1797 AND 1799 SHALL BE GALVANIZED OR TINNED IN A MANNER IN ACCORDANCE WITH DRAWING. TINNING OR GALVANIZING SHALL BE HEAVY, WELL DONE, EVEN IN THICKNESS THROUGHOUT, SMOOTH AND FREE FROM LUMPS.
   (c) TINNING SHALL BE OF LEAD TIN ALLOY, CONTAINING 70 PER CENT PURE TIN AND 30 PER CENT PURE LEAD.
9. ELONGATION.
   (a) MANUFACTURER MUST SUBJECT EACH RAIL BOND TO A STRETCHING PROCESS SUFFICIENT TO ELONGATE BOND (REGARDLESS OF LENGTH) TO PERMANENT SET OF ¼ IN. TO DETERMINE THE QUALITY OF THE WELDS. BONDS SHALL BE HELD BY THEIR TERMINALS IN SUCH A MANNER THAT THE WELDS ARE SUBJECTED TO THE FULL STRAIN DEVELOPED IN THE STRETCHING OPERATION.
   (b) STRETCHING MACHINE SHALL BE OF SUCH DESIGN THAT THE STRAIN WILL BE APPLIED TO EACH TERMINAL FOR NOT MORE THAN ONE SECOND.
10. INSPECTION.
   (a) PURCHASER MAY INSPECT MATERIAL AT ALL STAGES OF MANUFACTURE.
   (b) PURCHASER MAY INSPECT THE COMPLETED PRODUCT TO DETERMINE THAT THE REQUIREMENTS OF THIS SPECIFICATION HAVE BEEN MET.
   (c) IF MATERIAL HAS NOT BEEN ACCEPTED AT POINT OF PRODUCTION AND IF, UPON ARRIVAL AT DESTINATION, IT DOES NOT MEET THE REQUIREMENTS OF THIS SPECIFICATION, IT MAY BE REJECTED, AND THE CONTRACTOR, UPON REQUEST, SHALL ADVISE THE PURCHASER WHAT DISPOSITION IS TO BE MADE OF THE DEFECTIVE MATERIAL. CONTRACTOR SHALL PAY ALL FREIGHT CHARGES
   (d) IF PURCHASER IS TO MAKE INSPECTION AT POINT OF PRODUCTION, IT SHALL BE SO STATED.
11. TESTS.
   (a) TESTS MAY BE MADE AT POINT OF PRODUCTION, OR ON SAMPLES SUBMITTED, AND MAY ALSO BE MADE AT DESTINATION.
   (b) UNLESS OTHERWISE AUTHORIZED BY THE PURCHASER, THE CONTRACTOR SHALL GIVE THE ENGINEER OF TESTS, AT ALTOONA, PA., SUFFICIENT NOTICE OF TIME WHEN MATERIAL WILL BE READY FOR TESTING.
   (c) CONTRACTOR SHALL PROVIDE, AT POINT OF PRODUCTION, APPARATUS AND LABOR FOR MAKING REQUIRED TESTS UNDER SUPERVISION OF THE PURCHASER.
   (d) TESTS ARE TO MADE AT POINT OF PRODUCTION, UNLESS OTHERWISE STATED.
   (e) THREE BONDS TAKEN AT RANDOM FROM EACH SET OF 1000 OR LESS SHALL BE SELECTED BY THE PURCHASER FOR TESTS.
   (f) TERMINALS OF ALL SAMPLE BONDS SHALL BE CHECKED AGAINST THE REQUIRED DIMENSIONS.
   (g) TWO-THIRDS OF THE SAMPLES SHALL BE TESTED TO DESTRUCTION.
      1. ON THE SAMPLES TESTED TO DESTRUCTION, THE TERMINALS SHALL BE GRIPPED IN THE TENSILE MACHINE AND UNIFORM STRESS APPLIED ALONG THE AXIS OF THE BOND. FAILURE SHALL NOT OCCUR AT LESS THAN 3300 LBS. AND SHALL NOT OCCUR IN THE WELD, THAT IS; EACH INDIVIDUAL WIRE SHALL SHOW FRACTURE AND NOT PULL OUT OF THE WELDED AREA.
      IF ONE SAMPLE FAILS TO MEET THE 3300 LBS. LIMIT OR FAILS IN THE WELD, TWO ADDITIONAL SAMPLES TAKEN FROM THE SAME LOT SHALL BE SIMILARLY TESTED. IF MORE THAN ONE SAMPLE FROM A GIVEN LOT OR EITHER OF THE ADDITIONAL SAMPLES FAIL, THE ENTIRE LOT SHALL BE REJECTED.
      2. TERMINALS FROM THE SAMPLES USED FOR MECHANICAL TESTS SHALL BE TESTED FOR DRIVING AND BENDING REQUIREMENTS OF SECTION 5 (b). IF ONE OF THESE TERMINALS FAILS IN EITHER OF THESE TESTS, TWO ADDITIONAL SAMPLES TAKEN FROM THE SAME LOT SHALL BE SIMILARLY TESTED. IF MORE THAN ONE SAMPLE FROM A GIVEN LOT OR EITHER OF THE ADDITIONAL SAMPLES FAIL THE ENTIRE LOT SHALL BE REJECTED.
   (h) ONE THIRD OF THE SAMPLES SHALL BE USED FOR TINNING OR GALVANIZING TEST OF TERMINALS, GALVANIZING TEST OF STEEL WIRES, PHYSICAL TEST OF INDIVIDUAL WIRES AND ELECTRICAL TEST OF INDIVIDUAL WIRES. IF ANY SAMPLE FAILS ON ANY TEST, THE ENTIRE LOT SHALL BE REJECTED.
      1. TINNING TEST.
         (a) SOLUTION.
            (1) POTASSIUM FERRICYANIDE SOLUTION: 5 GRAMS OF THE SALT ARE DISSOLVED IN 1000 C.C. OF DISTILLED WATER.
            (2) NITRIC ACID SOLUTION SHALL HAVE A SPECIFIC GRAVITY OF 1.027 AT 60 DEG. F. MADE BY DILUTING 50 C.C. OF NITRIC ACID CHEMICALLY PURE, HAVING A SPECIFIC GRAVITY OF 1.42, WITH 950 C.C. OF DISTILLED WATER.
         (b) METHOD.
            (1) THE SAMPLES SELECTED FOR THE TEST SHALL BE THOROUGHLY CLEANED WITH GASOLINE AND THEN WITH SOAP AND WATER. AFTER RINSING THE CLEAN SAMPLES WITH DISTILLED WATER, THEY SHALL BE IMMERSED IN THE NITRIC ACID SOLUTION FOR ONE MINUTE, AND WITHOUT WIPING, DIPPED INTO THE FERRICYANIDE SOLUTION; IF A BLUE PRECIPITATE OR DISCOLORATION TAKES PLACE, IT INDICATES THE COATING HAS BEEN DISSOLVED OR PITTED. THE SAMPLES SHALL THEN BE WASHED WITH DISTILLED WATER TO FREE THEM FROM THE FERRICYANIDE SOLUTION AND THE ABOVE OPERATION REPEATED. SAMPLES WHICH HAVE BEEN COATED IN A SATISFACTORY MANNER SHALL STAND FOUR IMMERSIONS OF ONE MINUTE EACH IN THE NITRIC ACID SOLUTION WITHOUT SHOWING A BLUE PRECIPITATE OR DISCOLORATION IN THE FERRICYANIDE SOLUTION. IF BLUE PRECIPITATE APPEARS THE WHOLE SHIPMENT SHALL BE REJECTED.
            (2) GALVANIZING TEST SHALL BE IN ACCORDANCE WITH G.S.T. SPECIFICATION NO. 1002.
      (i) GALVANIZING OF RAIL BOND CLIPS SHALL BE TESTED IN ACCORDANCE WITH G.S.T. SPECIFICATION NO. 1002.
12. PACKING.
   (a) UNLESS OTHERWISE SPECIFIED, BONDS SHALL BE SECURELY TIED IN BUNDLES OF 50, WITH THE TERMINALS COMPLETELY AND CAREFULLY WRAPPED IN BURLAP OR EQUIVALENT PROTECTION.
   (b) RAIL BOND CLIPS SHALL BE PACKED SO AS TO FACILITATE HANDLING AND SHIPPING.
13. MARKING.
   (a) PURCHASER'S ORDER, NAME OF CONSIGNOR, AND NAME AND ADDRESS OF CONSIGNEE, SHALL BE PLAINLY MARKED ON OUTSIDE OF PACKAGE.
14. WARRANTY.
   (a) CONTRACTOR SHALL WARRANT THE MATERIAL COVERED BY THIS SPECIFICATION TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER ORDINARY USE AND SERVICE, HIS OBLIGATION UNDER THIS WARRANTY BEING LIMITED TO MAKING, AT POINT OF PRODUCTION, ANY PART OR PARTS TO REPLACE THOSE WHICH SHALL BE FOUND DEFECTIVE AFTER SHIPMENT TO THE PURCHASER. THIS WARRANTY SHALL NOT APPLY TO ANY APPARATUS WHICH HAS BEEN SUBJECTED TO MISUSE, NEGLIGENCE OR ACCIDENT.
   (b) CONTRACTOR SHALL COVENANT AND AGREE TO SAVE HARMLESS, AND INDEMNIFY THE PURCHASER AGAINST ALL CLAIMS, SUITS, ACTIONS OR PROCEEDINGS, DAMAGES, COSTS, FEES AND EXPENSES BY REASON OF INFRINGEMENT OR ALLEGED INFRINGEMENT OF PATENTS, OR PATENT ROYALITIES INVOLVED, IN CONSEQUENCE OF THE PURCHASE OR THE USE OF MATERIAL COVERED HEREBY.
15. FIELD WORK.
   (a) 1795, 1797 OR 1799 SHALL BE USED THROUGH ROAD CROSSINGS, STATION PLATFORMS AND TUNNELS. 1794, 1796 OR 1798 SHALL BE USED AT ALL OTHER POINTS.
   (b) AT POINTS WHERE JOINTS IN ROAD CROSSINGS AND STATION PLATFORMS CANNOT BE AVOIDED, THE PLANKING SHALL BE CUT BACK ⅜ OF AN INCH FROM HEAD OF RAIL TO ALLOW FOR INSPECTION OF BONDS.
   (c) HOLES FOR TERMINALS SHALL BE DRILLED IN OIL WITH ⅜ OF AN INCH DRILL AND PLUGGED SAME DAY AS DRILLED.
   (d) WHERE PRACTICABLE HOLES SHALL BE DRILLED FROM OUTSIDE OF TRACK AND NOT FROM GAUGE SIDE OF RAIL. TERMINAL SHALL BE DRIVEN INTO RAIL FROM SAME SIDE OF HOLE AS DRILLED.
   (e) GAUGE 5803, PLAN S-580, SHALL BE USED FREQUENTLY TO DETERMINE IF HOLE DRILLED IN RAIL IS WITHIN THE LIMITS INDICATED ON THE GAUGE.
   (f) WHERE CONDITIONS CAUSE EXCESSIVE CORROSION, RAIL BONDS SHALL BE GIVEN A PROTECTIVE COATING OF NO-OX-ID, CONSISTENCY "A SPECIAL" OR NO. 2 SLUSHING OIL.
   (g) HOLES SHALL BE DRILLED AS SHOWN IN FIG. "A," SO AS TO BE PROPERLY LOCATED FOR CROPPING RAIL ENDS.



APPLICATION OF RAIL BOND AND CLIP
FIGURE "A"

FOR DRAWINGS SEE SHEET NO. 1.

SHEET 2 OF 2

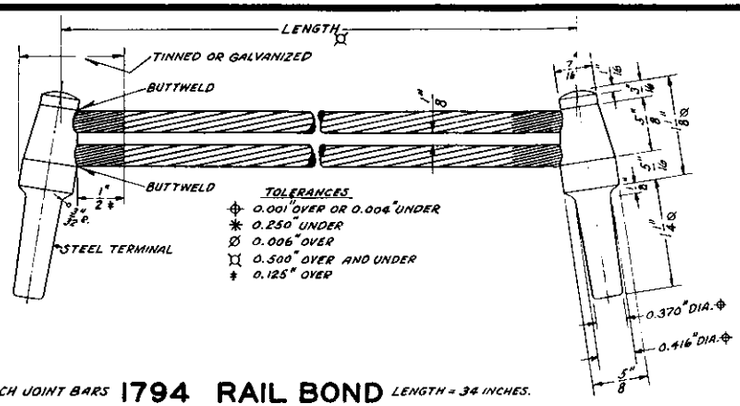
S-179-K

THE PENNSYLVANIA RAILROAD
STANDARD
RAIL BONDS AND CLIPS

OFFICE OF ASSISTANT CHIEF ENGINEER-SIGNALS, PHILA., PA., NOVEMBER 4, 1937.

Approved
N. L. Stanton
Assistant Chief Engineer-Signals

Approved
Chief Engineer

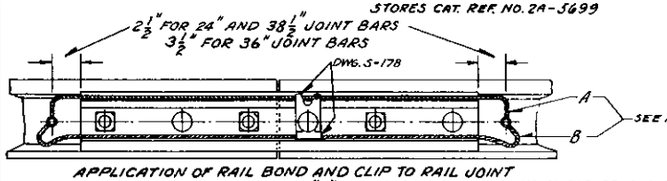


FOR 24 INCH JOINT BARS **1794 RAIL BOND** LENGTH = 34 INCHES.
STORES CAT. REF. NO. 2A-5694

FOR 24 INCH JOINT BARS **1795 RAIL BOND** LENGTH = 34 INCHES.
STORES CAT. REF. NO. 2A-5695

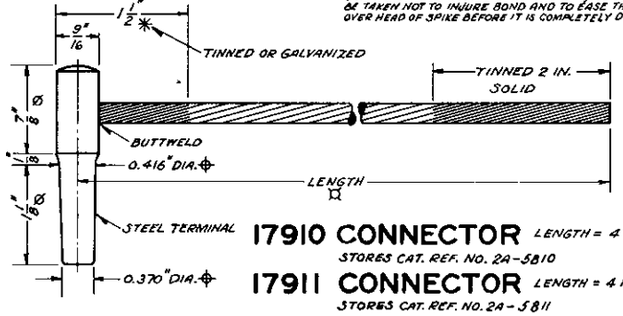
FOR 36 AND 38½ INCH JOINT BARS **1798 RAIL BOND** LENGTH = 48 INCHES.
STORES CAT. REF. NO. 2A-5698

FOR 36 AND 38½ INCH JOINT BARS **1799 RAIL BOND** LENGTH = 48 INCHES.
STORES CAT. REF. NO. 2A-5699



APPLICATION OF RAIL BOND AND CLIP TO RAIL JOINT
FIGURE "A"

NOTE:- IF IT SHOULD BE NECESSARY TO DRIVE SPIKE AFTER BOND IS APPLIED AROUND L-3 JOINT BAR, CARE SHOULD BE TAKEN NOT TO INJURE BOND AND TO EASE THE BOND OVER HEAD OF SPIKE BEFORE IT IS COMPLETELY DRIVEN.



17910 CONNECTOR LENGTH = 4 FEET.
STORES CAT. REF. NO. 2A-5810

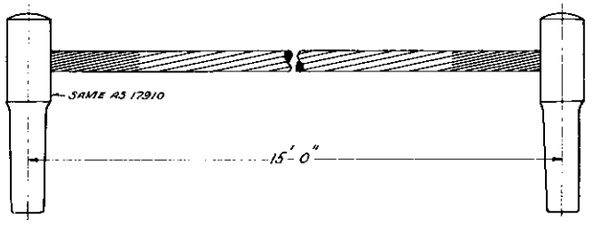
17911 CONNECTOR LENGTH = 4 FEET.
STORES CAT. REF. NO. 2A-5811

17912 CONNECTOR LENGTH = 11 FEET
STORES CAT. REF. NO. 2A-5812

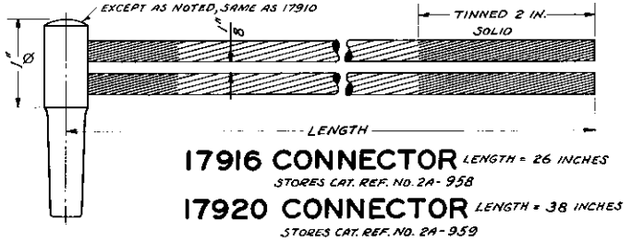
17913 CONNECTOR LENGTH = 11 FEET
STORES CAT. REF. NO. 2A-5813

17921 CONNECTOR LENGTH AS ORDERED
STORES CAT. REF. NO. 2A-5821

17922 CONNECTOR LENGTH AS ORDERED
STORES CAT. REF. NO. 2A-5822

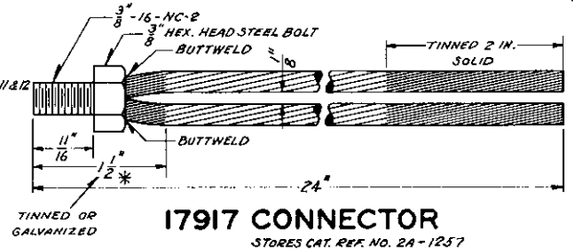


17914 CONNECTOR
STORES CAT. REF. NO. 2A-5814

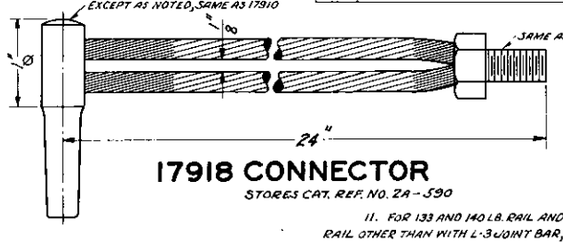


17916 CONNECTOR LENGTH = 26 INCHES
STORES CAT. REF. NO. 2A-958

17920 CONNECTOR LENGTH = 38 INCHES
STORES CAT. REF. NO. 2A-959



17917 CONNECTOR
STORES CAT. REF. NO. 2A-1257



17918 CONNECTOR
STORES CAT. REF. NO. 2A-590

REQUISITES.

1. THE STRANDS OF BONDS 1794, 1798 AND CONNECTORS 17916, 17917, 17918 AND 17920 SHALL BE MADE OF 1-ANNEALED COPPER WIRE AND 6-GALVANIZED STEEL WIRES. THE DIAMETER OF EACH WIRE .077" AND DIAMETER OF EACH STRAND .231". AXIAL LAY. 254".
2. THE STRANDS OF BONDS 1795 AND 1799 SHALL BE MADE OF 7-40% COPPER COVERED STEEL WIRES. THE DIAMETER OF EACH WIRE .081" AND DIAMETER OF EACH STRAND .243". AXIAL LAY .275".
3. THE STRANDS OF CONNECTORS 17910, 17912, 17914 & 17921 SHALL BE MADE OF 7-40% COPPER COVERED STEEL WIRES. THE DIAMETER OF EACH WIRE .102" AND DIAMETER OF EACH STRAND .306". AXIAL LAY .300".
4. THE STRANDS OF CONNECTORS 17911, 17913 & 17922 SHALL BE MADE OF 7-ANNEALED COPPER WIRES. THE DIAMETER OF EACH WIRE .102" AND DIAMETER OF EACH STRAND .306". AXIAL LAY .375".
5. MANUFACTURING TOLERANCES ALLOWED ON WIRE AND STRAND SIZES.
6. MATERIAL, WORKMANSHIP, TINNING, GALVANIZING, TESTS AND GENERAL SPECIFICATIONS SHALL BE IN ACCORDANCE WITH A.A.R. SIGNAL SECTION SPECIFICATION 151, CURRENT ISSUE.

APPLICATION OF WEB TYPE RAIL BONDS AND CONNECTORS

ITEM	APPLIED
1794	AROUND RAIL JOINTS, AND FOR OTHER USES AS SPECIFIED ON DRAWINGS
1795	SAME AS 1794, EXCEPT FOR USE AT ROAD CROSSINGS, STATION PLATFORMS & TUNNELS
1798	SAME AS 1794, ALSO BETWEEN STOCK RAIL AND WING RAIL OF FROGS (SEE DWG. S-182-J)
1799	SAME AS 1795.
17910	FOR SHUNTING TRACK, EXCEPT IN CAB SIGNAL AND ELECTRIFIED TERRITORIES
17911	SAME AS 17910, BUT USED IN CAB SIGNAL TERRITORY.
17912	SAME AS 17910.
17913	SAME AS 17911.
17914	AS FOULING CONNECTOR.
17916	BETWEEN RAIL AND PARKWAY OUTLET. SEE DWG. S-184-H.
17917	BETWEEN DRAGGING EQUIPMENT DETECTOR AND PARKWAY OUTLET. SEE DWG. S-241-J.
17918	BETWEEN STOCK RAIL AND 1¼ IN. PIPE AROUND FROG. SEE DWG. S-184-K.
17920	SAME AS 17916.
17921	FOR SHUNTING TRACK WITH SL-26 ELECTRIC LOCK, EXCEPT CAB SIGNAL TERRITORY.
17922	SAME AS 17921, BUT USED IN CAB SIGNAL TERRITORY.

FIELD WORK.

1. BONDS 1795 AND 1799 SHALL BE USED THROUGH ROAD CROSSINGS, STATION PLATFORMS AND TUNNELS. BONDS 1794 AND 1798 SHALL BE USED AT ALL OTHER POINTS.
2. AT POINTS WHERE JOINTS IN ROAD CROSSINGS AND STATION PLATFORMS CANNOT BE AVOIDED, THE PLANKING SHALL BE CUT BACK ¾" FROM HEAD OF RAIL TO ALLOW FOR INSPECTION OF BONDS.
3. RAIL BONDS AND CONNECTORS SHALL BE APPLIED SAME DAY HOLES ARE DRILLED.
4. WHERE PRACTICABLE, HOLES SHALL BE DRILLED FROM OUTSIDE OF TRACK AND NOT FROM GAUGE SIDE OF RAIL. TERMINAL SHALL BE DRIVEN INTO RAIL FROM SAME SIDE OF HOLE AS DRILLED.
5. GAUGE 5803, PLAN S-580, SHALL BE USED FREQUENTLY TO DETERMINE IF HOLE DRILLED IN RAIL IS WITHIN THE LIMITS INDICATED ON GAUGE.
6. WHERE CONDITIONS CAUSE EXCESSIVE CORROSION, RAIL BONDS AND CONNECTORS SHALL BE GIVEN A PROTECTIVE COATING OF NO-OX-ID, CONSISTENCY "A-SPECIAL" OR NO. 2 SLUSHING OIL.
7. HOLES FOR RAIL BONDS SHALL BE DRILLED AS SHOWN IN FIG. "A", SO AS TO BE PROPERLY LOCATED FOR CROPPING RAIL ENDS.
8. FOULING AND SHUNT CONNECTORS SHALL BE STAPLED ONE INCH BELOW TOP OF TIE.
9. CONNECTORS 17911, 17913 & 17922 ARE FOR USE IN CAB SIGNAL TERRITORY.
10. FOR STANDARD ARRANGEMENTS OF FOULING AND SHUNTING CIRCUITS SEE PLAN S-803.
11. FOR 133 AND 140 LB. RAIL AND FOR 130 LB. RAIL OTHER THAN WITH L-3 JOINT BAR, INSTALL RAIL BONDS AND CLIPS IN ACCORDANCE WITH A, FIG. "A".
12. FOR 131, 152 AND 155 LB. RAIL AND FOR 130 LB. RAIL WITH L-3 JOINT BAR, INSTALL RAIL BONDS AND CLIPS IN ACCORDANCE WITH B, FIG. "A".

RAIL BONDS AND CONNECTORS ON THIS DRAWING ARE FOR USE OUTSIDE OF ELECTRIFIED TERRITORY, EXCEPT 17916, 17917, 17920, WHICH ARE UNIVERSAL.

REVISIONS

REDRAWN FROM PLAN S-179-K, DATED 11-4-37 AND REVISED AS FOLLOWS:- BONDS 1796 & 1797 ELIMINATED. TERMINALS OF BONDS 1794, 1795, 1798 & 1799 MADE TAPER HEAD. CLIPS NOW SHOWN ON PLAN S-178. SPECIFICATIONS CHANGED TO A.A.R. 316. SEC. 151. CONNECTORS 17910, 17911, 17912, 17913 & 17914 FORMERLY SHOWN ON PLAN S-182-I. CONNECTORS 17916, 17917, 17918 & 17920 FORMERLY SHOWN ON PLAN S-184. CONNECTORS 17921 AND 17922 ADDED.

REVISED NOVEMBER 12, 1946. FIG. A AMPLIFIED TO INCLUDE BOND UNDER BOLTS. NOTES 11 & 12 ADDED.

SHEET 1 OF 2.

S-179-L

THE PENNSYLVANIA RAILROAD

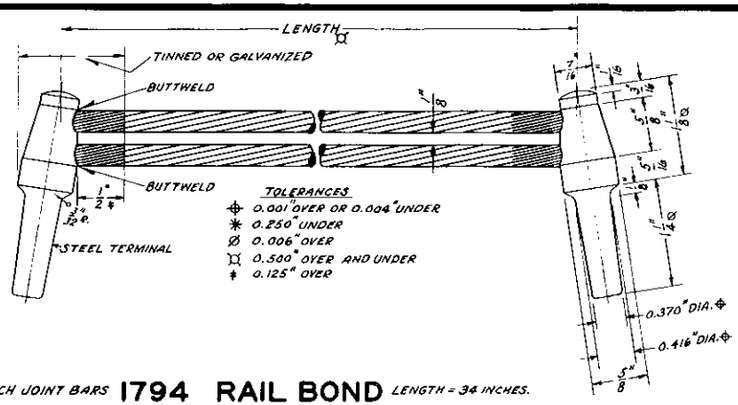
STANDARD

RAIL BONDS AND CONNECTORS

OFFICE OF CHIEF ENGINEER, PHILA., PA., NOVEMBER 12, 1946.

Approved
Assistant Chief Engineer T-C & S

Approved
Chief Engineer



FOR 24 INCH JOINT BARS **1794 RAIL BOND** LENGTH = 34 INCHES.
STORES CAT. REF. NO. 2A-5694

FOR 24 INCH JOINT BARS **1795 RAIL BOND** LENGTH = 34 INCHES.
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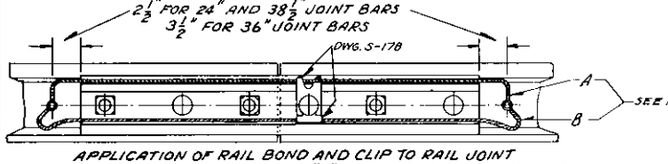
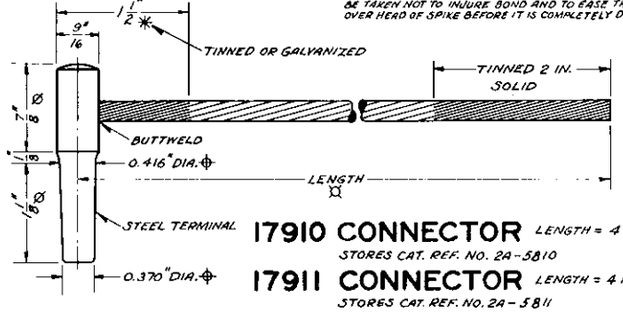
STORES CAT. REF. NO. 2A-5698

FOR 36 AND 38½ INCH JOINT BARS **1799 RAIL BOND** LENGTH = 48 INCHES.
STORES CAT. REF. NO. 2A-5699



APPLICATION OF RAIL BOND AND CLIP TO RAIL JOINT
FIGURE "A"

NOTE :- IF IT SHOULD BE NECESSARY TO DRIVE SPIKE AFTER BOND IS APPLIED AROUND L-3 JOINT BAR, CARE SHOULD BE TAKEN NOT TO INJURE BOND AND TO CASE THE BOND OVER HEAD OF SPIKE BEFORE IT IS COMPLETELY DRIVEN.



17910 CONNECTOR LENGTH = 4 FEET.
STORES CAT. REF. NO. 2A-5810

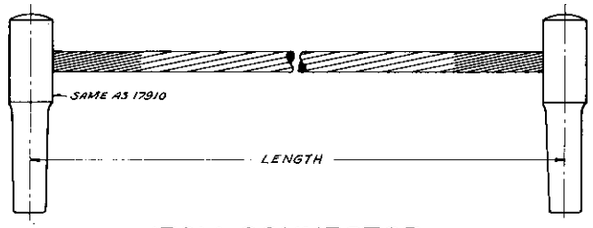
17911 CONNECTOR LENGTH = 4 FEET.
STORES CAT. REF. NO. 2A-5811

17912 CONNECTOR LENGTH = 11 FEET
STORES CAT. REF. NO. 2A-5812

17913 CONNECTOR LENGTH = 11 FEET
STORES CAT. REF. NO. 2A-5813

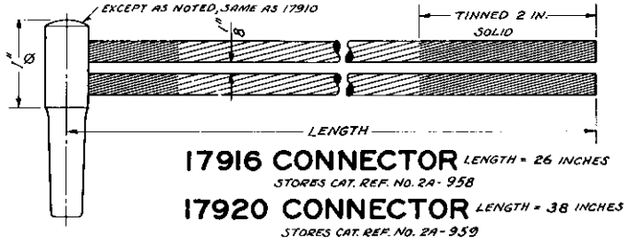
17921 CONNECTOR LENGTH AS ORDERED
STORES CAT. REF. NO. 2A-5821

17922 CONNECTOR LENGTH AS ORDERED
STORES CAT. REF. NO. 2A-5822



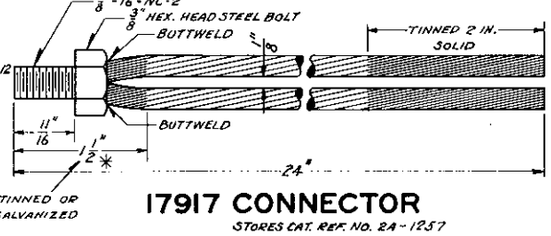
17914 CONNECTOR LENGTH = 15 FEET.
STORES CAT. REF. NO. 2A-5814

17915 CONNECTOR LENGTH = 10 FEET.
STORES CAT. REF. NO. 2A-5815

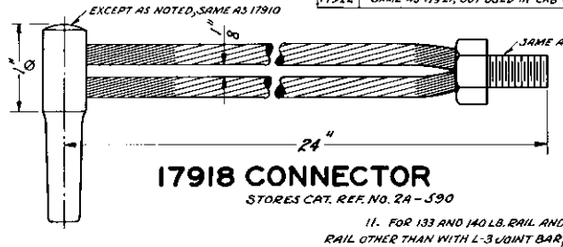


17916 CONNECTOR LENGTH = 26 INCHES
STORES CAT. REF. NO. 2A-958

17920 CONNECTOR LENGTH = 38 INCHES
STORES CAT. REF. NO. 2A-959



17917 CONNECTOR
STORES CAT. REF. NO. 2A-1257



17918 CONNECTOR
STORES CAT. REF. NO. 2A-590

REQUISITES.

1. THE STRANDS OF BONDS 1794, 1798 AND CONNECTORS 17916, 17917, 17918 AND 17920 SHALL BE MADE OF 1-ANNEALED COPPER WIRE AND 6-GALVANIZED STEEL WIRES. THE DIAMETER OF EACH WIRE .077" AND DIAMETER OF EACH STRAND .231". AXIAL LAY. 254".
2. THE STRANDS OF BONDS 1795 AND 1799 SHALL BE MADE OF 7-40% COPPER COVERED STEEL WIRES. THE DIAMETER OF EACH WIRE .081" AND DIAMETER OF EACH STRAND .243". AXIAL LAY. 275".
3. THE STRANDS OF CONNECTORS 17910, 17912, 17914, 17915 & 17921 SHALL BE MADE OF 7-40% COPPER COVERED STEEL WIRES. THE DIAMETER OF EACH WIRE .102" AND DIAMETER OF EACH STRAND .306". AXIAL LAY. 300".
4. THE STRANDS OF CONNECTORS 17911, 17913 & 17922 SHALL BE MADE OF 7-ANNEALED COPPER WIRES. THE DIAMETER OF EACH WIRE .102" AND DIAMETER OF EACH STRAND .306". AXIAL LAY. 375".
5. MANUFACTURING TOLERANCES ALLOWED ON WIRE AND STRAND SIZES.
6. MATERIAL, WORKMANSHIP, TINNING, GALVANIZING, TESTS AND GENERAL SPECIFICATIONS SHALL BE IN ACCORDANCE WITH A.A.R. SIGNAL SECTION SPECIFICATION 151, CURRENT ISSUE.

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1798	SAME AS 1794, ALSO BETWEEN STOCK RAIL AND WING RAIL OF FROGS (SEE DWG. S-182-J)
1799	SAME AS 1795.
17910	FOR SHUNTING TRACK, EXCEPT IN CAB SIGNAL AND ELECTRIFIED TERRITORIES
17911	SAME AS 17910, BUT USED IN CAB SIGNAL TERRITORY.
17912	SAME AS 17910.
17913	SAME AS 17911.
17914 17915	AS FOULING CONNECTOR.
17916	BETWEEN RAIL AND PARKWAY OUTLET. SEE DWG. S-184-M. NOTES.
17917	BETWEEN DRAGGING EQUIPMENT DETECTOR AND PARKWAY OUTLET. SEE DWG. S-241-J.
17918	BETWEEN STOCK RAIL AND 1½ IN. PIPE AROUND FROG. SEE DWG. S-182-J.
17920	SAME AS 17916.
17921	FOR SHUNTING TRACK WITH SL-26 ELECTRIC LOCK, EXCEPT CAB SIGNAL TERRITORY.
17922	SAME AS 17921, BUT USED IN CAB SIGNAL TERRITORY.

FIELD WORK.

1. BONDS 1795 AND 1799 SHALL BE USED THROUGH ROAD CROSSINGS, STATION PLATFORMS AND TUNNELS. BONDS 1794 AND 1798 SHALL BE USED AT ALL OTHER POINTS. (SEE NOTE 13.)
2. AT POINTS WHERE JOINTS IN ROAD CROSSINGS AND STATION PLATFORMS CANNOT BE AVOIDED, THE PLANKING SHALL BE CUT BACK ¾" FROM HEAD OF RAIL TO ALLOW FOR INSPECTION OF BONDS.
3. RAIL BONDS AND CONNECTORS SHALL BE APPLIED SAME DAY HOLES ARE DRILLED.
4. WHERE PRACTICABLE, HOLES SHALL BE DRILLED FROM OUTSIDE OF TRACK AND NOT FROM GAUGE SIDE OF RAIL. TERMINAL SHALL BE DRIVEN INTO RAIL FROM SAME SIDE OF HOLE AS DRILLED.
5. GAUGE 5803, PLAN S-580, SHALL BE USED FREQUENTLY TO DETERMINE IF HOLE DRILLED IN RAIL IS WITHIN THE LIMITS INDICATED ON GAUGE.
6. WHERE CONDITIONS CAUSE EXCESSIVE CORROSION, RAIL BONDS AND CONNECTORS SHALL BE GIVEN A PROTECTIVE COATING OF NO-OX-ID, CONSISTENCY "A-SPECIAL" OR NO. 2 SLUSHING OIL.
7. HOLES FOR RAIL BONDS SHALL BE DRILLED AS SHOWN IN FIG. "A", SO AS TO BE PROPERLY LOCATED FOR CROPPING RAIL ENDS.
8. FOULING AND SHUNT CONNECTORS SHALL BE STAPLED ONE INCH BELOW TOP OF TIE.
9. CONNECTORS 17911, 17913 & 17922 ARE FOR USE IN CAB SIGNAL TERRITORY.
10. FOR STANDARD ARRANGEMENTS OF FOULING AND SHUNTING CIRCUITS SEE PLAN S-803.
11. FOR 133 AND 140 LB. RAIL AND FOR 130 LB. RAIL OTHER THAN WITH L-3 JOINT BAR, INSTALL RAIL BONDS AND CLIPS IN ACCORDANCE WITH A, FIG. "A."
12. FOR 131, 132 AND 155 LB. RAIL AND FOR 130 LB. RAIL WITH L-3 JOINT BAR, INSTALL RAIL BONDS AND CLIPS IN ACCORDANCE WITH B, FIG. "A".
13. BONDS 1794, 1795, 1798 & 1799 USED GENERALLY AT LOCATIONS WHERE FLANGE WORN RAILS DO NOT PERMIT SATISFACTORY APPLICATION OF RAIL HEAD BONDS. (SEE DRAWING S-180.)

RAIL BONDS AND CONNECTORS ON THIS DRAWING ARE FOR USE OUTSIDE OF ELECTRIFIED TERRITORY, EXCEPT 17916, 17917, 17920, WHICH ARE UNIVERSAL.

REVISIONS

REDRAWN FROM PLAN S-179-K, DATED 11-4-37 AND REVISED AS FOLLOWS:- BONDS 1796 & 1797 ELIMINATED. TERMINALS OF BONDS 1794, 1795, 1798 & 1799 MADE TAPER HEAD. CLIPS NOW SHOWN ON PLAN S-178. SPECIFICATIONS CHANGED TO A.A.R. SIG. SEC. 151. CONNECTORS 17910, 17911, 17912, 17913 & 17914 FORMERLY SHOWN ON PLAN S-182-I. CONNECTORS 17916, 17917, 17918 & 17920 FORMERLY SHOWN ON PLAN S-184. CONNECTORS 17921 AND 17922 ADDED.

REVISED NOVEMBER 12, 1946. FIG. A AMPLIFIED TO INCLUDE BOND UNDER BOLTS. NOTES 11 & 12 ADDED.

M REVISED DECEMBER 28, 1948. CONNECTOR 17915 AND NOTE 13 ADDED TO SHEET 1.

APPROVED

SHEET 1 OF 2.

S-179-M

THE PENNSYLVANIA RAILROAD

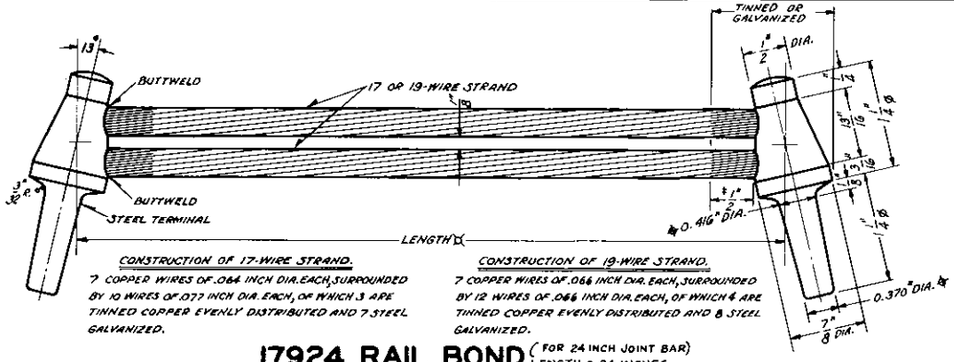
STANDARD

RAIL BONDS AND CONNECTORS

OFFICE OF CHIEF ENGINEER, PHILA., PA., NOVEMBER 12, 1946.

Approved
Assistant Chief Engineer T-C & S

Approved
Chief Engineer



CONSTRUCTION OF 17-WIRE STRAND.

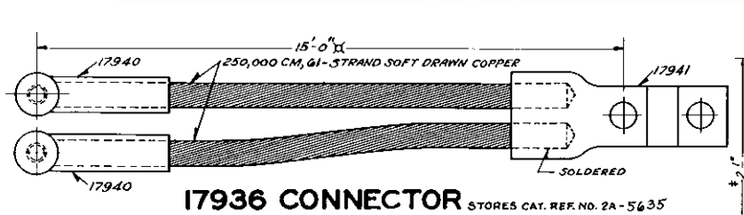
7 COPPER WIRES OF .064 INCH DIA. EACH, SURROUNDED BY 10 WIRES OF .077 INCH DIA. EACH, OF WHICH 3 ARE TINNED COPPER EVENLY DISTRIBUTED AND 7 STEEL GALVANIZED.

CONSTRUCTION OF 19-WIRE STRAND.

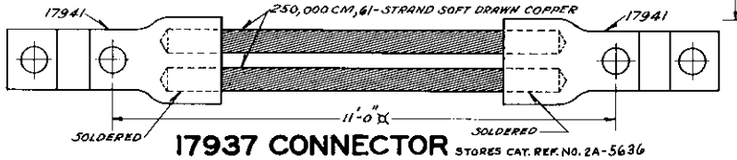
7 COPPER WIRES OF .064 INCH DIA. EACH, SURROUNDED BY 12 WIRES OF .064 INCH DIA. EACH, OF WHICH 4 ARE TINNED COPPER EVENLY DISTRIBUTED AND 8 STEEL GALVANIZED.

17924 RAIL BOND (FOR 24 INCH JOINT BAR) LENGTH = 34 INCHES.
STORES CAT. REF. NO. 2A-349

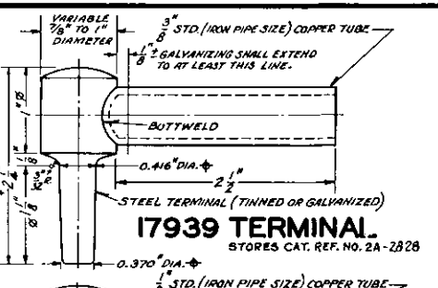
17925 RAIL BOND (FOR 38½ INCH JOINT BAR) LENGTH = 48 INCHES.
STORES CAT. REF. NO. 2A-352



17936 CONNECTOR STORES CAT. REF. NO. 2A-5635

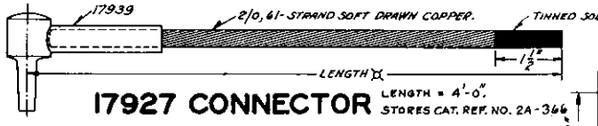


17937 CONNECTOR STORES CAT. REF. NO. 2A-5636

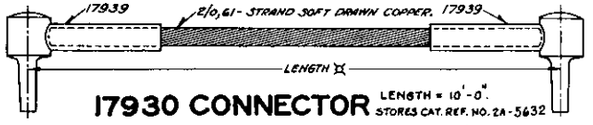


17939 TERMINAL
STORES CAT. REF. NO. 2A-2828

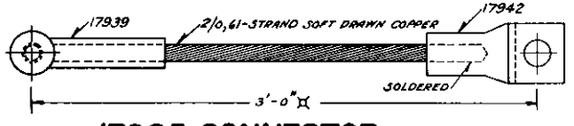
17940 TERMINAL
STORES CAT. REF. NO. 2A-5637



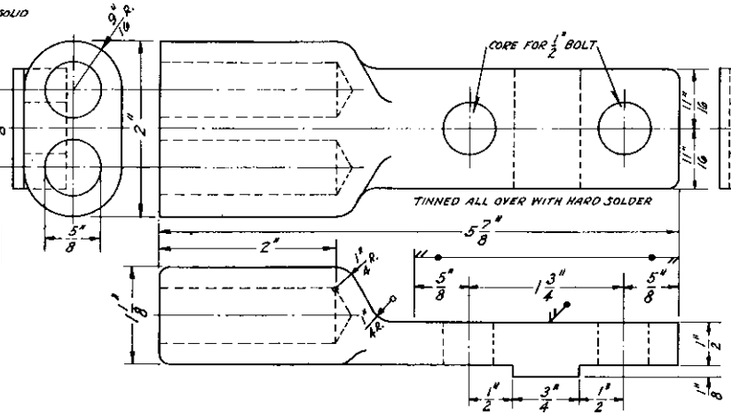
17927 CONNECTOR LENGTH = 4'-0". STORES CAT. REF. NO. 2A-346
17928 CONNECTOR LENGTH = 11'-0". STORES CAT. REF. NO. 2A-5630
17929 CONNECTOR LENGTH = AS ORDERED STORES CAT. REF. NO. 2A-5631



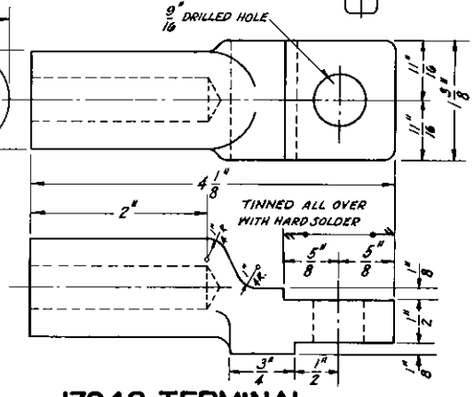
17930 CONNECTOR LENGTH = 10'-0". STORES CAT. REF. NO. 2A-5632
17931 CONNECTOR LENGTH = 15'-0". STORES CAT. REF. NO. 2A-341
17932 CONNECTOR LENGTH = 18'-0". STORES CAT. REF. NO. 2A-342
17933 CONNECTOR LENGTH = 23'-0". STORES CAT. REF. NO. 2A-350
17934 CONNECTOR LENGTH = AS ORDERED. STORES CAT. REF. NO. 2A-5633



17935 CONNECTOR STORES CAT. REF. NO. 2A-5634



17941 TERMINAL CAST BRASS
STORES CAT. REF. NO. 2A-5638



17942 TERMINAL CAST BRASS
STORES CAT. REF. NO. 2A-5639

APPLICATION OF RAIL BONDS AND CONNECTORS

ITEM	APPLIED
17924, 17925	AROUND RAIL JOINTS AND FOR OTHER USES AS SPECIFIED ON DRAWINGS.
17927, 17928, 17929	FOR SHUNTING WITH T-20 MECH'S., H.D. CONTROLLERS, AND STRUCTURE GROUNDING.
17930, 17931, 17932 17933, 17934	FOR FOULING PROTECTION AND OTHER USES AS SPECIFIED ON DRAWINGS.
17935, 17936	BETWEEN RAIL AND IMPEDANCE BOND (SPEC. 1754)
17937	BETWEEN IMPEDANCE BONDS (SPEC. 1754) (NEUTRAL CONNECTION).

NOTES:-

1. AFTER BUTT WELDING, THE 2/0, 61-STRAND CABLE OR THE 250,000 CM, 61-STRAND CABLE SHALL BE PROPERLY SOLDERED INTO TERMINALS 17939 OR 17940
2. THE 3/8" AND 1/2" COPPER SLEEVES OF 17939 AND 17940 SHALL BE TINNED INSIDE AND OUTSIDE.
3. PARAGRAPHS 2, 3, 4, 5, 6, 7, 8 & 10 OF FIELD WORK AND PARAGRAPH 3 OF REQUISITES ON SHEET 1 OF THIS DRAWING SHALL APPLY TO BONDS AND CONNECTIONS INCLUDED ON THIS SHEET.
4. WELDING AND SOLDERING OF TERMINALS 17939 AND 17940 SHALL BE SUCH THAT, WHEN GIVEN A TENSILE TEST, THE CABLE SHALL FAIL WITHOUT PULLING OUT OF THE SLEEVE AND WITHOUT FAILURE OF THE SLEEVE OR WELD.
5. FOR TOLERANCES SEE SHEET 1 OF THIS DRAWING.
6. FOR RAIL HEAD TYPE OF RAIL BONDS SEE DRAWING S-180.
7. MATERIAL, WORKMANSHIP, TINNING, GALVANIZING, TESTS AND GENERAL SPECIFICATIONS SHALL BE IN ACCORDANCE WITH P.R.R. SPECIFICATION C.E. 48.

CONNECTORS 17935, 17936 AND 17937 ARE FOR USE WITH IMPEDANCE BOND SPECIFICATION 1754.

REVISIONS

THIS DRAWING SUPERSEDES M.P. DRAWINGS ET-R93D-3, F-41291A, AND F-91064. TERMINAL 17939 IS IN ACCORDANCE WITH M.P. DRAWING F-40671-7. M FIRST ISSUE THIS SHEET.

SHEET 2 OF 2.

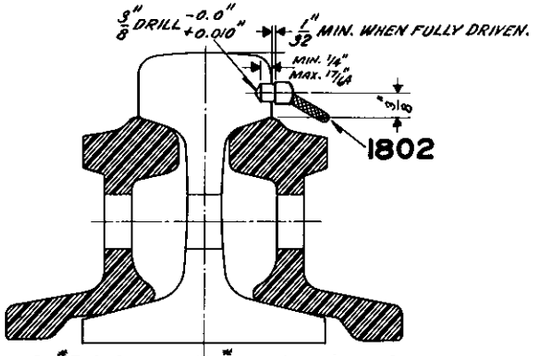
S-179-M

THE PENNSYLVANIA RAILROAD
STANDARD
RAIL BONDS AND CONNECTORS
A-C ELECTRIFIED TERRITORY

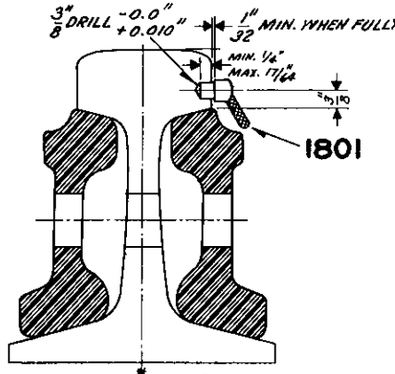
OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 28, 1948.

Approved
Assistant Chief Engineer - T, C & S

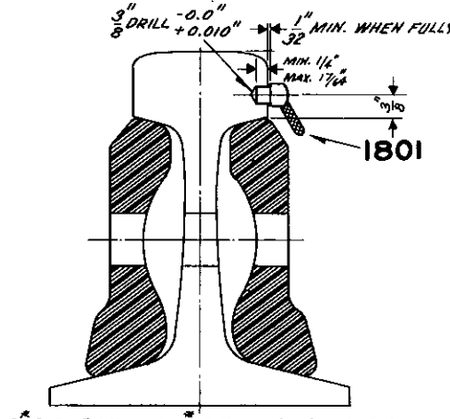
Approved
Chief Engineer



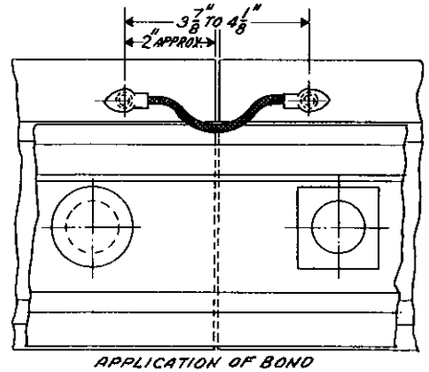
130# P.S. RAIL - 130# P.S. L-3 JOINT BARS.



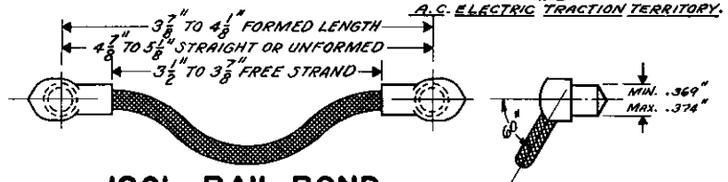
131# R.E. RAIL - 131# R.E. F-7 JOINT BARS.



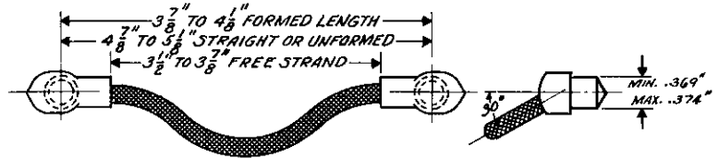
152# P.S. RAIL - 152# P.S. F-2 JOINT BARS.



APPLICATION OF BOND AND DRILLING OF RAIL.
STEAM ROAD TERRITORY AND A.C. ELECTRIC TRACTION TERRITORY.



1801 - RAIL BOND STORES CAT. REF. NO. 2A-3707



1802 - RAIL BOND STORES CAT. REF. NO. 2A-3708

NOTE:-

1. BOND 1801 OR 1802 SHOULD BE ORDERED, AND USED (1 BOND PER JOINT), FOR BOTH STEAM AND A.C. ELECTRIFIED TERRITORY, WHEN MAKING RAIL RENEWALS OR GENERAL REPLACEMENTS. THE USE OF THE WEB TYPE DOUBLE STRAND LONG BOND PLAN S-179 (FOR STEAM ROAD) OR PLAN M.P. 412914 (FOR A.C. ELECTRIFIED TERRITORY) SHOULD BE CONFINED TO LOCATIONS WHERE FLANGE WORN RAILS DO NOT PERMIT SATISFACTORY APPLICATION OF THE RAIL HEAD TYPE BOND.
2. BONDS SHALL BE IN ACCORDANCE WITH A.A.R. SIGNAL SECTION SPECIFICATION 179-42 AND DRAWING 1048-B.
3. AT POINTS WHERE JOINTS IN ROAD CROSSINGS AND STATION PLATFORMS CANNOT BE AVOIDED THE PLANKING SHALL BE CUT BACK 3/4 OF AN INCH TO ALLOW FOR INSPECTION OF BONDS.
4. HOLES FOR BONDS SHALL BE DRILLED FROM OUTSIDE OF TRACK AND NOT FROM GAUGE SIDE OF RAIL. HOLES SHALL BE PLUGGED SAME DAY AS DRILLED.
5. AFTER RAIL BONDS ARE INSTALLED, THEY SHALL BE GIVEN A PROTECTIVE COATING OF "NO-OX-ID", CONSISTENCY "A-SPECIAL" OR NO. 2 SLUSHING OIL.

C.S.
C.S.

REVISIONS

B-SEPTEMBER 11, 1940. C.O. NOTE 4 CHANGED AND NOTE 6 ADDED.
C-AUGUST 26, 1942. C.O. MIN. & MAX. DIM. OF BOND ON ADDED NOTE 1 ADDED. NOTES 2, 3, 4 & 5 FORMERLY 1, 2, 3 & 4. DRAWING SHOWING APPLICATION OF BOND FORMERLY SPECIFIED FOR STEAM ROAD ONLY. LOCATION OF 3/4" HOLE IN RAIL FORMERLY 1" FROM TOP OF RAIL.
APPROVED AS STANDARD SEPT. 19-1942

1 SHEET

S-180-C

THE PENNSYLVANIA RAILROAD
STANDARD
RAIL BOND
RAIL HEAD TYPE
OFFICE OF CHIEF ENGINEER, PHILA., PA., MAY 12, 1939.

Approved
H. R. Stanton
Assistant Chief Engineer-Signals

Approved
M. Higgins
Chief Engineer

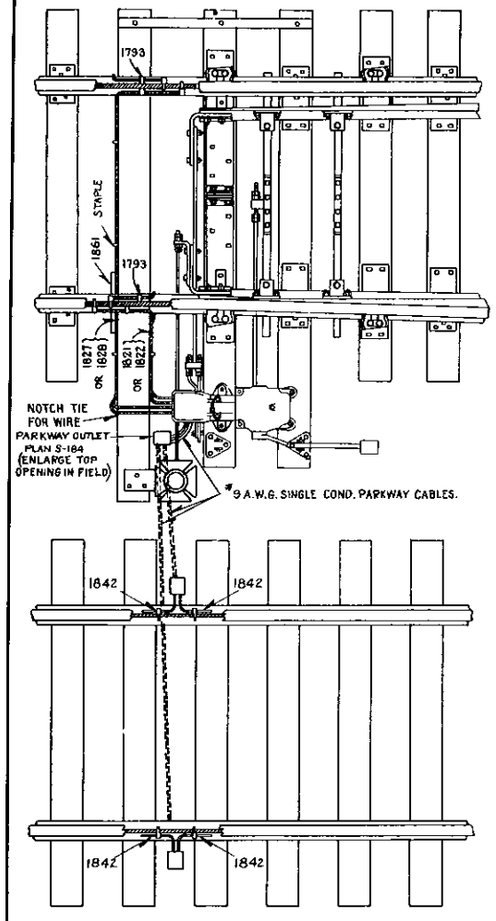


FIG. A

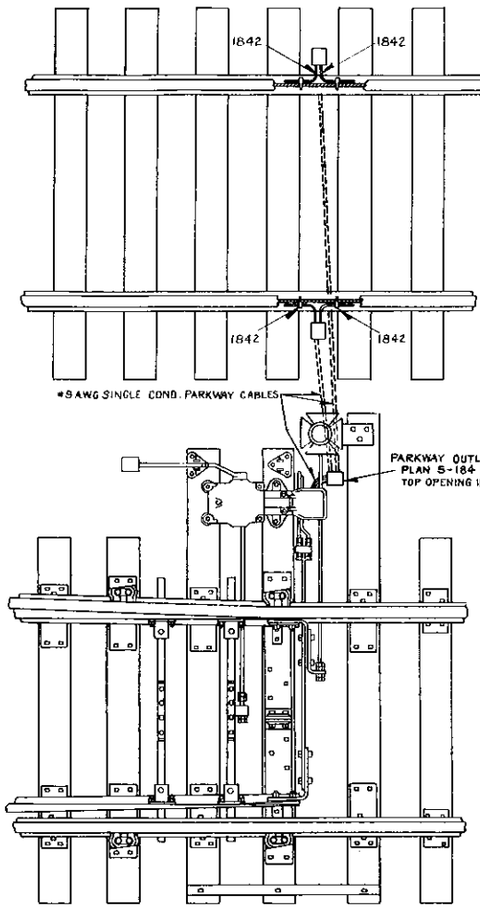


FIG. B

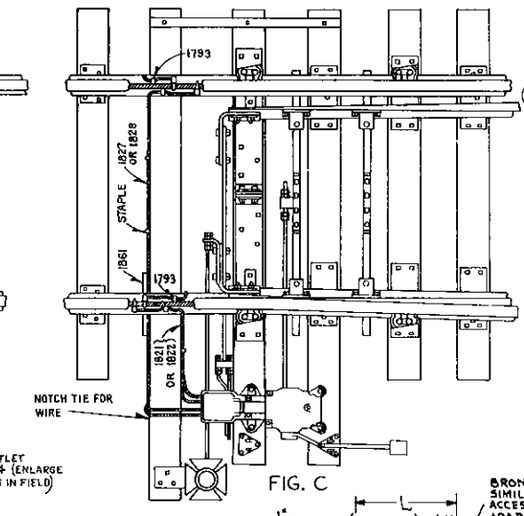


FIG. C

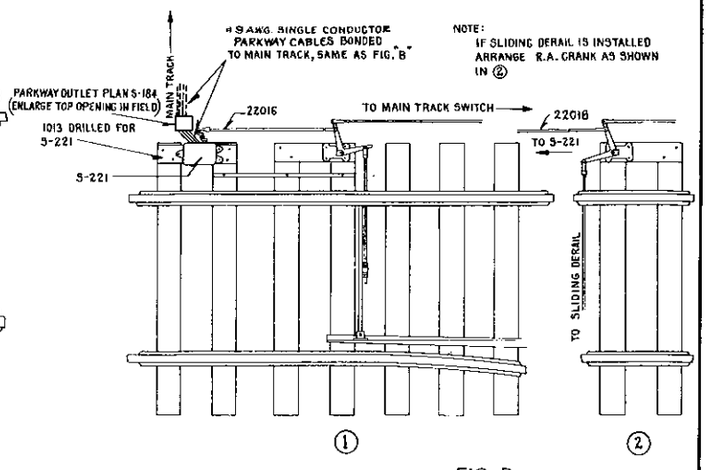
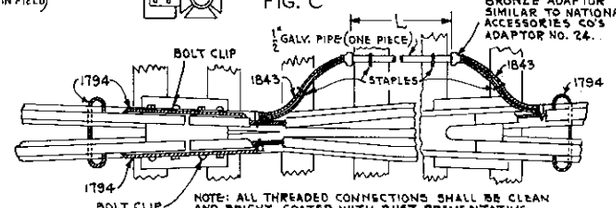


FIG. D



NOTE: ALL THREADED CONNECTIONS SHALL BE CLEAN AND BRIGHT, COATED WITH RUST PREVENTATIVE AND DRAWN UP AS TIGHT AS PRACTICABLE.

FIG. E { L = 12'-0" FOR #8 OR #10 FROG. L = 14'-0" " #15 FROG. L = 19'-0" " #20 "

(NOT TO BE USED IN ELECTRIFIED TERRITORY.)

APPLICATION OF BONDS AT FROG WITH GROOVE IN FILLER AT END OF WING RAILS.

FIG. G

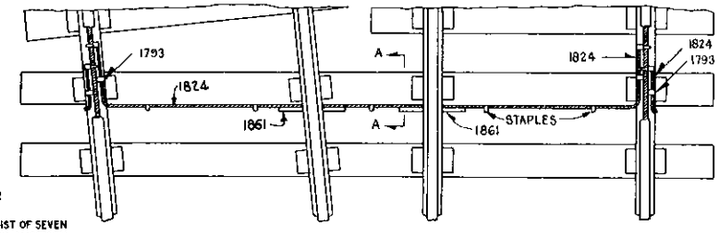
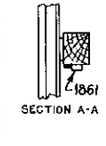
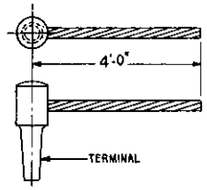


FIG. F

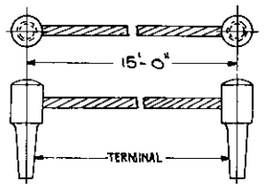


SECTION A-A

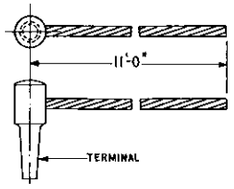
REVISIONS
REDRAWN FROM APPROVED PLAN S-182-E, DATED 5-29-24 LAST REVISED 7-13-26 AND REVISED.
G. JUNE 19, 1930. H.E.S. C.O. APPROVED:- A.H. Rudd
H. JULY 31, 1931. S.S. APPROVED:- A.H. Rudd
I. MAY 22, 1935. APPROVED:- A.H. Rudd



1821-CONNECTION
1822 "



1824-CONNECTION
1827-CONNECTION



1828 "

NOTE:

MATERIAL

1. CONNECTIONS, 1821, 1824, AND 1827 SHALL CONSIST OF SEVEN (7) #10 A.W.G. ANNEALED COPPER COVERED STEEL STRANDS, 40 PER CENT CONDUCTIVITY.

2. CONNECTIONS 1822 AND 1828 SHALL CONSIST OF SEVEN (7) #10 A.W.G. COPPER STRANDS, IN ACCORDANCE WITH AMERICAN SOCIETY FOR TESTING MATERIALS SPECIFICATION B-3-13. THE CONDUCTOR SHALL BE ANNEALED AFTER STRANDING.

3. TERMINALS SHALL BE IN ACCORDANCE WITH CURRENT ISSUE OF PLAN, B-179.

FIELD WORK

1. FOR DRILLING RAILS SEE PLAN, S-179.

2. FOULING AND SHUNT CONNECTIONS SHALL BE STAPLED CLOSE TO TOP OF TIE.

3. CONNECTIONS 1822 AND 1828 ARE FOR USE IN TRAIN CONTROL TERRITORY ONLY.

4. FOR STANDARD ARRANGEMENTS OF FOULING AND SHUNTING CIRCUITS SEE PLAN B-803.

1 SHEET

S-182-1

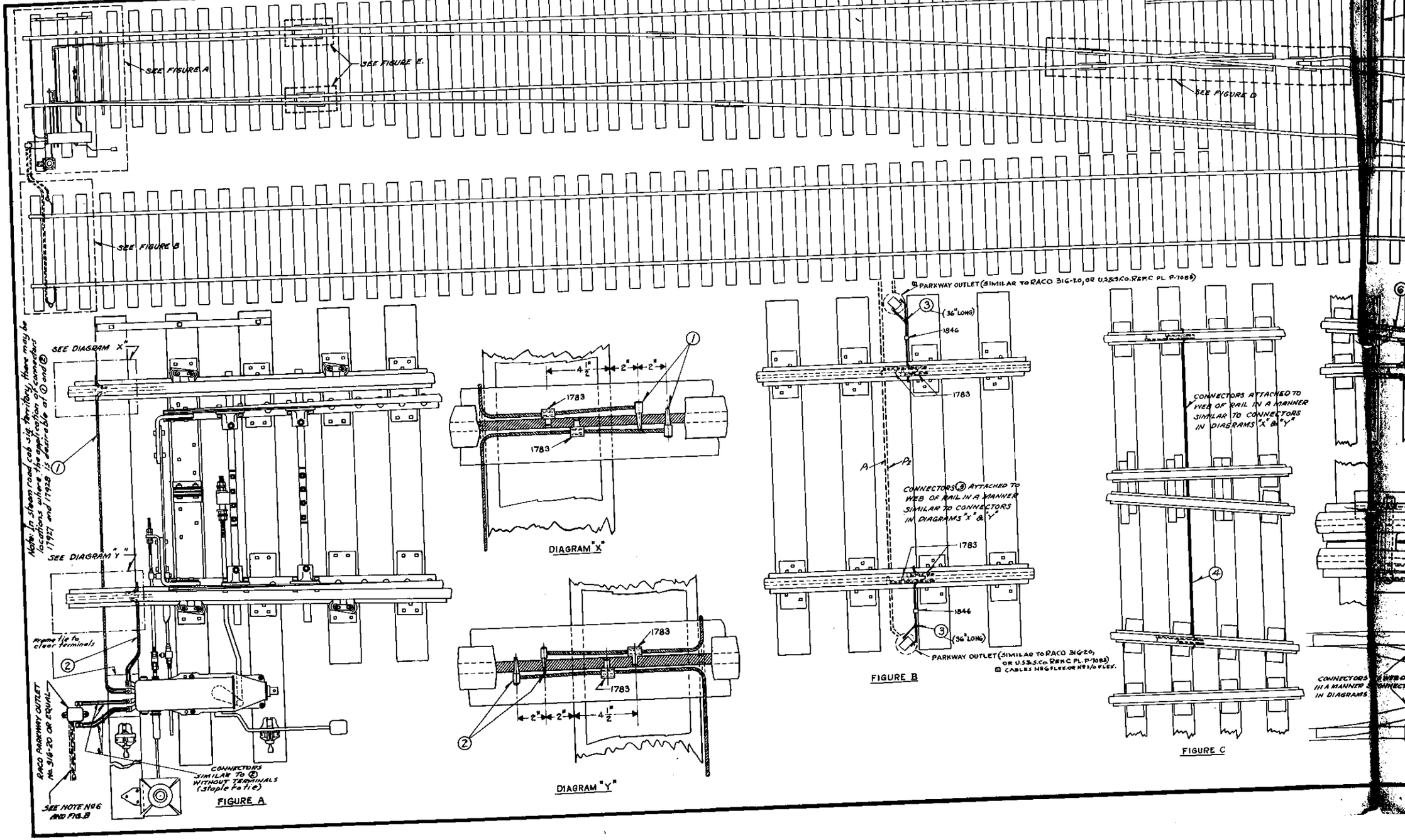
THE PENNSYLVANIA RAILROAD
STANDARD

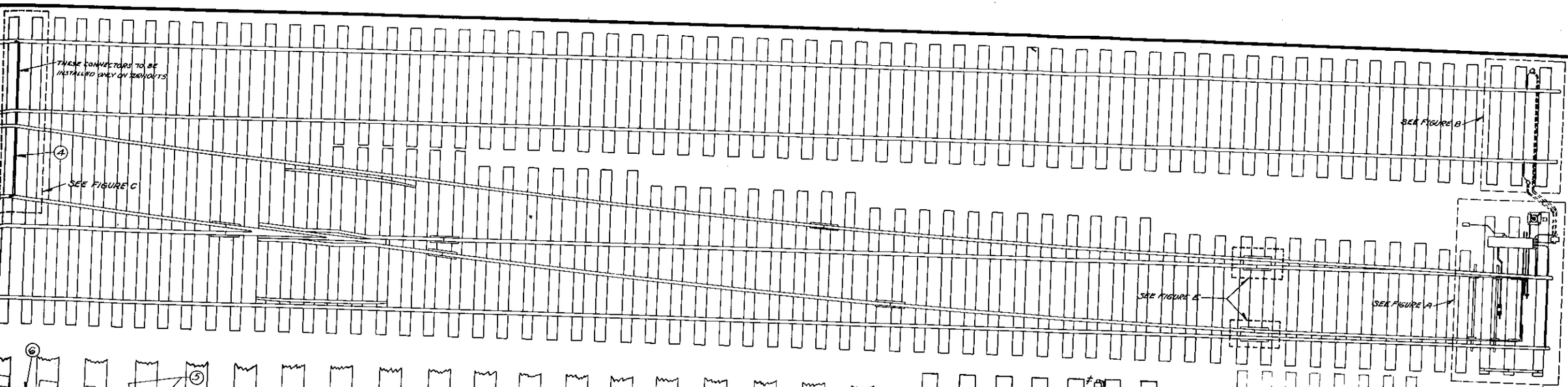
TRACK CIRCUIT CONNECTIONS

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA. PA., FEB. 16, 1927

Approved A.H. Rudd Chief Signal Engineer

Approved Chief Engineer


SEE FIGURE A
SEE FIGURE E
SEE FIGURE D
SEE FIGURE B
Note: In steam road cab it is unlikely there may be locations where the application of connector ① and ② 17927 and 17928 is desirable at
SEE DIAGRAM "X"
SEE DIAGRAM "Y"
Flame tie to clear terminals
RACO PARKWAY OUTLET No. 316-20 OR EQUAL
SEE NOTE NO 6 AND FIG. B
CONNECTORS SIMILAR TO ② WITHOUT TERMINALS (staple tie)
FIGURE A
4½"
2"
2"
1783
1783
DIAGRAM "X"
1783
2"
2"
4½"
DIAGRAM "Y"
PARKWAY OUTLET (SIMILAR TO RACO 316-20, OR U.S.S.Co. REF.C PL. P-7088)
(36" LONG)
1846
1783
A
A
CONNECTORS ③ ATTACHED TO WEB OF RAIL IN A MANNER SIMILAR TO CONNECTORS IN DIAGRAMS "X" & "Y"
1783
1846
(36" LONG)
PARKWAY OUTLET (SIMILAR TO RACO 316-20, OR U.S.S.Co. REF.C PL. P-7088)
③ CABLES NEOFLEX OR NO 1/0 FLEX.
FIGURE B
CONNECTORS ATTACHED TO WEB OF RAIL IN A MANNER SIMILAR TO CONNECTORS IN DIAGRAMS "X" & "Y"
④
FIGURE C



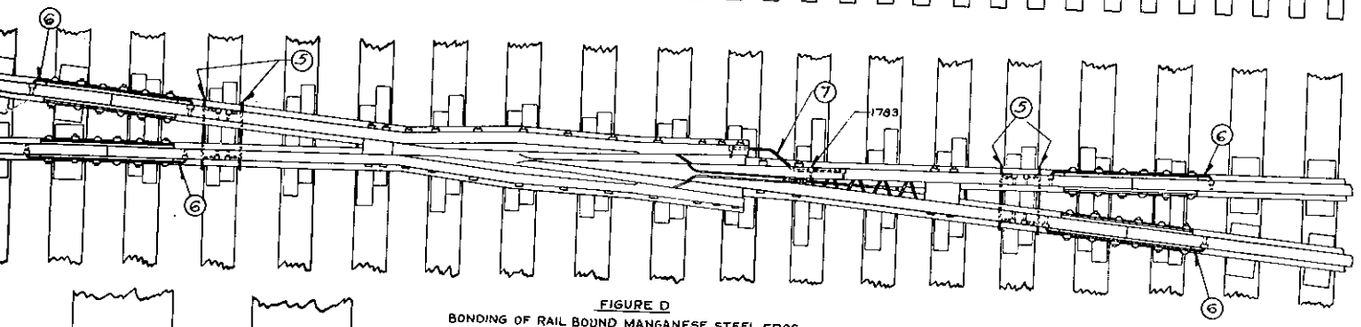


FIGURE D
BONDING OF RAIL BOUND MANGANESE STEEL FROG.

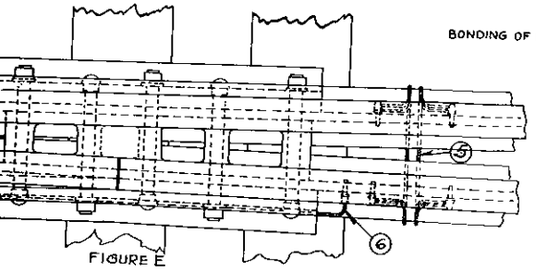
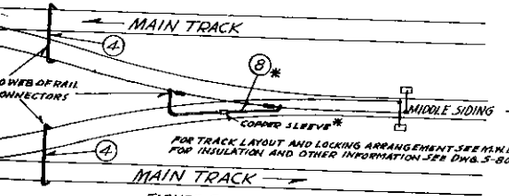


FIGURE E



FOR TRACK LAYOUT AND LOCKING ARRANGEMENT SEE M.N.H. DWG. 73930. FOR INSULATION AND OTHER INFORMATION SEE DWG. S-803.

FIGURE G

NOTES :-

1(a) Shunt and Fouling Connectors for turnout shall be arranged similar to one end of crossover. At derail or clearance point in Cab Signal Territory, arrangement shall be in accordance with Figure F or H (see note 3)

(b) At clearance point of turnout, where derail is not used, locate Circuit Controller as indicated by Mark on tie of Main Track and pipe connect it to T-20 Mechanism.

(c) At clearance point of turnout, where derail is used, locate Circuit Controller as indicated by S or J

2. Shunt and Fouling Connectors where passing along ties shall be stapled near top of tie.

3. In Non-Cab Signal Territory, or trailing point switch in Cab Signal Territory, shunt connections in Figs. F & H are not necessary.

4 For Standard Circuits showing bonding and insulation of switches see Drawing S-803.

5 In Fig. H, pipe line to be arranged as indicated in full lines: where derail is in service apply controller as at J, where derail is not used apply controller as at K near clearance point.

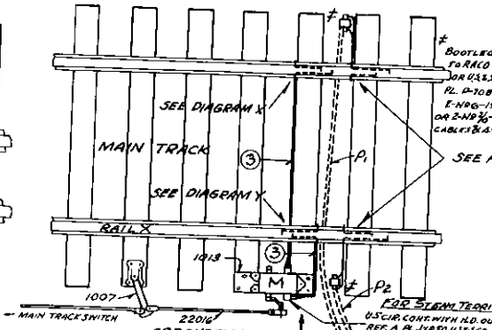
6. Cables P_1 and P_2 shall each be 2-№6 single conductor non-metallic parkway cables, S. Cat. Ref. 2A-5751 for steam territory, and 2-№2/0 single conductor non-metallic parkway cables, S. Cat. Ref. 2A-3031, for A-C elect. territory.

7. For the №6-19 strand cable apply BURNDY terminal YAV26-L3 or equal: USING BURNDY HYTOOL MY 28, or equal for pressing terminal to either cable. BURNDY terminal YAV 26-L3 or equal: USING BURNDY HYTOOL MY 28, or equal for pressing terminal to either cable. Where the №6-19 strand cable is applied to AAR binding post use BURNDY terminal YAV6C-L4, or equal.

REFERENCE TABLE

ITEM №	IN STEAM ROAD TERRITORY APPLY CONNECTOR	IN A.C. TRACTION TERRITORY APPLY CONNECTOR
	DWG. S-179 SHEET 1	DWG. S-179 SHEET 2
(1)	2-17912 OR 2-17913	2-17928
(2)	2-17910 OR 2-17911	2-17927
(3)	2-17921 OR 2-17922	2-17929
(4)	2-17914	2-17931
(5)	2-RAIL BONDS	2-RAIL BONDS
(6)	1-RAIL BOND	1-RAIL BOND
(7)	1-RAIL BOND	1-RAIL BOND
(8)	4-17921 OR 4-17922 *	4-17929 *

*LENGTH AS REQUIRED — EACH PAIR OF CONNECTORS 17921, 17922 OR 17929 SHALL BE JOINED BY SOLDERING INTO COPPER SLEEVE AT CENTER BETWEEN TERMINALS APPLY COPPER SLEEVE S. CAT. REF. 25E-2847 FOR 17921 AND 17922, AND 25E-1945 FOR 17929.



WHERE DIFFERENCES IN MAINTAINING PROPER ADJUSTMENTS ETC., ARE ENCOUNTERED, CENTER LOCK LEVER DWG. S-228 SHOULD BE APPLIED.

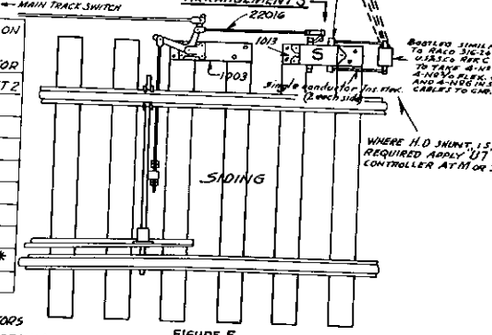


FIGURE F.
SHUNTING MAIN TRACK AT DERAIL OR CLEARANCE POINT.
(FIGS. F AND H APPLY TO TURNOUTS ONLY)

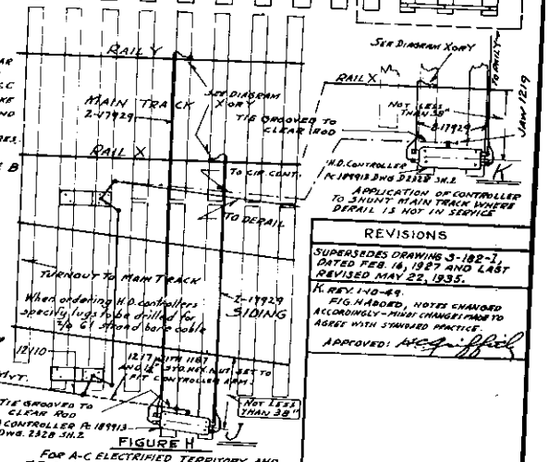


FIGURE H
FOR A-C ELECTRIFIED TERRITORY, AND F.P. SW'S. IN CAB SIG. TERRITORY STEAM ROAD IF REQUIRED.

REVISIONS

SUPERSEDES DRAWING S-182-J, DATED FEB. 14, 1927 AND LAST REVISED MAY 22, 1935.

K. REV. 1-10-49. FIG. H ADDED, NOTES CHANGED ACCORDINGLY — MINOR CHANGES MADE TO AGREE WITH STANDARD PRACTICE.

APPROVED: H.C. Griffith

SHEET 1 OF 2.

S-182-K

THE PENNSYLVANIA RAILROAD

STANDARD

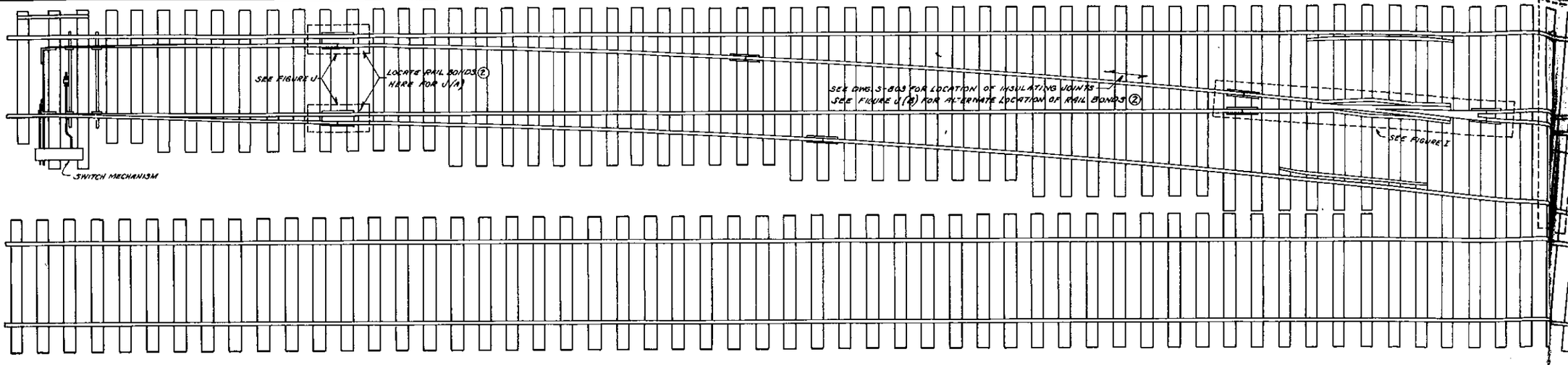
TRACK CIRCUIT CONNECTIONS

NON-INTERLOCKED SWITCHES STEAM OR A-C ELECTRIFIED TERRITORY

OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 27, 1948.

Approved H.C. Griffith
Assistant Chief Engineer-T, C & S

Approved W.W. Atterbury
Chief Engineer.



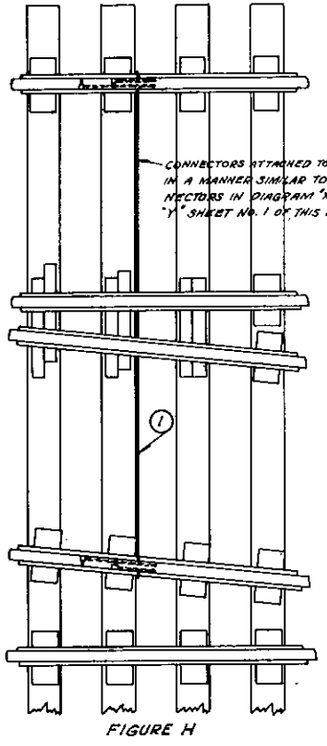


FIGURE H

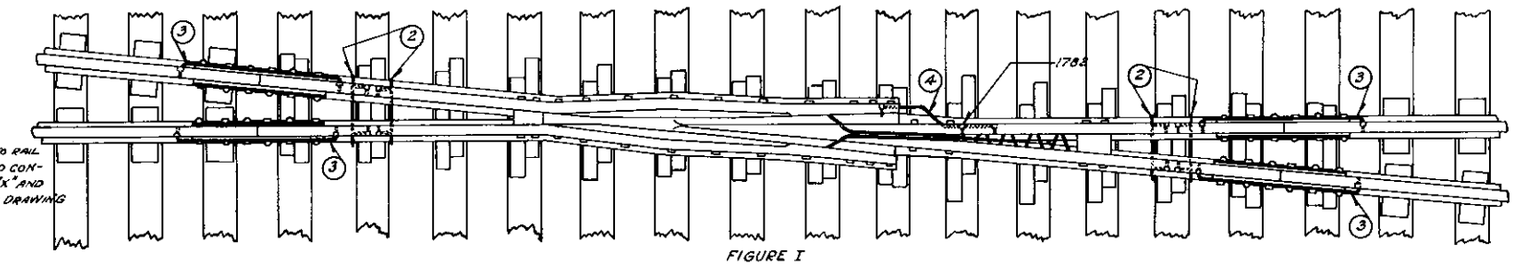


FIGURE I

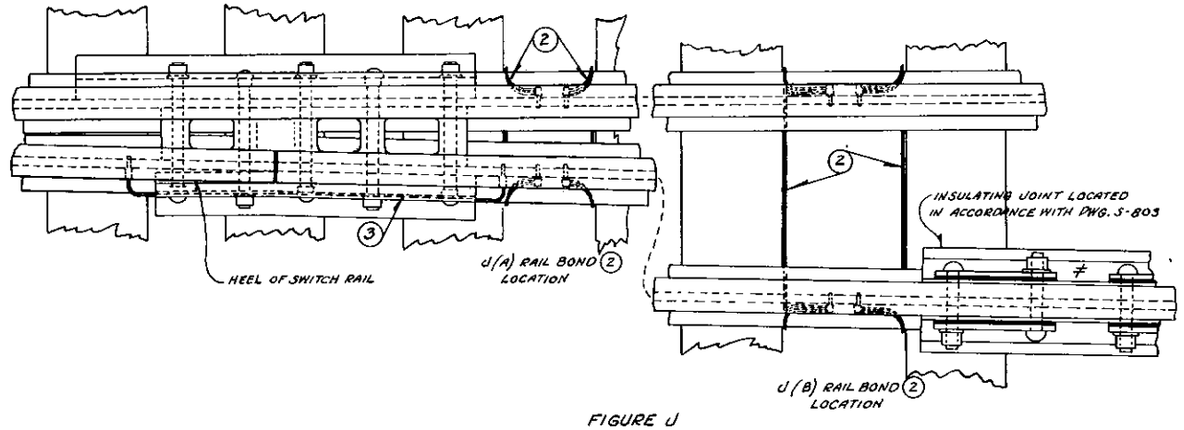


FIGURE J
SEE S-803 FOR USE OF A & B.

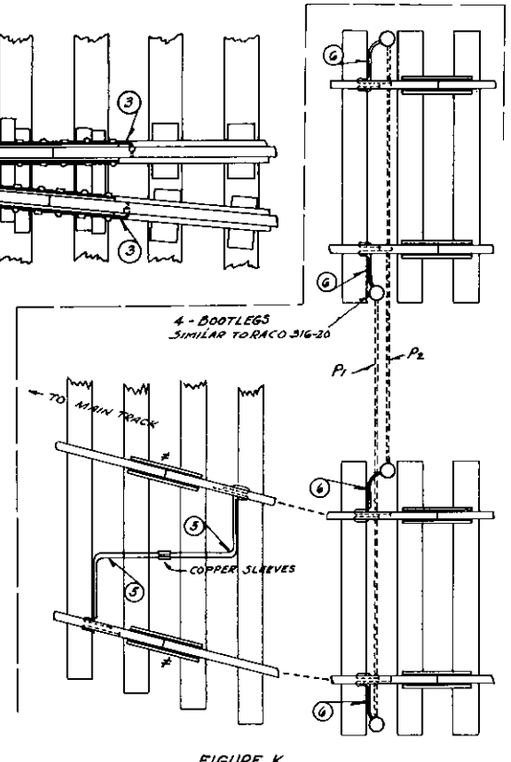
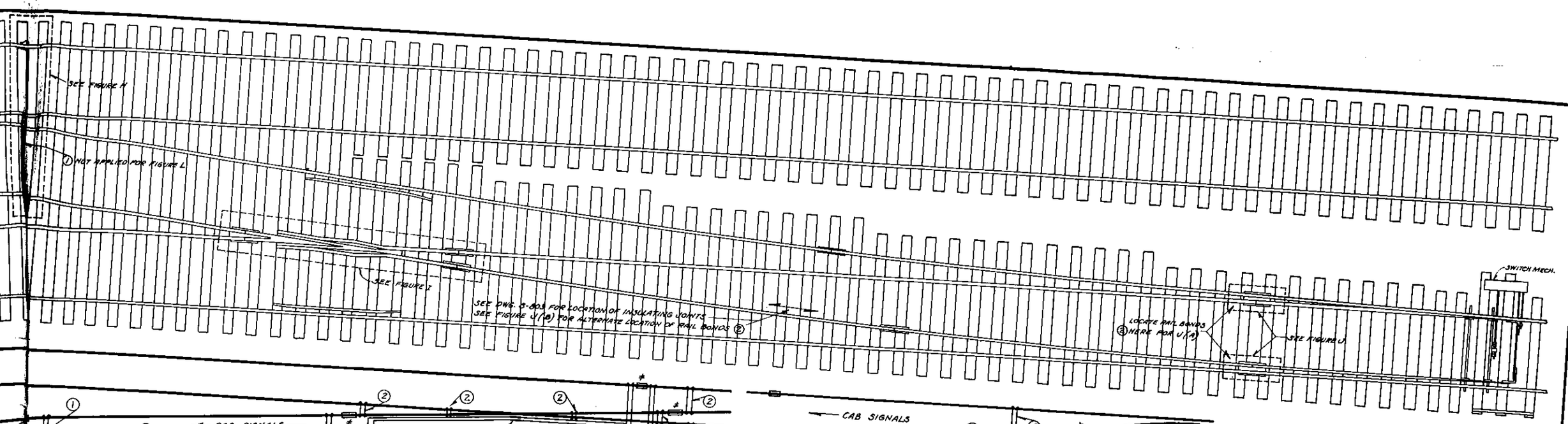


FIGURE K
(SEE FIG. 2C DRAWING S-803)



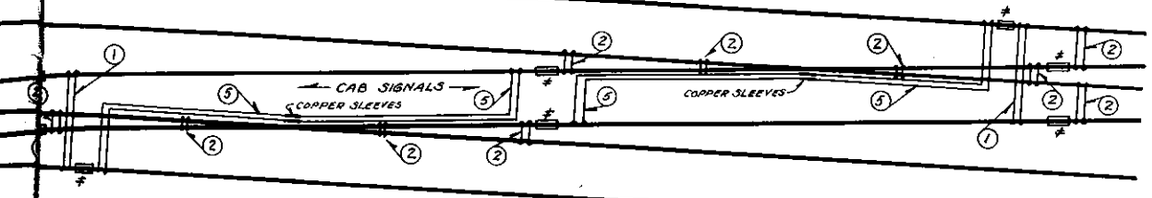


FIGURE L

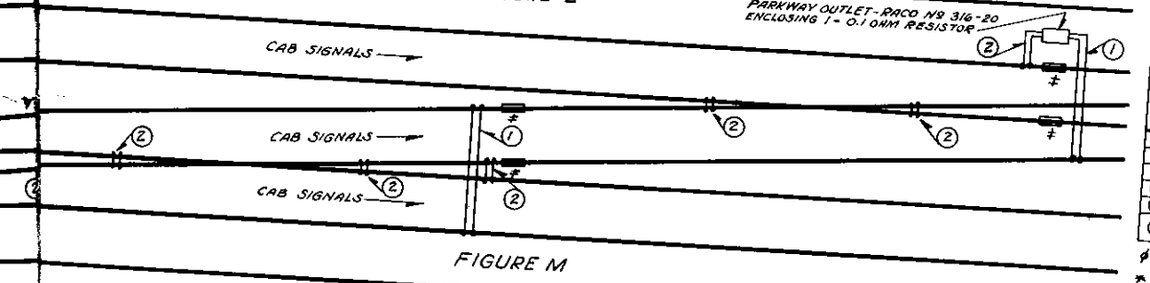


FIGURE M

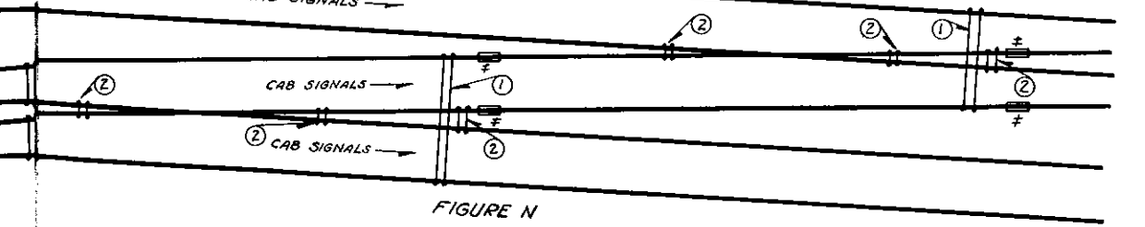


FIGURE N

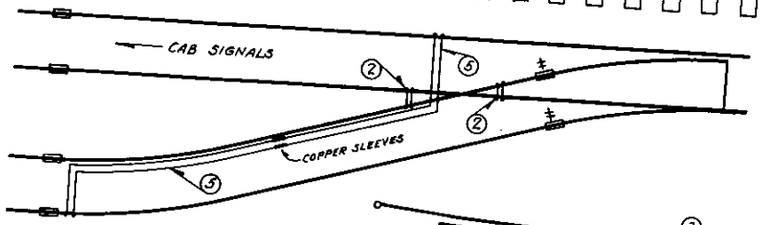


FIGURE O

REFERENCE TABLE

ITEM NO.	IN STEAM ROAD TERRITORY APPLY RAIL BONDS CONNECTORS ETC.	IN A-C ELECTRIFIED TERRITORY APPLY RAIL BONDS CONNECTORS ETC.
	DWG. S-179, SHEET 1	DWG. S-179, SHEET 2
①	2 - 17914	2-17931
② ϕ	2 - RAIL BONDS	2- RAIL BONDS
③ ϕ	1 - RAIL BOND	1 - RAIL BOND
④ ϕ	1 - RAIL BOND	1 - RAIL BOND
⑤ *	2 - 17921, OR 2-17922	2 - 17929
⑥	2-17921, OR 2-17922 36 IN. LONG	2 - 17929 36 IN. LONG

ϕ APPLY THE PROPER RAIL BOND TO FIT LOCAL CONDITIONS.

* LENGTH AS REQUIRED - EACH PAIR OF CONDUCTORS 17921, 17922, OR 17929 SHALL BE JOINED BY SOLDERING INTO A COPPER SLEEVE AT CENTER BETWEEN TERMINALS. APPLY SLEEVE S.C. REF. 25E-2847 FOR 17921 AND 17922. " " S.C. REF. 25E-1485 " 17929.

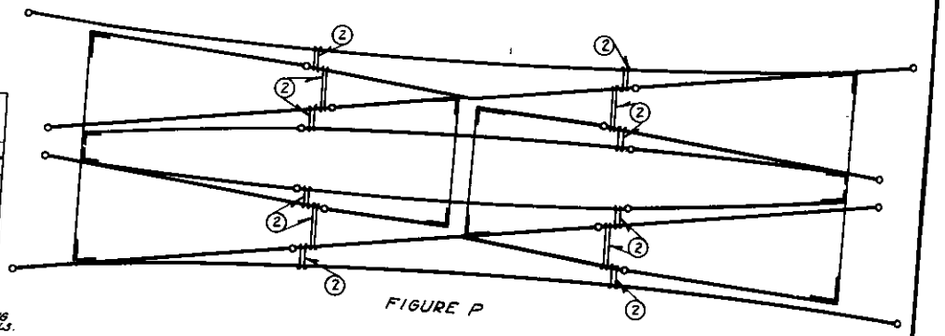


FIGURE P

NOTES :-

1. SHUNT AND FOULING CONNECTORS WHERE PASSING ALONG TIES SHALL BE STAPLED NEAR TOP OF TIE.
2. CONNECTORS ⑤ SHALL BE STAPLED TO TOP OF TIES ALONG BASE OF RAIL INVOLVED, BUT MUST BE FREE FROM MAKING CONTACT WITH RAIL BETWEEN TERMINALS. APPLIES TO FIGS. L AND O ONLY.
3. RAIL BONDS ② AND CONNECTORS ①, ③ & ⑥ SHALL BE CONNECTED TO RAIL IN A MANNER SIMILAR TO DIAGRAMS "X" AND "Y" SHEET № 1.
4. FOR CIRCUITS SHOWING BONDING AND INSULATION OF SWITCHES SEE DRAWING S-803.
5. INSULATING JOINTS MARKED ‡ SHALL BE LOCATED IN ACCORDANCE WITH DRAWING S-803.
6. CABLES P_1 AND P_2 SHALL EACH BE 2-№6 SINGLE CONDUCTOR NON-METALLIC PARKWAY CABLES, S.C. REF. 2A-5731 FOR STEAM TERRITORY, AND 2-№ 3/0 SINGLE CONDUCTOR NON-METALLIC PARKWAY CABLES, S.C. REF. 2A-3031, FOR A-C ELECT. TERRITORY.

SHEET 2 OF 2

S-182-K

THE PENNSYLVANIA RAILROAD STANDARD TRACK CIRCUIT CONNECTIONS

INTERLOCKED SWITCHES STEAM OR A-C ELECTRIFIED TERRITORY.

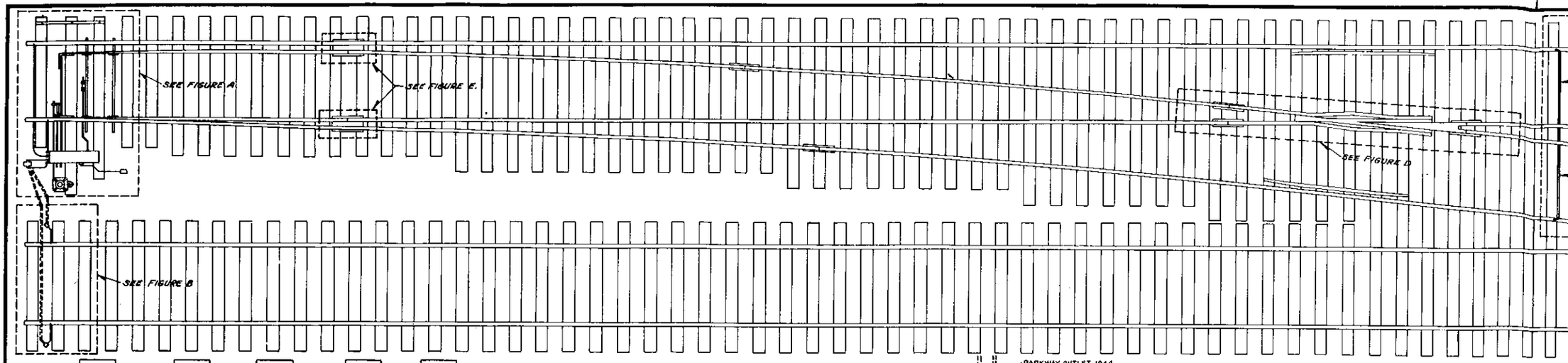
OFFICE OF CHIEF ENGINEER, PHILA., PA.,

Approved

Assistant Chief Engineer - T, C & S

Approved

Chief Engineer



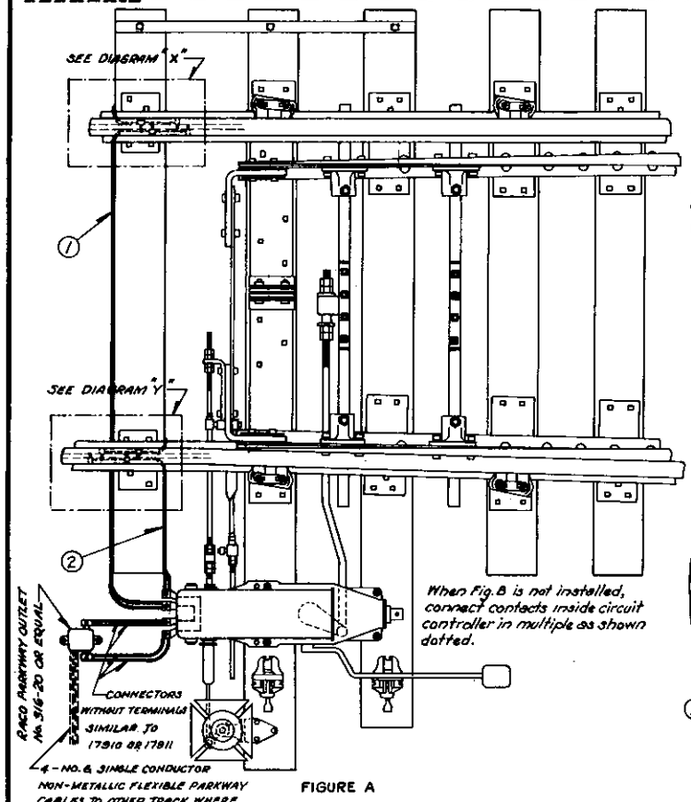


FIGURE A

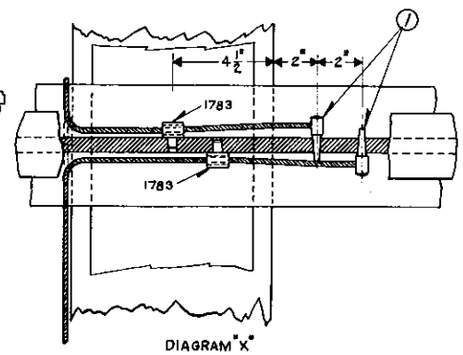


DIAGRAM "X"

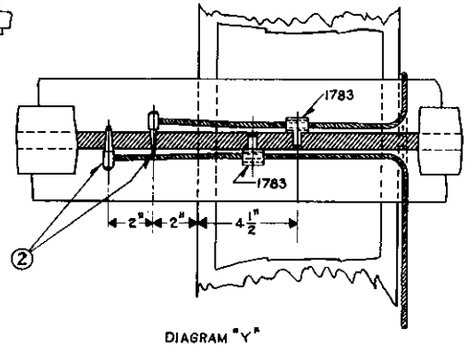


DIAGRAM "Y"

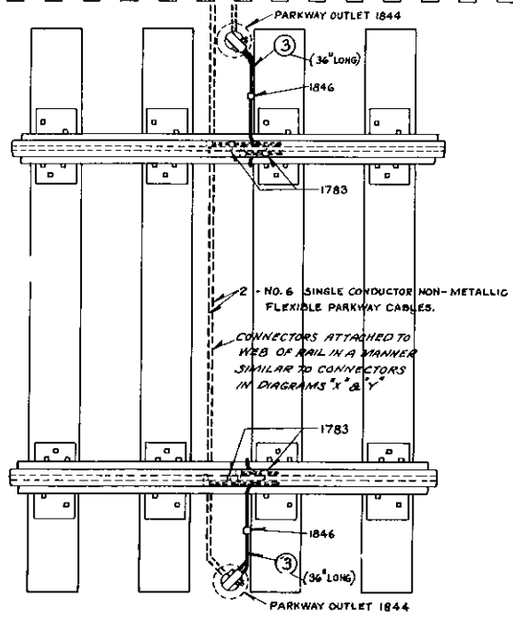


FIGURE B

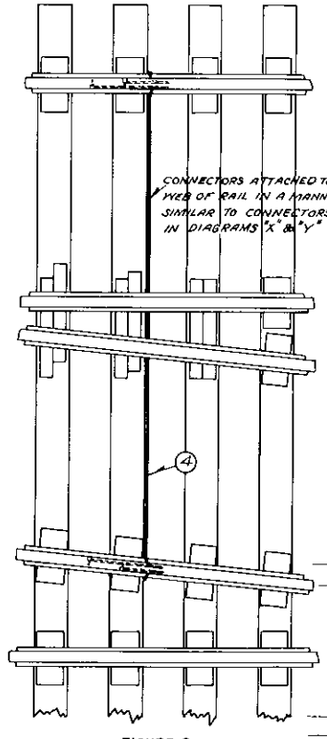
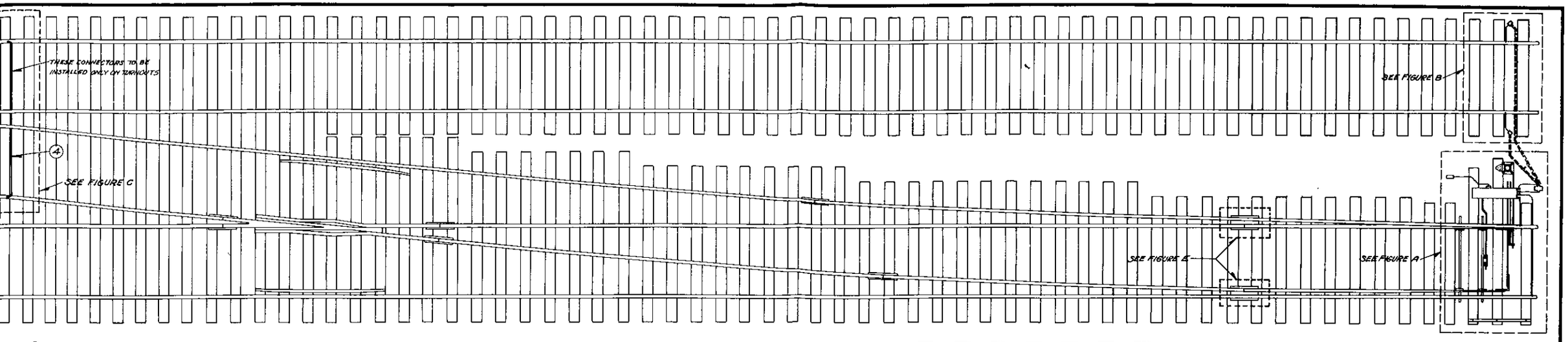


FIGURE C



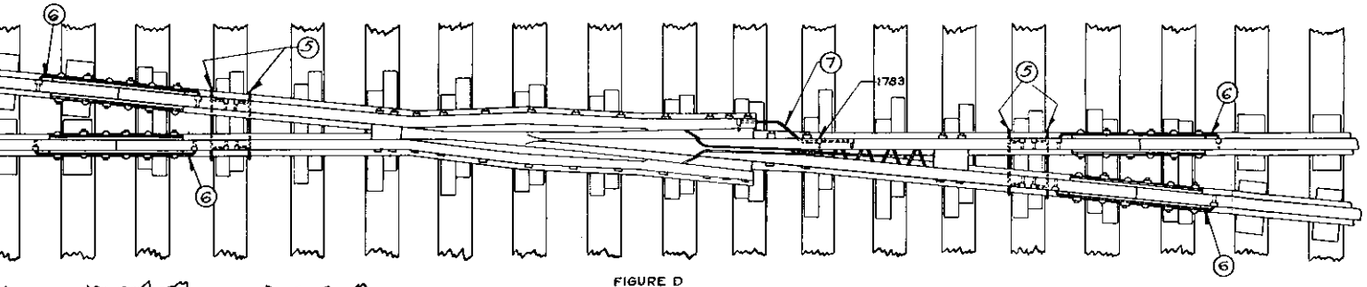


FIGURE D
BONDING OF RAIL BOUND MANGANESE STEEL FROG.

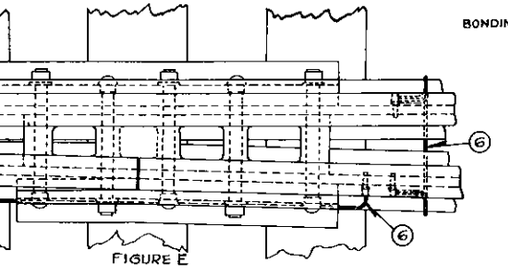


FIGURE E

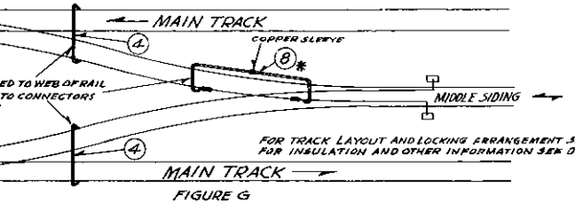


FIGURE G

NOTES :-

1 (a) Shunt and Fouling Connectors for turnout shall be arranged similar to one end of crossover. At derail or clearance point in Cab Signal Territory, arrangement shall be in accordance with Figure F. (See Note 3)

(b) At clearance point of turnout, where derail is not used, locate Circuit Controller as indicated by M on tie of Main Track and pipe connect it to T-20 Mechanism.

(c) At clearance point of turnout, where derail is used, locate Circuit Controller as indicated by S.

2. Shunt and Fouling Connectors where passing along ties shall be stapled near top of tie.

3. In Non-Cab Signal Territory, or trailing point switch in Cab Signal Territory, shunt connections in Fig. F are not necessary.

4 For Standard Circuits showing bonding and insulation of switches see Drawing S-803.

FOR TRACK LAYOUT AND LOCKING ARRANGEMENT SEE MW DWG 73930-A
FOR INSULATION AND OTHER INFORMATION SEE DWG S-803

REFERENCE TABLE

ITEM Nº	IN STEAM ROAD TERRITORY APPLY CONNECTOR	IN A.C. TRACTION TERRITORY APPLY CONNECTOR
	DWG. S-179 SHEET 1	DWG. S-179 SHEET 2
(1)	2-17912 OR 2-17913	2-17928
(2)	2-17910 OR 2-17911	2-17927
(3)	2-17921 OR 2-17922	2-17929
(4)	2-17914	2-17931
(5)	2-RAIL BONDS	2-RAIL BONDS
(6)	1-RAIL BOND	1-RAIL BOND
(7)	1-RAIL BOND	1-RAIL BOND
(8)	4-17921 OR 4-17922 *	4-17929 *

*LENGTH AS REQUIRED - EACH PAIR OF CONNECTORS 17921, 17922 OR 17929 SHALL BE JOINED BY SOLDERING INTO COPPER SLEEVE AT CENTER BETWEEN TERMINALS

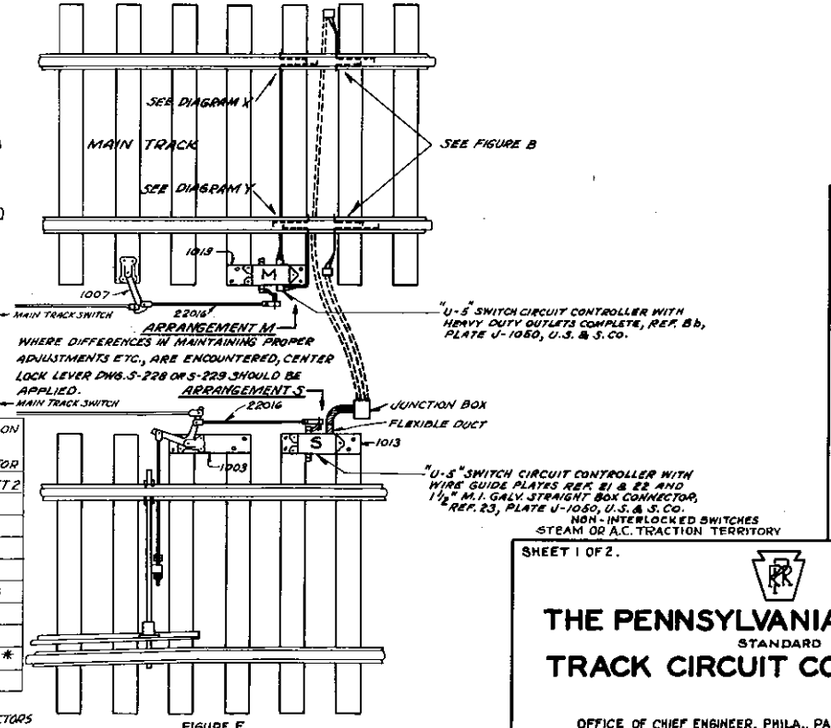


FIGURE F.
SHUNTING MAIN TRACK AT DERAIL OR CLEARANCE POINT.

REVISIONS

SUPERSEDES DRAWING S-182-I, DATED FEB. 16, 1927 AND LAST REVISED MAY 22, 1935.

SHEET 1 OF 2.

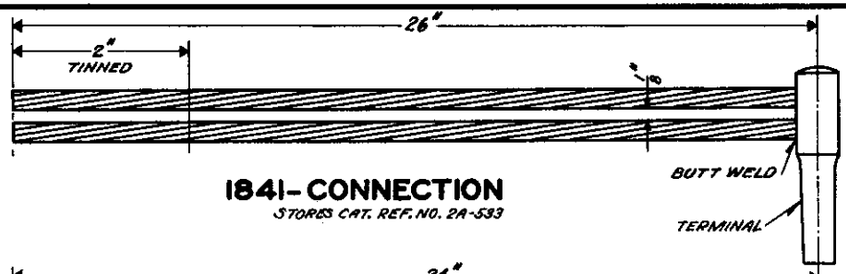
S-182-J

THE PENNSYLVANIA RAILROAD
STANDARD
TRACK CIRCUIT CONNECTIONS

OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 27, 1948.

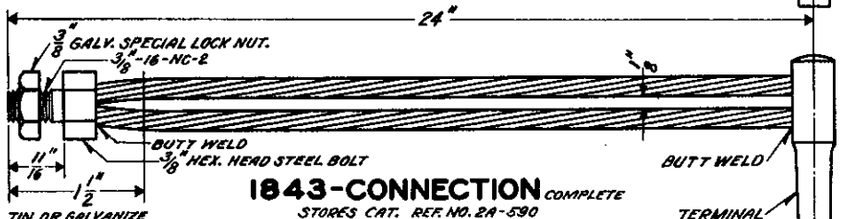
Approved
Assistant Chief Engineer-T, C & S

Approved
Chief Engineer



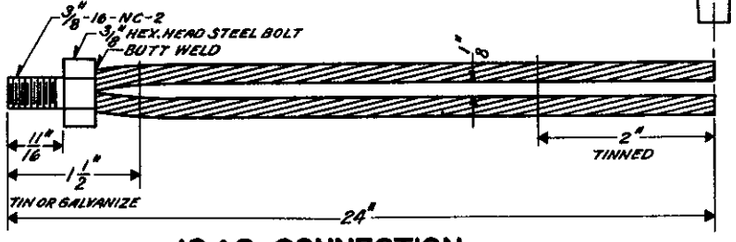
1841-CONNECTION

STORES CAT. REF. NO. 2A-533



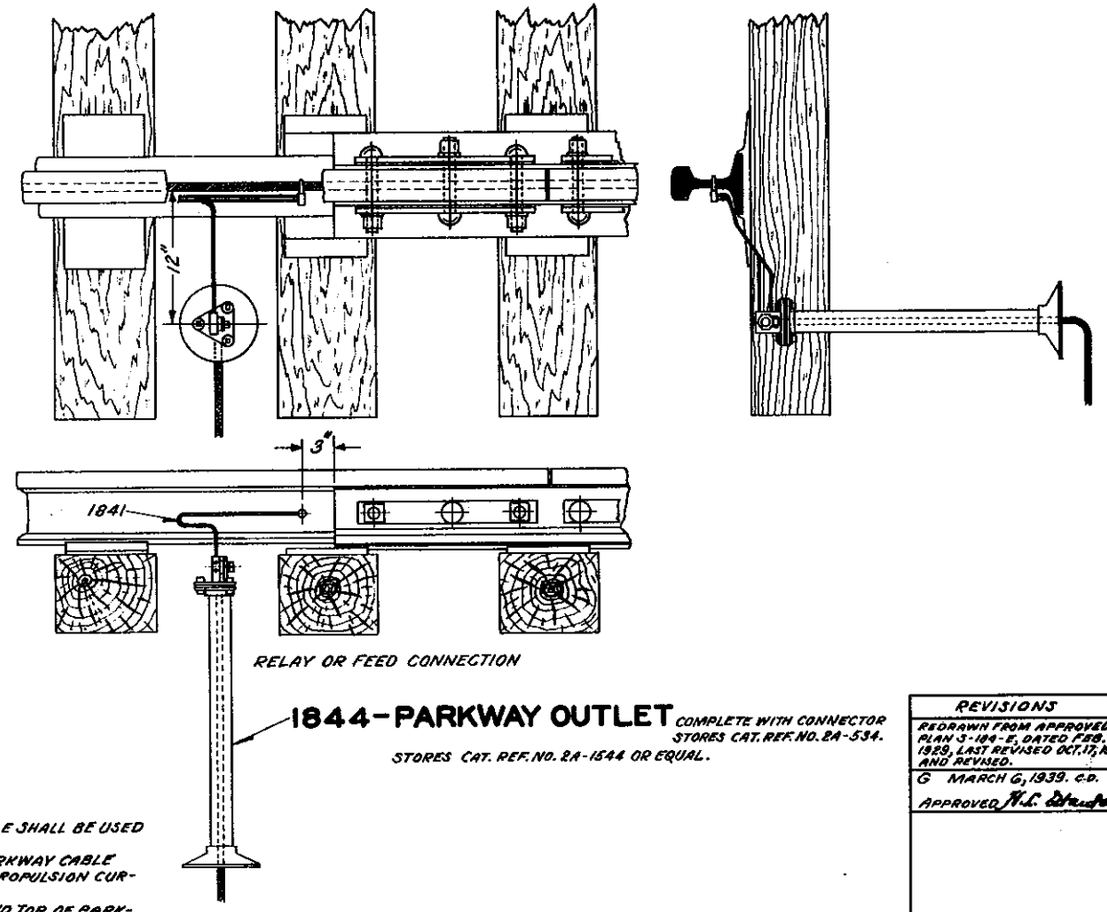
1843-CONNECTION COMPLETE

STORES CAT. REF. NO. 2A-590



1842-CONNECTION

STORES CAT. REF. NO. 2A-1257



RELAY OR FEED CONNECTION

1844-PARKWAY OUTLET COMPLETE WITH CONNECTOR

STORES CAT. REF. NO. 2A-534.

STORES CAT. REF. NO. 2A-1544 OR EQUAL.

NOTES:-

1. PARKWAY OUTLET.
   PARKWAY OUTLET STORES CAT. REF. NO. 2A-1544, OR SIMILAR, TO BE FURNISHED ASSEMBLED.
2. MATERIAL FOR RAIL CONNECTIONS.
   (a) CONDUCTOR SHALL CONSIST OF ONE (1) COPPER STRAND IN CENTER AND SIX (6) GALVANIZED STEEL STRANDS IN ACCORDANCE WITH SPECIFICATION FOR STRANDED WIRES CURRENT ISSUE OF PLAN NO. S-179.
   (b) TERMINALS SHALL BE IN ACCORDANCE WITH CURRENT ISSUE OF PLAN NO. S-179.
3. TINNING OF CONDUCTORS.
   (a) STUB ENDS OF CONNECTIONS 1841 AND 1842 SHALL BE TINNED FOR A LENGTH OF 2 INCHES.
   (b) STUB ENDS SHALL BE CLOSELY BUNCHED AND FINISHED TINNED DIAMETER APPROXIMATING THE NOMINAL DIAMETER OF THE STRAND. TEST 11(H-1) PLAN S-179 NOT REQUIRED.

FIELD WORK.

1. NON-INDUCTIVE PARKWAY CABLE SHALL BE USED FOR A.C. TRACK CIRCUITS.
2. NO. 6 A.W.G. NON-INDUCTIVE PARKWAY CABLE SHALL BE USED WHERE THERE IS PROPULSION CURRENT RETURN.
3. WHEN IN PLACE, CONNECTION AND TOP OF PARKWAY OUTLET SHALL BE GIVEN A HEAVY COAT OF A RUST PREVENTATIVE APPROVED BY THE ASSISTANT CHIEF ENGINEER-SIGNALS.
4. PARKWAY OUTLETS SHALL BE FILLED WITH SAND OR COMPOUND.
5. PARKWAY CABLE SHALL BE NOT LESS THAN 2 FEET 6 INCHES BELOW THE BOTTOM OF TIE.
6. THE FILL AROUND PARKWAY CABLE SHALL BE FREE FROM CINDERS.

REVISIONS
REDRAWN FROM APPROVED PLAN S-184-E, DATED FEB. 8, 1929, LAST REVISED OCT. 17, 1934 AND REVISED.
G MARCH 6, 1939. C.D.
APPROVED N. L. Stanton

1 SHEET

S-184-G

THE PENNSYLVANIA RAILROAD

STANDARD

TRACK CIRCUIT CONNECTIONS

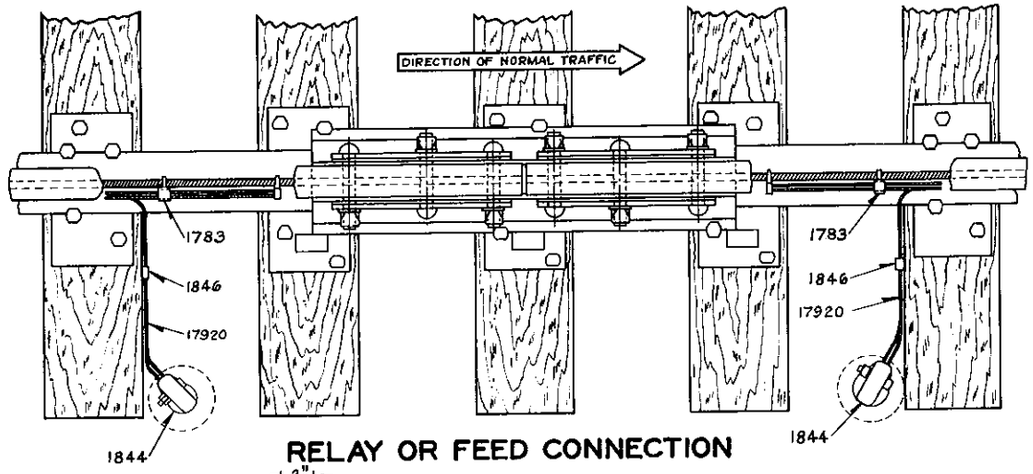
PARKWAY CABLE

OFFICE OF ASSISTANT CHIEF ENGINEER-SIGNALS, PHILA., PA., MAY 16, 1938.

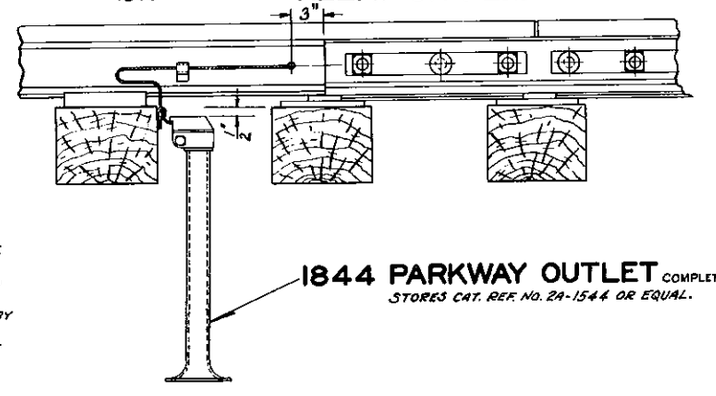
Approved N. L. Stanton
Assistant Chief Engineer-Signals

Approved [illegible]
Chief Engineer

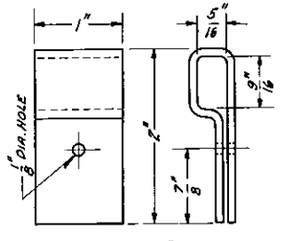
C.D.
C.S.



RELAY OR FEED CONNECTION



1844 PARKWAY OUTLET COMPLETE
STORES CAT. REF. NO. 2A-1544 OR EQUAL.



1846 CLIP *12 U.S. STD. GAGE SHEET LEAD OR ALUMINUM.
STORES CAT. REF. NO. 2A-398

FIELD WORK

1. NO. 6 A.W.G. SINGLE CONDUCTOR PARKWAY CABLE SHALL BE USED FOR LEAD WIRES OF ALL TRACK CIRCUITS. NON-INDUCTIVE COVERING SHALL BE USED IN A.C. TRACK CIRCUIT TERRITORY.
2. WHEN IN PLACE, CONNECTOR AND TOP OF HEAD AT PARKWAY OUTLET SHALL BE GIVEN A HEAVY COAT OF A RUST PREVENTIVE APPROVED BY THE ASSISTANT CHIEF ENGINEER-T-C.&S.
3. PARKWAY OUTLETS SHALL BE FILLED WITH SAND OR COMPOUND.
4. PARKWAY CABLE SHALL BE NOT LESS THAN 2 FEET 6 INCHES BELOW THE BOTTOM OF TIE.
5. THE FILL AROUND PARKWAY CABLE SHALL BE FREE FROM CINDERS.
6. FIBRE INSULATION IN PARKWAY OUTLETS SHALL MEET THE REQUIREMENTS OF THE ELECTRICAL AND ABSORPTION TEST OF P.R.R. SPEC. C.E. 50(b).
7. WHERE CONNECTOR 17920 IS USED, CLIP 1783 PLAN NO. S-178 SHALL BE INSTALLED TO KEEP THE STRANDED CONDUCTORS IN PLACE ALONG THE WEB OF RAIL.
8. PARKWAY OUTLET SHALL BE INSTALLED AS SHOWN WITH TOP OF OUTLET APPROX. 1/2" BELOW TOP OF TIE.
9. CONNECTORS 17916 & 17920 FOR USE BETWEEN PARKWAY OUTLET AND RAIL. (CONNECTOR 17916 FOR OLD LOCATION OF PARKWAY OUTLET).

REVISIONS

REDRAWN FROM APPROVED PLAN S-184-G, DATED MAY 16, 1938, LAST REVISED MARCH 6, 1939 AND CHANGED AS FOLLOWS:-NUT ON BOLT OF 1843 REMOVED & CONNECTION 1846 ADDED. LOCATION OF PARKWAY OUTLETS CHANGED. NOTE & FIELD WORK ADDED. CLIPS FOR HOLDING CONNECTIONS IN PLACE ADDED.

1 NOVEMBER 12, 1946
CONNECTORS 1841, 1842, 1843 & 1845 AND NOTES REFERRING THERETO REMOVED, INCLUDED ON S-179-L. FIELD NOTES CHANGED ACCORDINGLY.
APPROVED H.C. Griffith

1 SHEET

S-184-H

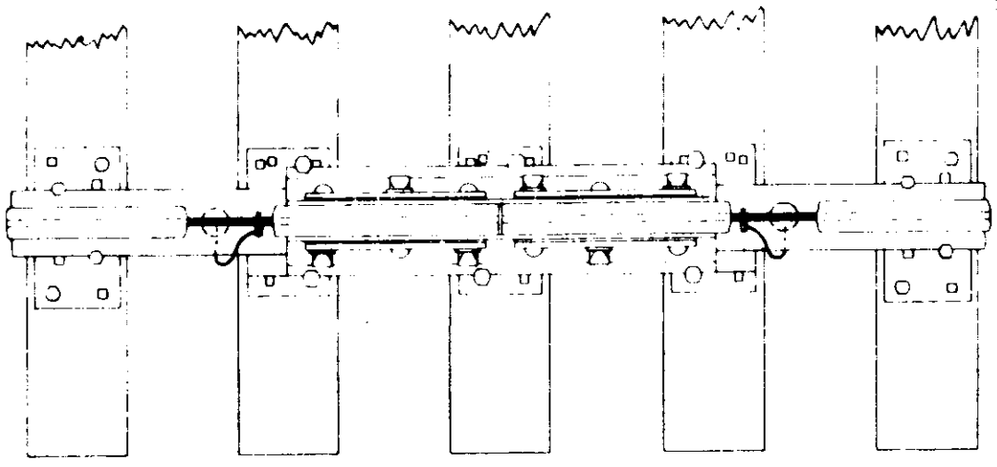
THE PENNSYLVANIA RAILROAD
STANDARD
TRACK CIRCUIT CONNECTIONS
PARKWAY CABLE

OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 18-1946

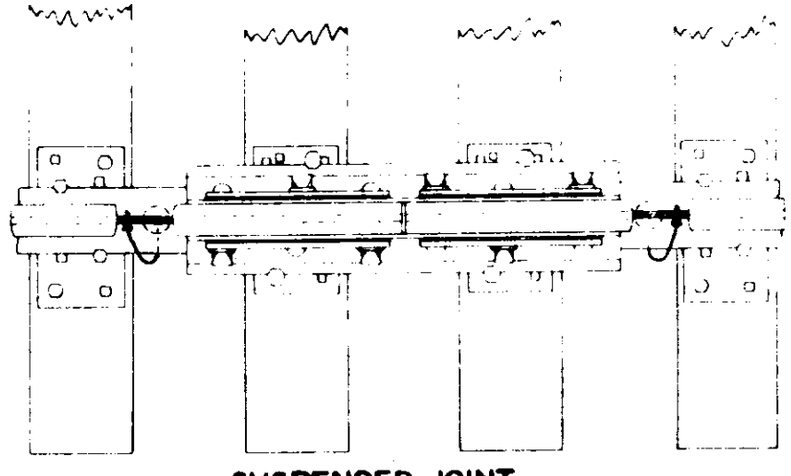
Approved H.C. Griffith
Assistant Chief Engineer T-C & S

Approved J. Minnich
Chief Engineer

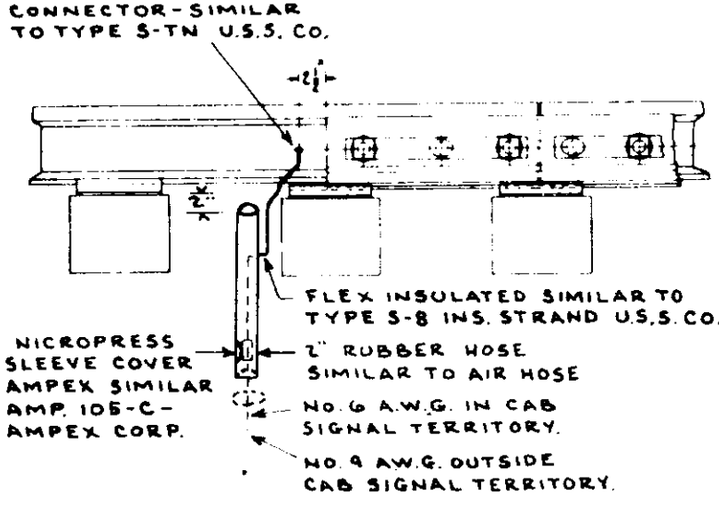
W. F. KNITTER



SUPPORTED JOINT



SUSPENDED JOINT



02-152401 CONNECTOR, U.S. STEEL, TYPE S-TN OR EQUAL.

02-555856 STRAND, INSULATED, U.S. STEEL CO. TYPE S-8 OR EQUAL.

02-842100 SLEEVE, NICROPRESS, SPLICING, NO. 2363-J (NO. 6 AWG TO STRAND) NATIONAL TELEPHONE SUPPLY COMPANY.

02-842126 SLEEVE, NICROPRESS, SPLICING, NO. 2314-J (NO. 9 AWG. TO STRAND) NATIONAL TELEPHONE SUPPLY COMPANY.

NOTE

TRACK CIRCUIT CONNECTIONS FOR ELECTRONIC AND OTHER TRACK CIRCUITS WITH AND WITHOUT INSULATED JOINTS TO BE SIMILAR.

REVISIONS
SUPERSEDES PLAN S-184-J DATED 12-27-51

1 SHEET

S-184-K

THE PENNSYLVANIA RAILROAD

TYPICAL

TRACK CIRCUIT CONNECTIONS

PARKWAY CABLE

OFFICE OF CHIEF MAINTENANCE OF WAY OFFICER PHILA. PA. JULY 15, 1946

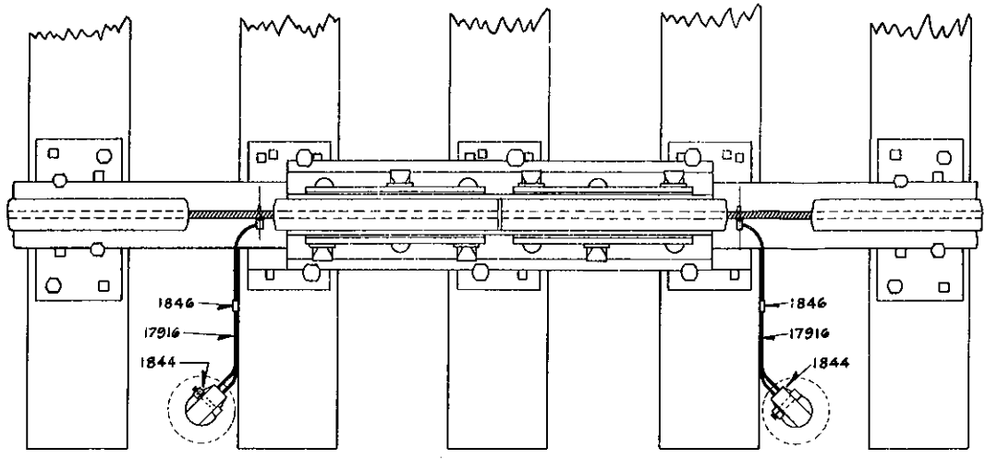
NOT TO SCALE

APPROVED

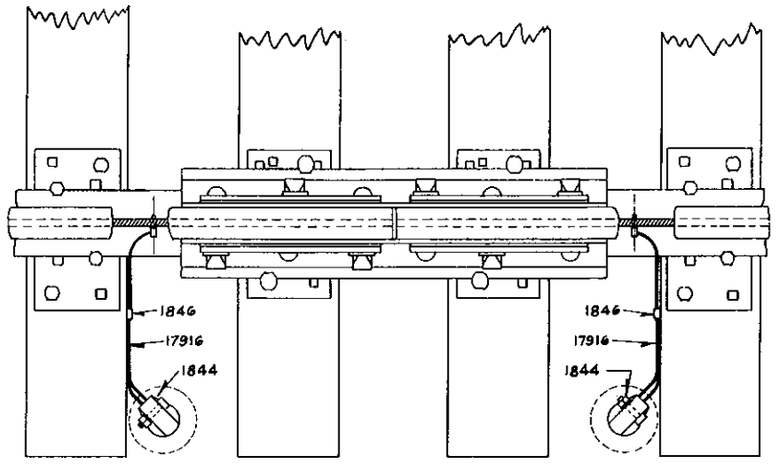
APPROVED

SYSTEM ENGR C&S

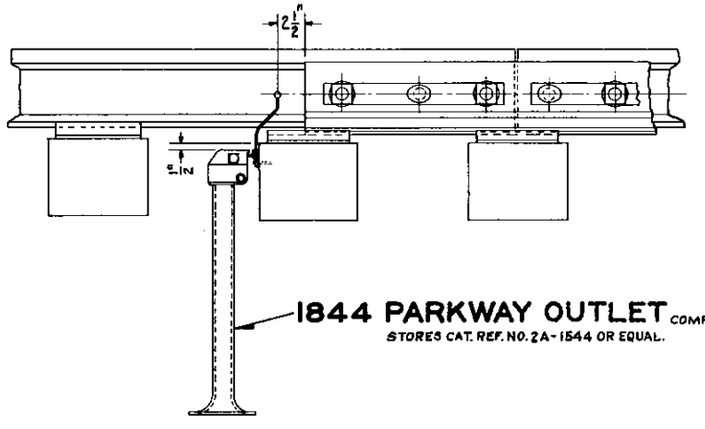
CHIEF M.O. WAY OFFICER



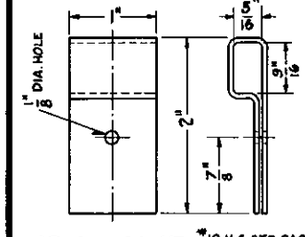
SUPPORTED JOINT



SUSPENDED JOINT



1844 PARKWAY OUTLET COMPLETE
STORES CAT. REF. NO. 2A-1544 OR EQUAL.



1846 CLIP #12 U.S. STD. GAGE SHEET LEAD OR ALUMINUM.
STORES CAT. REF. NO. 2A-398

NOTES:-

1. NO. 6 A.W.G. SINGLE CONDUCTOR PARKWAY CABLE SHALL BE USED FOR LEAD WIRES OF ALL TRACK CIRCUITS. NON-INDUCTIVE COVERING SHALL BE USED IN A.C. TRACK CIRCUIT TERRITORY.
2. WHEN IN PLACE, CONNECTOR AND CLAMP IN PARKWAY OUTLET SHALL BE GIVEN A HEAVY COAT OF A RUST PREVENTIVE APPROVED BY THE ASSISTANT CHIEF ENGINEER-SIGNALS.
3. PARKWAY OUTLETS MAY BE FILLED WITH SAND OR COMPOUND.
4. PARKWAY CABLE SHALL BE NOT LESS THAN TWO (2) FEET, SIX (6) INCHES BELOW THE BOTTOM OF TIES.
5. THE FILL AROUND PARKWAY CABLE SHALL BE FREE OF CINDERS.
6. FIBRE INSULATION IN PARKWAY OUTLETS SHALL MEET THE REQUIREMENTS OF A.A.R. SIGNAL SECTION SPECIFICATION NO. 13 FOR HARD FIBRE.
7. PARKWAY OUTLET SHALL BE INSTALLED AS SHOWN WITH TOP OF OUTLET ONE-HALF (1/2) INCH BELOW TOP OF TIE.
8. WHEN INSTALLING, CARE SHOULD BE EXERCISED TO ARRANGE CONNECTOR SO THAT IT WILL NOT MAKE CONTACT WITH THE RAIL OR TIE PLATE.

REVISIONS

REDRAWN FROM APPROVED PLAN S-184-I, DATED APRIL 18, 1946, LAST REVISED NOV. 12, 1946 AND CHANGED AS FOLLOWS: SUSPENDED JOINT LAY-OUT ADDED. LOCATION OF OUTLETS CHANGED. TERMINALS FORMERLY 3" FROM ENDS OF JOINT BARS. CLIPS 1783 SECURING CONNECTOR TO WEB OF RAIL REMOVED. NOTES 7 & 9 REMOVED NOTE 7 FORMERLY 8 & NEW NOTE 8 ADDED.

1 SHEET

S-184-J

THE PENNSYLVANIA RAILROAD

STANDARD

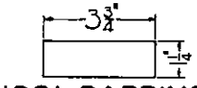
TRACK CIRCUIT CONNECTIONS

PARKWAY CABLE

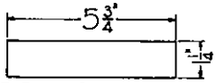
OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 27, 1951.

Approved
W. J. Salmonson
Assistant Chief Engineer-Signals

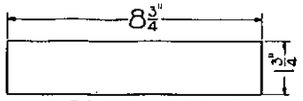
Approved
J. H. Cunniff
Chief Engineer



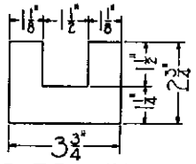
1861-CAPPING.



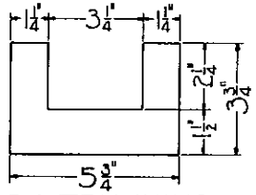
1863-CAPPING.



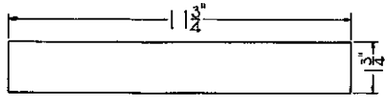
1865-CAPPING.



1862-TRUNKING.



1864-TRUNKING.



1866-CAPPING.

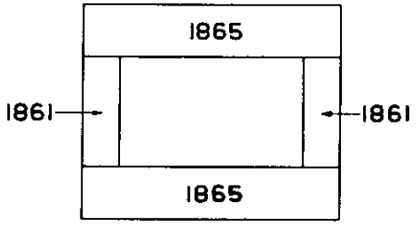


FIG-A.

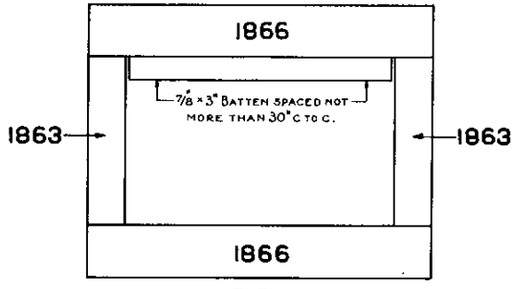


FIG-B.

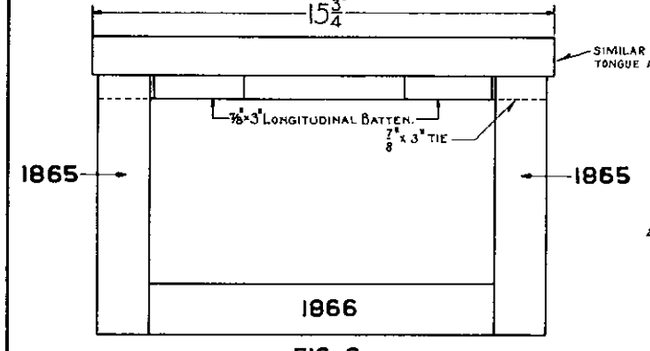
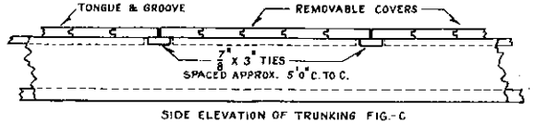


FIG-C.



SIDE ELEVATION OF TRUNKING FIG.-C

NOTE:-
FIGURES A-B & C SHOW METHOD OF ASSEMBLING BUILT UP TRUNKING.
UNLESS OTHERWISE SPECIFIED, PARTS SHOWN IN FIGURES A, B & C SHALL BE ORDERED SEPARATELY IN LINEAL FEET AND SHIPPED KNOCKED-DOWN.
TONGUE & GROOVE WHEN USED AS ASSEMBLED IN FIG. C MAY BE CUT IN LENGTHS OF 15¾" AT THE MILL, IF SO ORDERED.

K.W.S.
C.W.A.
H.E.H.

SPECIFICATION

MATERIAL

1. PURPOSE:
The purpose of this specification is to provide material adequate for the protection of insulated wires.

2. KIND OF WOOD:
Red cypress, cedar, or redwood.

3. GENERAL QUALITY:
(a) Trunking and capping shall be free from any defects which will impair the durability, strength or water tightness of the piece, such as decay, holes, splits, shakes, large, loose or numerous knots, or wane, and be free of sap wood elsewhere than on bottom corners of trunking.
(b) Sapwood shall not be wider than 1½ inches, measured across the face of sap.

4. STRENGTH:
Trunking and capping shall be of compact wood, and have an average of six (6) or more rings of annual growth per inch.

5. DIMENSIONS:
All trunking and capping shall conform to the dimensions specified, and may be 8 to 20 feet long; but 50 per cent. of each shipment shall be 16 to 20 feet in length; 35 per cent. shall be 10 feet and over.

6. MANUFACTURE:
All trunking and capping shall be straight, well manufactured and surfaced on all exterior planes, with ends sawed square.

7. INSPECTION:
(a) Trunking and capping will be rejected when decayed, or split more than ¼ inch deep and 6 inches in length.
(b) A shake is a separation of one ring of annual growth from another.
(c) A large knot is one more than 1 inch in diameter in capping and more than 2 inches in diameter in trunking.
(d) A loose knot is one not firmly held in place by growth or position.
(e) Numerous knots are any number equalling a large knot in damaging effect.
(f) Wane is bark, or lack of wood from any cause on corners.
(g) Trunking and capping is not well sawed and surfaced, and trunking is not well grooved, when their surfaces are not even.
(h) All dimension requirements are minimum measurements. An excess of ¼ inch in outside dimensions, and of ⅛ inch in groove dimensions are maximum tolerances.
(i) Trunking and capping will be inspected at points of shipment by Pennsylvania Railroad System Inspectors. The Manufacturer shall afford the Inspector, free of cost, all reasonable facilities to satisfy him that the trunking and capping supplied is in accordance with this specification.

FIELD WORK

1. Top of trunking, inside of ballast line, shall be level with the surface of the ballast.
2. Where trunking and capping is above ground, the exposed surface shall be given not less than two (2) coats of SLATE COLORED FIRE RETARDING PAINT that meets the approval of the Chief Signal Engineer.
3. After fire retarding paint is applied, the top of capping for cross runs, running under tracks, other than for track connections, shall be covered, from the ballast line, with sheet steel of number 16 U. S. Standard gauge, except under and two inches each side of the rail.
4. Capping, where run lengthwise, shall be secured to built up trunking by ⅜" x 3½" lag screws with flat washers.
5. The joints in capping and bottom of built up trunking, shall be staggered not less than 1 foot in relation to the joints in the sides.
6. All joints in grooved trunking shall be reenforced on the bottom with a piece of capping ten inches long and the width of the trunking.
7. Nails shall not be driven through the trunking from the inside of the groove, nor shall they be driven into the groove from the outside.
8. Inside corner of trunking at turns shall be rounded to prevent injury to wire insulation.

REVISIONS.
REDRAWN FROM APPROVED PLAN S-186-A DATED 4-25-21 AND REVISED C. SEPTEMBER 6, 1929.
APPROVED:

1 SHEET

S-186-C

PENNSYLVANIA RAILROAD SYSTEM
STANDARD
TRUNKING AND CAPPING
OFFICE OF CHIEF SIGNAL ENGINEER. PHILA., PA., MAR. 6, 1923

Correct
Chief Signal Engineer

Approved
Chief Engineer

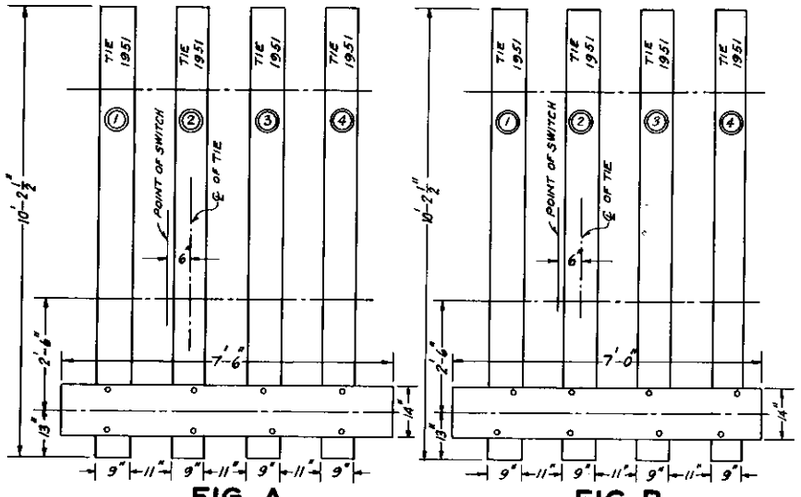


FIG. A
TYPE A5

FIG. B
TYPE A1

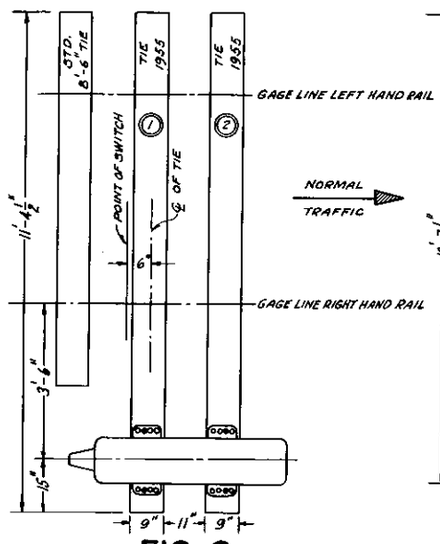


FIG. C
STYLE M2 & M20

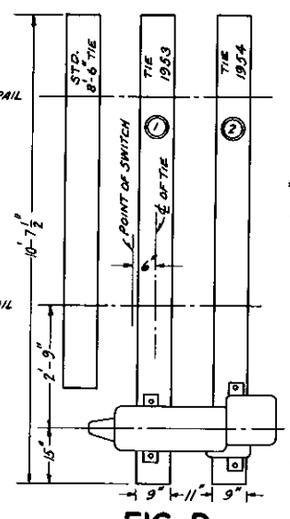


FIG. D
STYLE M

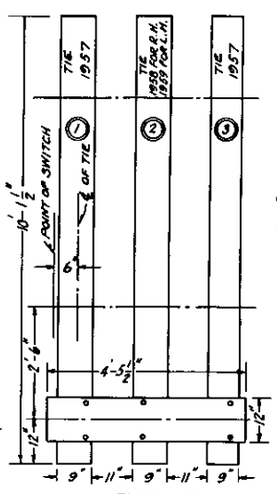


FIG. E
TYPE G

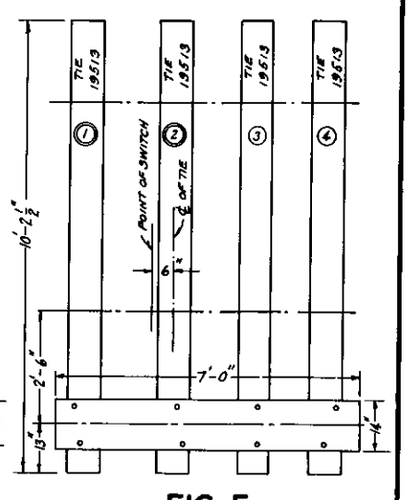


FIG. F
MODEL 14

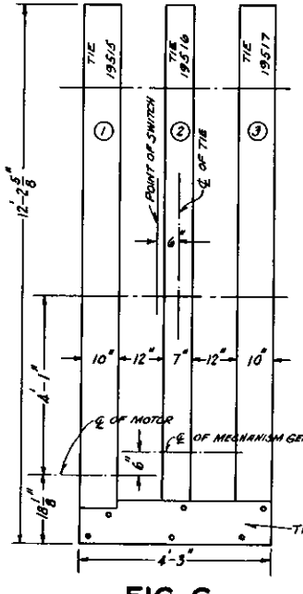


FIG. G
MODEL 2 (G.R.S.)

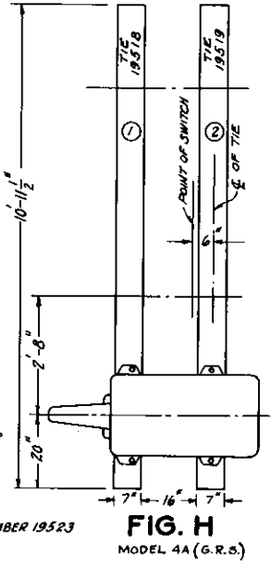


FIG. H
MODEL 4A (G.R.S.)

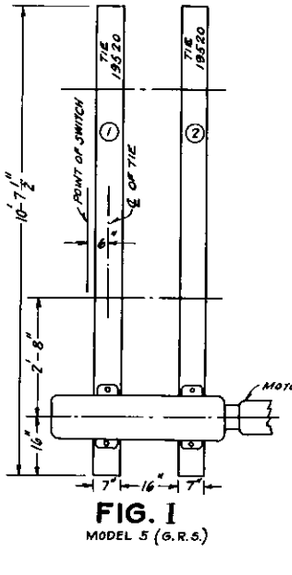


FIG. I
MODEL 5 (G.R.S.)

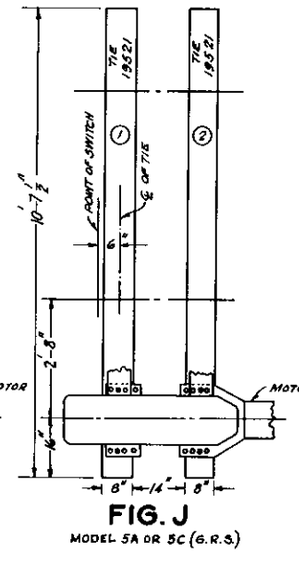


FIG. J
MODEL 5A OR 5C (G.R.S.)

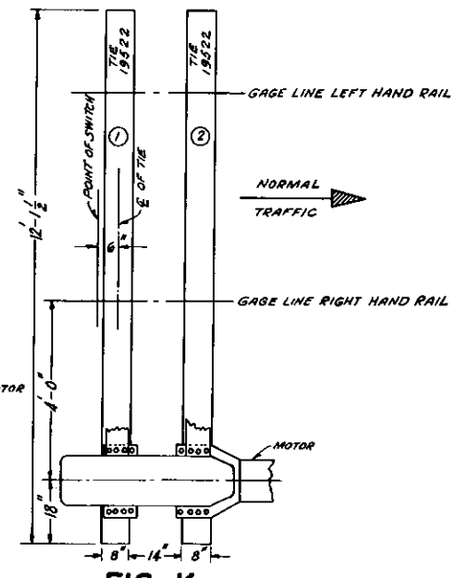


FIG. K
MODEL 5B OR 5D (G.R.S.)

REVISIONS

FOR DETAILS OF TIES SEE SHEETS 2 & 3.

SHEET 1 OF 3.

S-195-A

THE PENNSYLVANIA RAILROAD

STANDARD

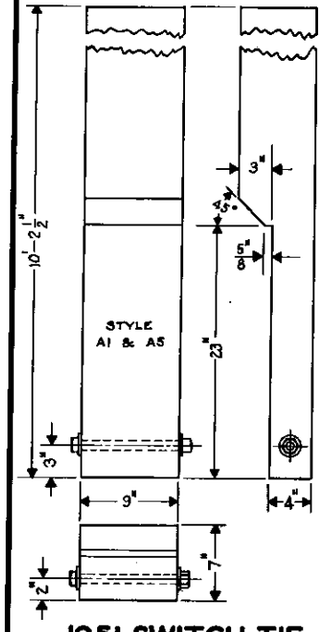
SWITCH TIES

FOR INTERLOCKED SINGLE SWITCHES.

OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 4, 1947.

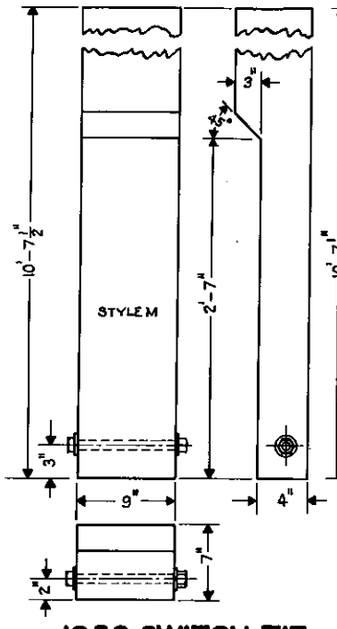
Approved
H. C. Griffith
Assistant Chief Engineer - T.C. & S.

Approved
J. H. Linville
Chief Engineer



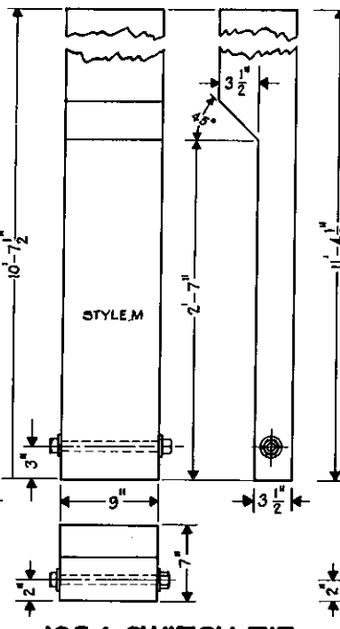
1951 SWITCH TIE.

STORES CAT. REF. NO. 5A-80



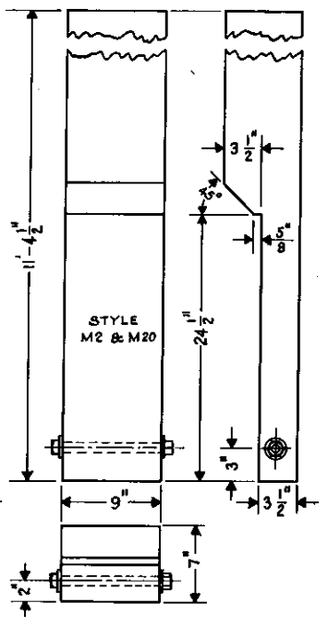
1953 SWITCH TIE.

STORES CAT. REF. NO. 5A-81



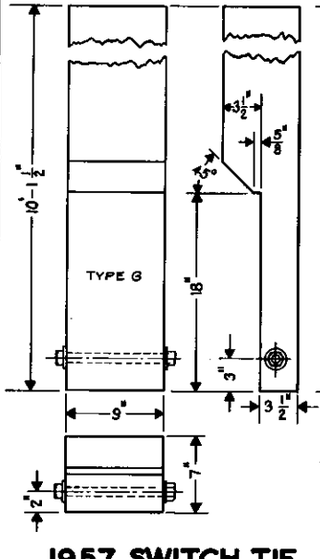
1954 SWITCH TIE.

STORES CAT. REF. NO. 5A-82



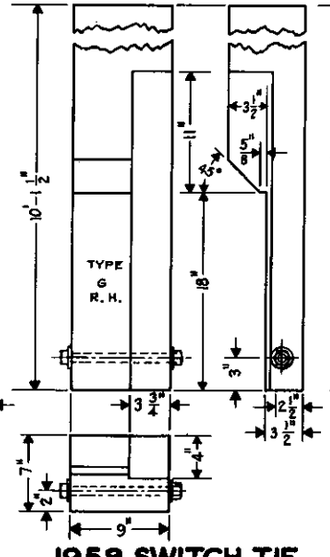
1955 SWITCH TIE.

STORES CAT. REF. NO. 5A-83



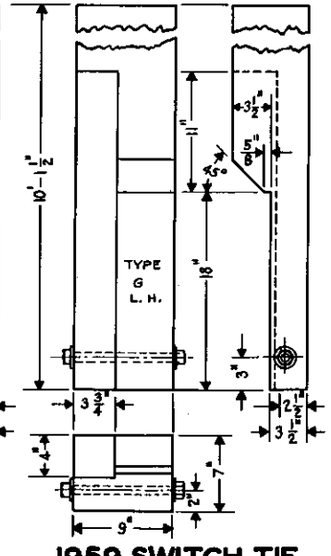
1957 SWITCH TIE.

STORES CAT. REF. NO. 5A-84



1958 SWITCH TIE.

STORES CAT. REF. NO. 5A-85



1959 SWITCH TIE.

STORES CAT. REF. NO. 5A-86

NOTES:-

1. ALL TIES FOR INTERLOCKED SWITCHES SHALL MEET THE REQUIREMENTS OF C.E. 23, WITH THE ADDITIONAL REQUIREMENT THAT THE FRAMED END OF ALL TIES SHALL BE STRAIGHT GRAIN WOOD WITHOUT KNOTS, DECAY, SHAKES, SPLITS, OR HOLES OF ANY KIND, AND SHALL BE CREOSOTED IN ACCORDANCE WITH PARAGRAPH 25, C.E. 23 AFTER FRAMING HAS BEEN COMPLETED.
2. BEFORE CREOSOTING, EACH TIE SHALL BE DRILLED FOR 5/8 IN. BOLT, LOCATED AS INDICATED. AFTER CREOSOTING, BUT BEFORE SHIPMENT, EACH TIE SHALL BE PROVIDED WITH 5/8 IN. GALVANIZED SQ. HD. BOLT WITH HEX. NUT, AND FLAT WASHER EACH SIDE OF TIE. PULL BOLT UP TIGHT.
3. UNLESS OTHERWISE INDICATED, TIES ARE ADAPTABLE FOR EITHER RIGHT OR LEFT HAND LAYOUT.
4. FOR LOCATIONS OF TIES SEE SHEET 1 OF THIS DRAWING.

SHEET 2 OF 3.

S-195-A

THE PENNSYLVANIA RAILROAD

STANDARD

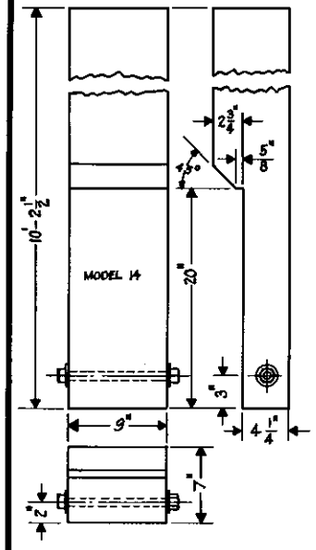
SWITCH TIES

FOR INTERLOCKED SINGLE SWITCHES

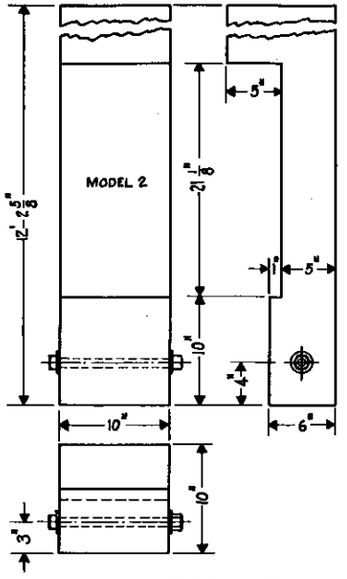
OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 4, 1947.

Approved
A. C. Griffith
Assistant Chief Engineer-T.C.&S.

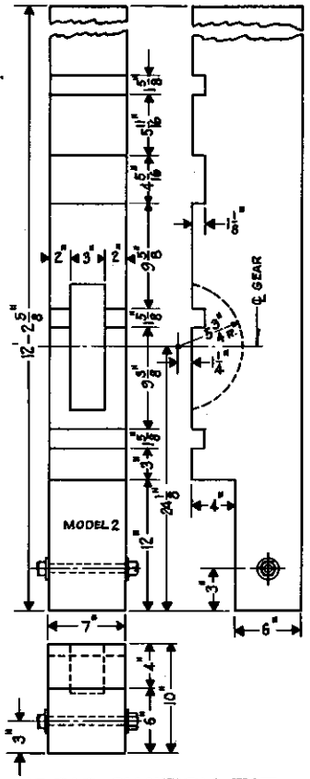
Approved
J. Minick
Chief Engineer



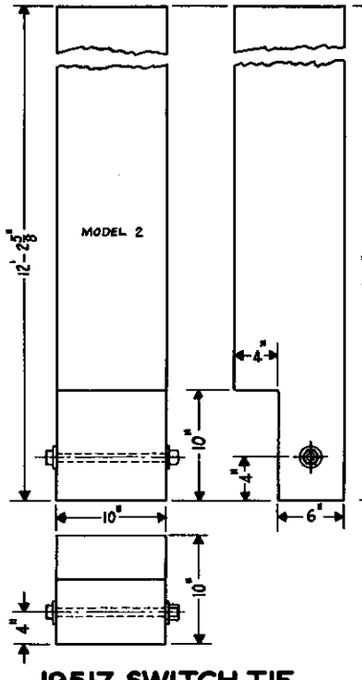
19513 SWITCH TIE.
STORES CAT. REF. NO. 5A-87



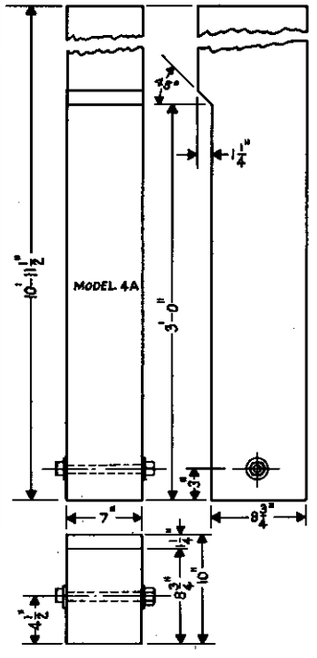
19515 SWITCH TIE.
STORES CAT. REF. NO. 5A-88



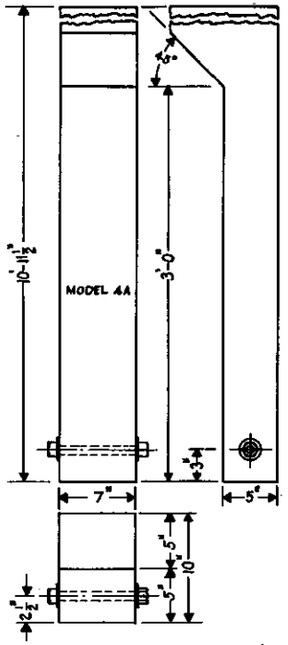
19516 SWITCH TIE.
STORES CAT. REF. NO. 5A-89



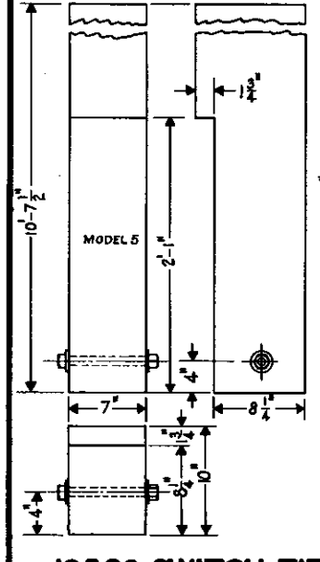
19517 SWITCH TIE.
STORES CAT. REF. NO. 5A-90

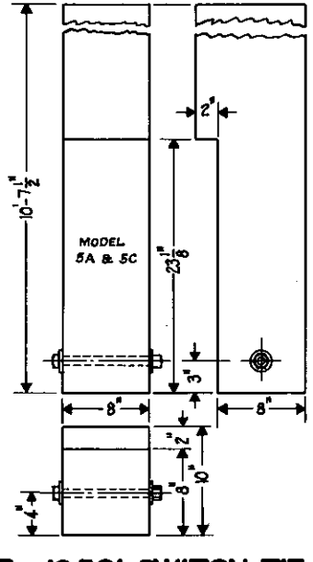


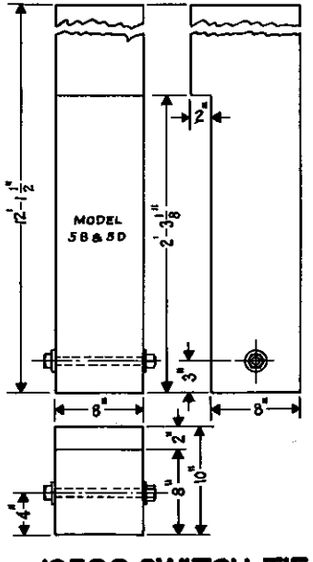
19518 SWITCH TIE.
STORES CAT. REF. NO. 5A-91



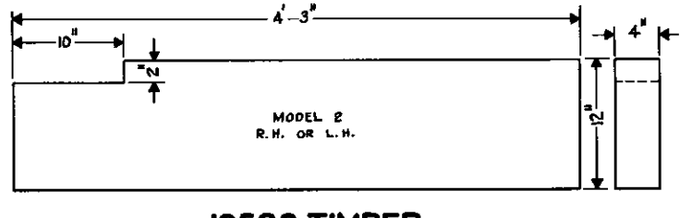
19519 SWITCH TIE.
STORES CAT. REF. NO. 5A-92







19520 SWITCH TIE. **19521 SWITCH TIE.** **19522 SWITCH TIE.**
STORES CAT. REF. NO. 5A-93 STORES CAT. REF. NO. 5A-94 STORES CAT. REF. NO. 5A-95



19523 TIMBER.
STORES CAT. REF. NO. 5A-96

FOR NOTES SEE SHEET 2.

SHEET 3 OF 3.

S-195-A

THE PENNSYLVANIA RAILROAD
STANDARD
SWITCH TIES
FOR INTERLOCKED SINGLE SWITCHES.
OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 4, 1947.

Approved
Assistant Chief Engineer-T.C.&S.

Approved
Chief Engineer

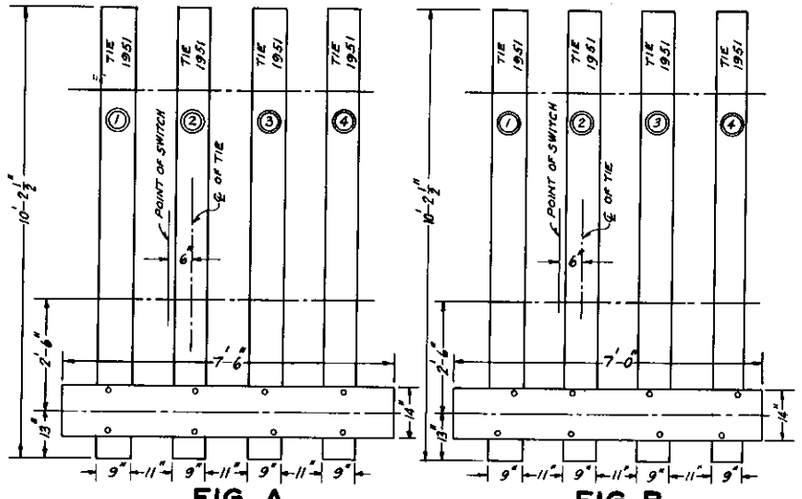


FIG. A
TYPE A5

FIG. B
TYPE A1

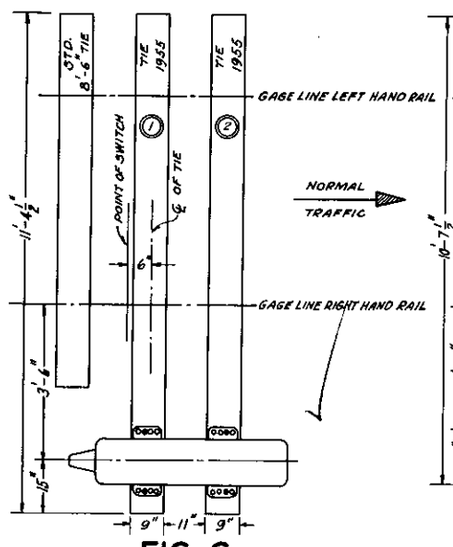


FIG. C
STYLE M2 & M20

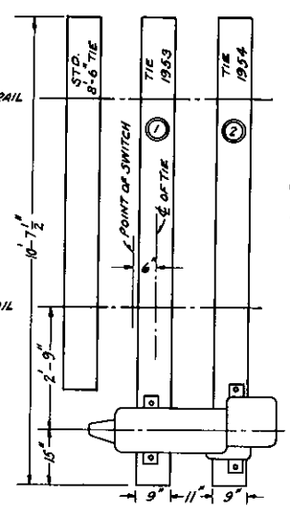


FIG. D
STYLE M

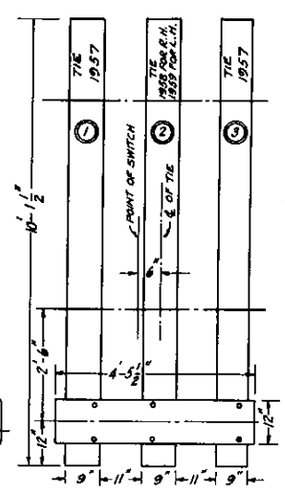


FIG. E
TYPE G

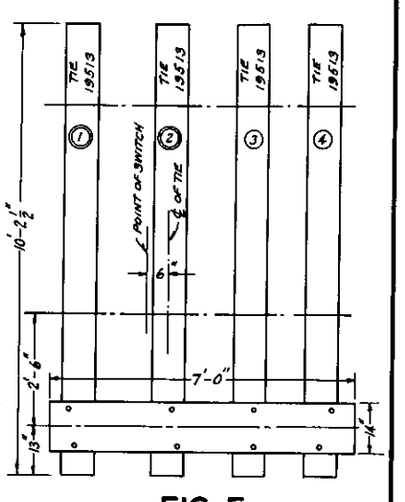


FIG. F
MODEL 14

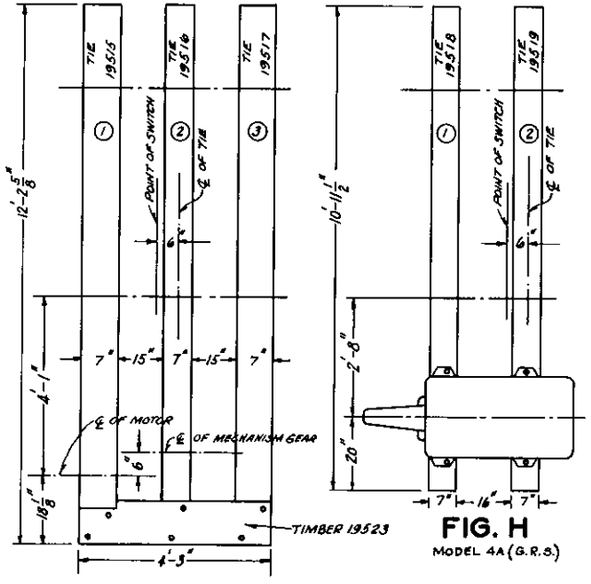


FIG. G
MODEL 2 (G.R.S.)

FIG. H
MODEL 4A (G.R.S.)

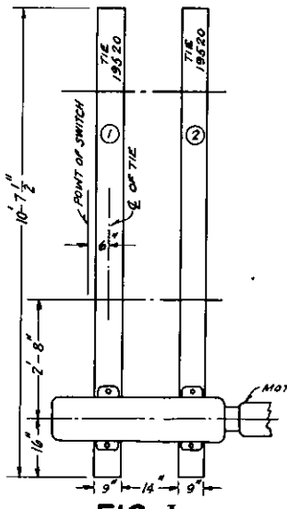


FIG. I
MODEL 5 (G.R.S.)

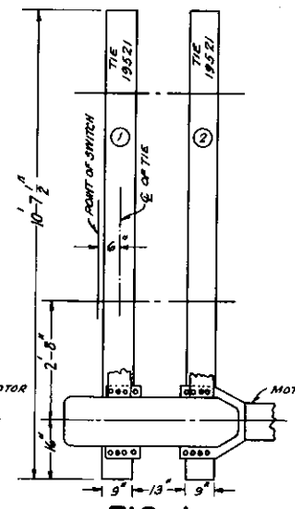


FIG. J
MODEL 5A OR 5C (G.R.S.)

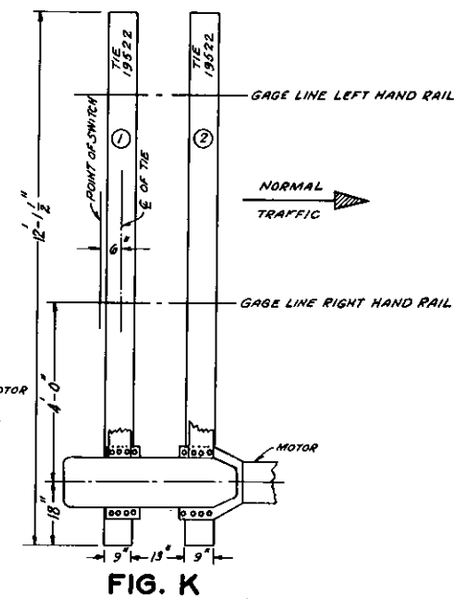


FIG. K
MODEL 5B OR 5D (G.R.S.)

REVISIONS
8 MAY 26, 1948. SHEETS 1 AND 3 CHANGED. ITEMS 19515 TO 19523 INCL. CHANGED TO STD. 7"x 9" TIMBERS. APPROVED H.C. Griffith

FOR DETAILS OF TIES SEE SHEETS 2 & 3.

SHEET 1 OF 3.

S-195-B

THE PENNSYLVANIA RAILROAD

STANDARD

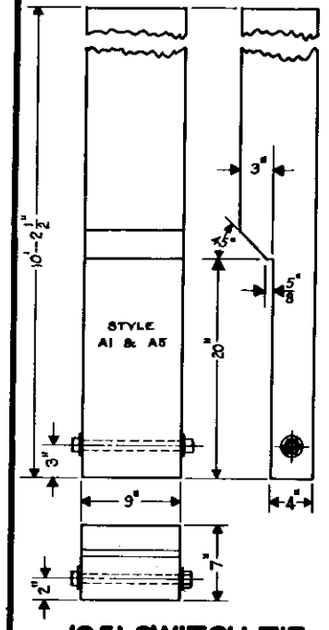
SWITCH TIES

FOR INTERLOCKED SINGLE SWITCHES.

OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 4, 1947.

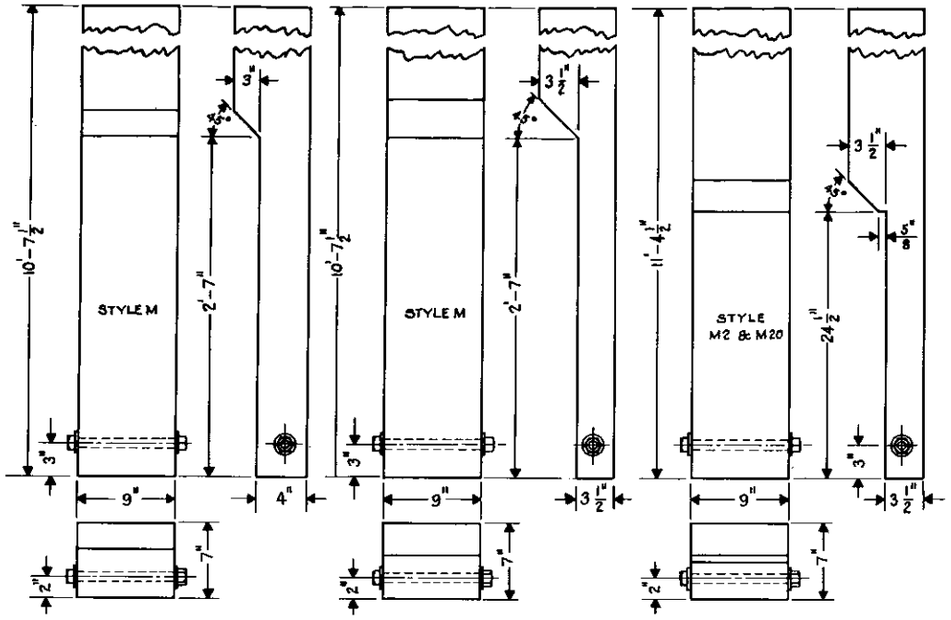
Approved H.C. Griffith
Assistant Chief Engineer - T.C. & S.

Approved J.T. Rutter
Chief Engineer



1951 SWITCH TIE.

STORES CAT. REF. NO. 5A-80



1953 SWITCH TIE.

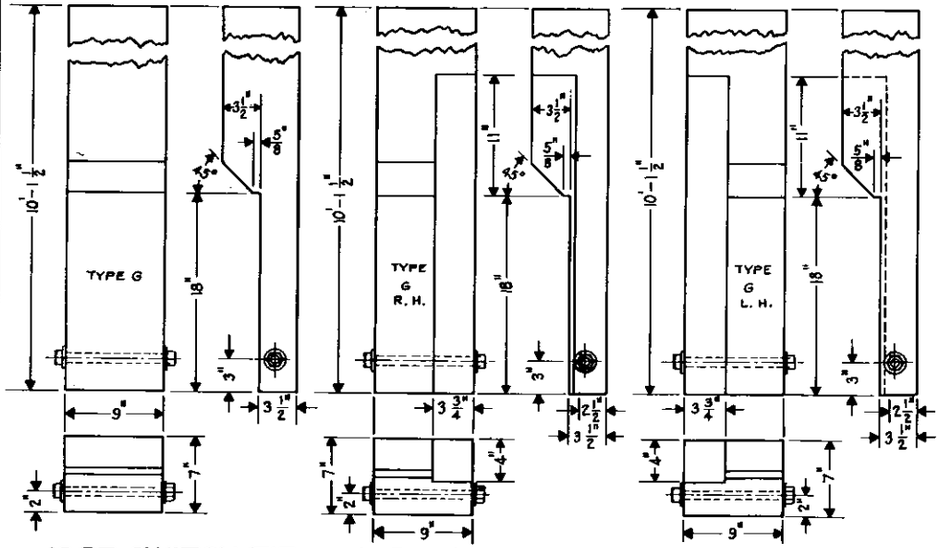
STORES CAT. REF. NO. 5A-81

1954 SWITCH TIE.

STORES CAT. REF. NO. 5A-82

1955 SWITCH TIE.

STORES CAT. REF. NO. 5A-83



1957 SWITCH TIE.

STORES CAT. REF. NO. 5A-84

1958 SWITCH TIE.

STORES CAT. REF. NO. 5A-85

1959 SWITCH TIE.

STORES CAT. REF. NO. 5A-86

NOTES:-

1. ALL TIES FOR INTERLOCKED SWITCHES SHALL MEET THE REQUIREMENTS OF C.E. 23, WITH THE ADDITIONAL REQUIREMENT THAT THE FRAMED END OF ALL TIES SHALL BE STRAIGHT GRAIN WOOD WITHOUT KNOTS, DECAY, SHAKES, SPLITS, OR HOLES OF ANY KIND, AND SHALL BE CREOSOTED IN ACCORDANCE WITH PARAGRAPH 25, C.E. 23 AFTER FRAMING HAS BEEN COMPLETED.
2. BEFORE CREOSOTING, EACH TIE SHALL BE DRILLED FOR $\frac{5}{8}$ IN. BOLT, LOCATED AS INDICATED. AFTER CREOSOTING, BUT BEFORE SHIPMENT, EACH TIE SHALL BE PROVIDED WITH $\frac{5}{8}$ IN. GALVANIZED SQ. HD. BOLT WITH HEX. NUT, AND FLAT WASHER EACH SIDE OF TIE. PULL BOLT UP TIGHT.
3. UNLESS OTHERWISE INDICATED, TIES ARE ADAPTABLE FOR EITHER RIGHT OR LEFT HAND LAYOUT.
4. FOR LOCATIONS OF TIES SEE SHEET 1 OF THIS DRAWING.

SHEET 2 OF 3.

S-195-B

THE PENNSYLVANIA RAILROAD

STANDARD

SWITCH TIES

FOR INTERLOCKED SINGLE SWITCHES

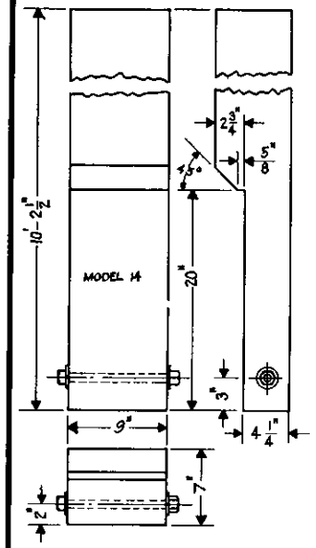
OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 4, 1947.

Approved

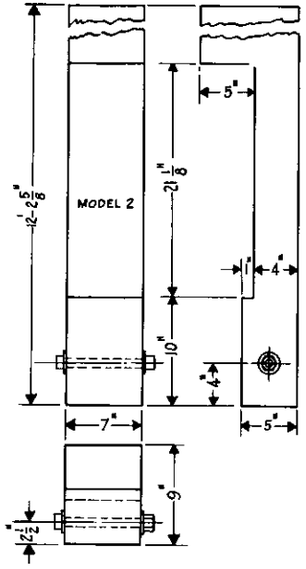
Assistant Chief Engineer-T.C.& S.

Approved

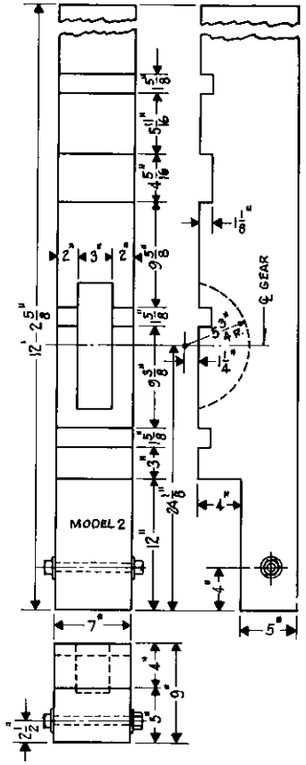
Chief Engineer



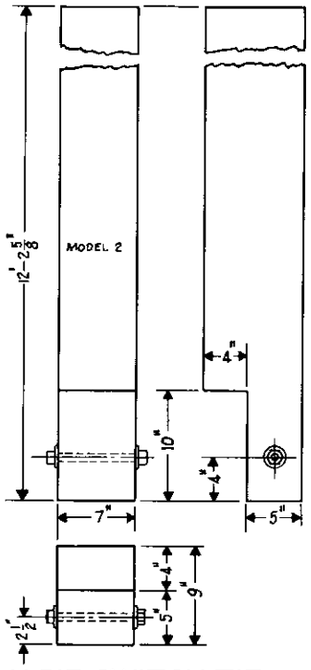
19513 SWITCH TIE.
STORES CAT. REF. NO. 5A-87



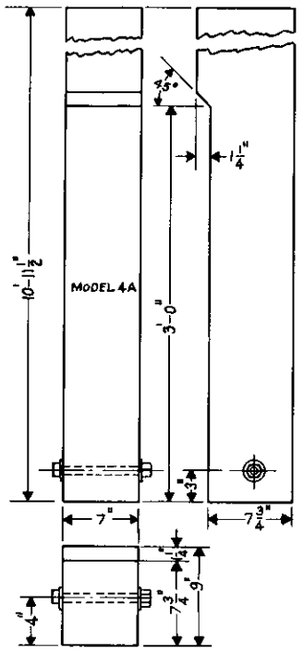
19515 SWITCH TIE.
STORES CAT. REF. NO. 5A-88



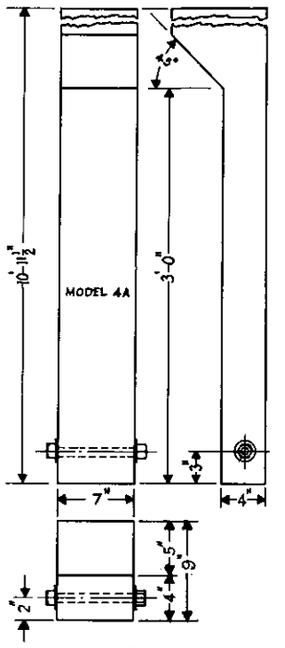
19516 SWITCH TIE.
STORES CAT. REF. NO. 5A-89



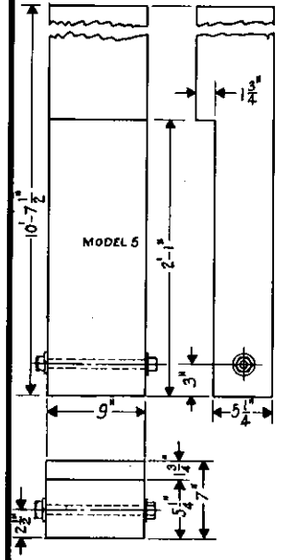
19517 SWITCH TIE.
STORES CAT. REF. NO. 5A-90

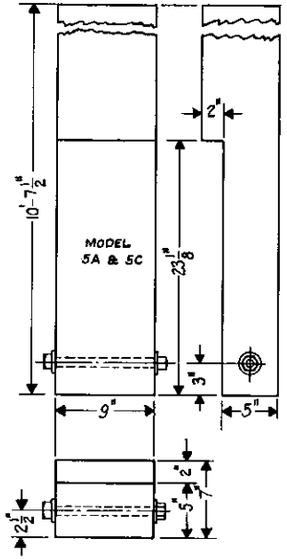


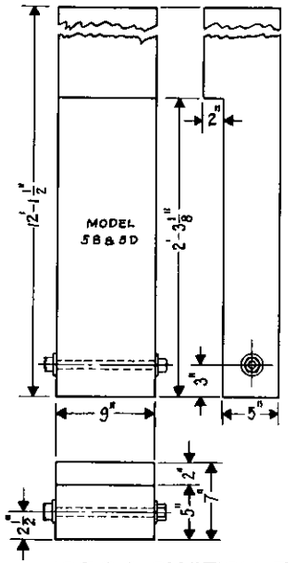
19518 SWITCH TIE.
STORES CAT. REF. NO. 5A-91



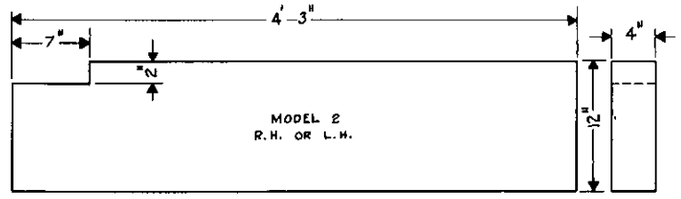
19519 SWITCH TIE.
STORES CAT. REF. NO. 5A-92







19520 SWITCH TIE. STORES CAT. REF. NO. 5A-93
19521 SWITCH TIE. STORES CAT. REF. NO. 5A-94
19522 SWITCH TIE. STORES CAT. REF. NO. 5A-95



19523 TIMBER.
STORES CAT. REF. NO. 5A-96

FOR NOTES SEE SHEET 2.

SHEET 3 OF 3.

S-195-B.

THE PENNSYLVANIA RAILROAD

STANDARD

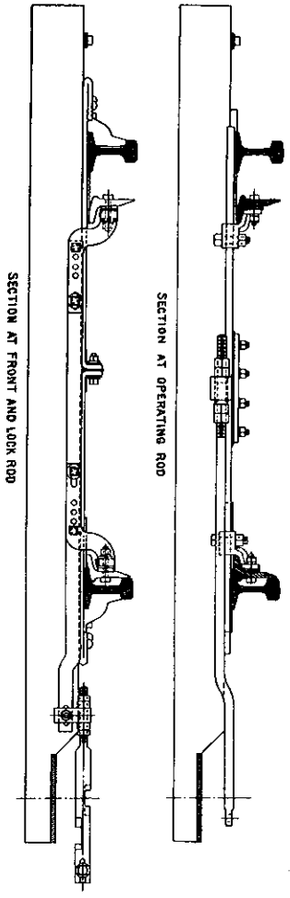
SWITCH TIES

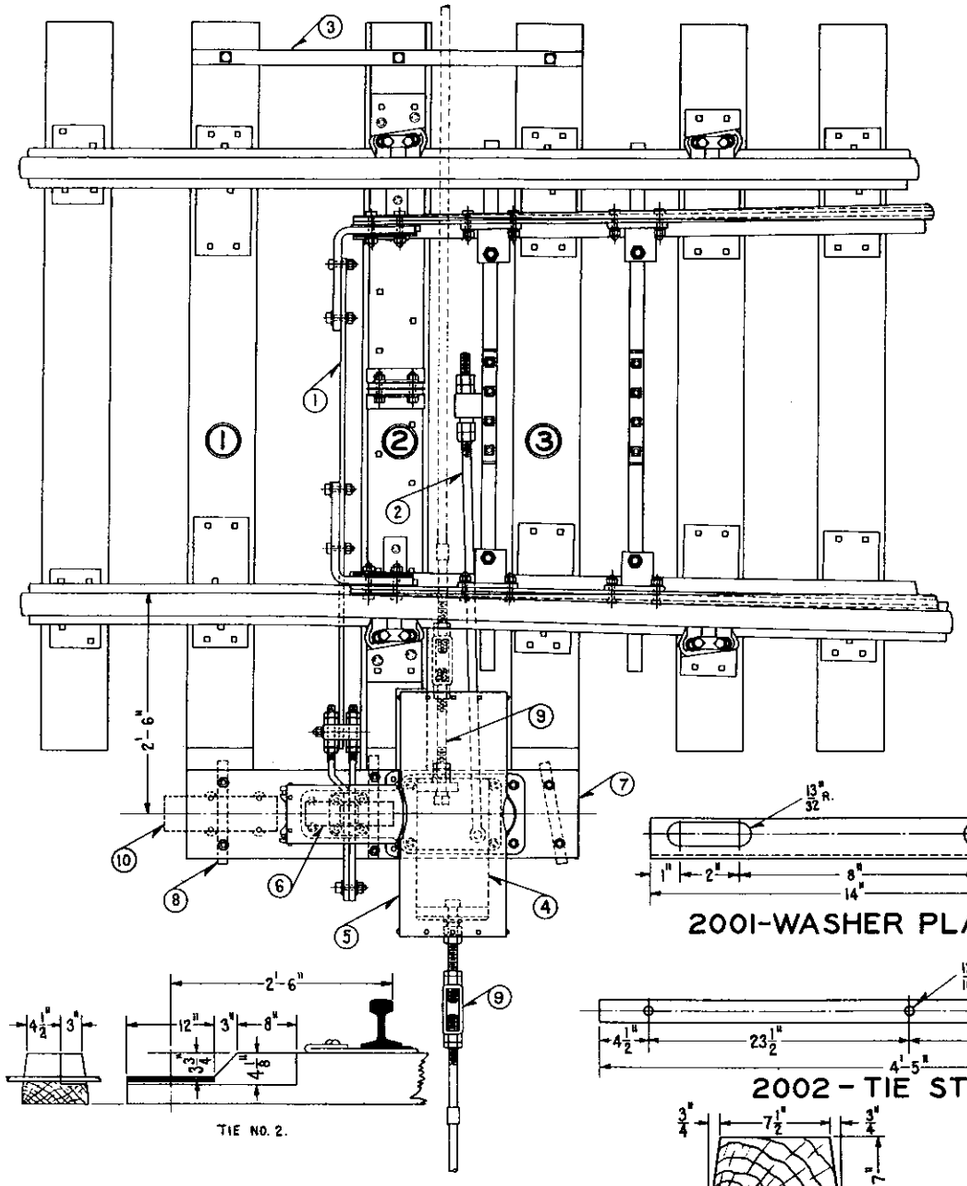
FOR INTERLOCKED SINGLE SWITCHES.

OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 4, 1947.

Approved
Assistant Chief Engineer-T.C.&S.

Approved
Chief Engineer





ASSEMBLAGE

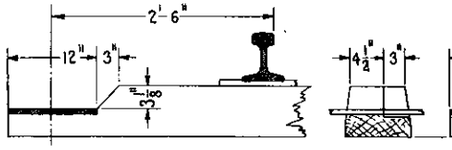
ITEM	REQ'D.	NAME	FIG.	PLAN
1	1	FRONT AND LOCK ROD.	3051	S-305
2	1	OPERATING ROD.	3311	S-331
3	1	TIE STRAP.	2002	S-200
4	1	R. H. TYPE "S" SWITCH MECHANISM.	2582	S-258
5	1	R. H. MECHANISM COVER.	25818	S-258
6	1	INDICATION BOX.		
7	1	BASE PLATE.	2586	S-258
8	3	WASHER PLATES.	2001	S-200
9	1	MECHANISM ROD.	25816	S-258
10	1	ELECTRIC LOCK (WHEN REQUIRED).		

NOTE:-
SWITCH RODS, GAUGE PLATE AND RAIL BRACES SHALL BE FURNISHED WITH SWITCH POINTS: FOR DETAILS SEE STANDARD M. W. MATERIAL PLANS.
WHERE NO DETAIL REFERENCE IS GIVEN, THE MANUFACTURER'S STANDARD APPARATUS SHOULD BE FURNISHED.
MECHANISM FOR FACING POINT SWITCH IN MAIN TRACK SHALL BE LOCATED ON THE NORMALLY CLOSED SIDE OF THE SWITCH.

* MINIMUM DIMENSIONS.

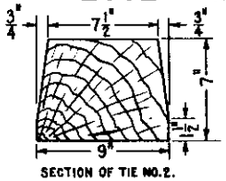
2001-WASHER PLATE GALVANIZED.

2002 - TIE STRAP O. H. STEEL.



TIES NO'S. 1 & 3.

TIE NO. 2.



SECTION OF TIE NO. 2.

REVISIONS
REDRAWN FROM APPROVED PLAN S-200-B, DATED 11-22-20, LAST REVISED 10-18-22 AND REVISED.

1 SHEET

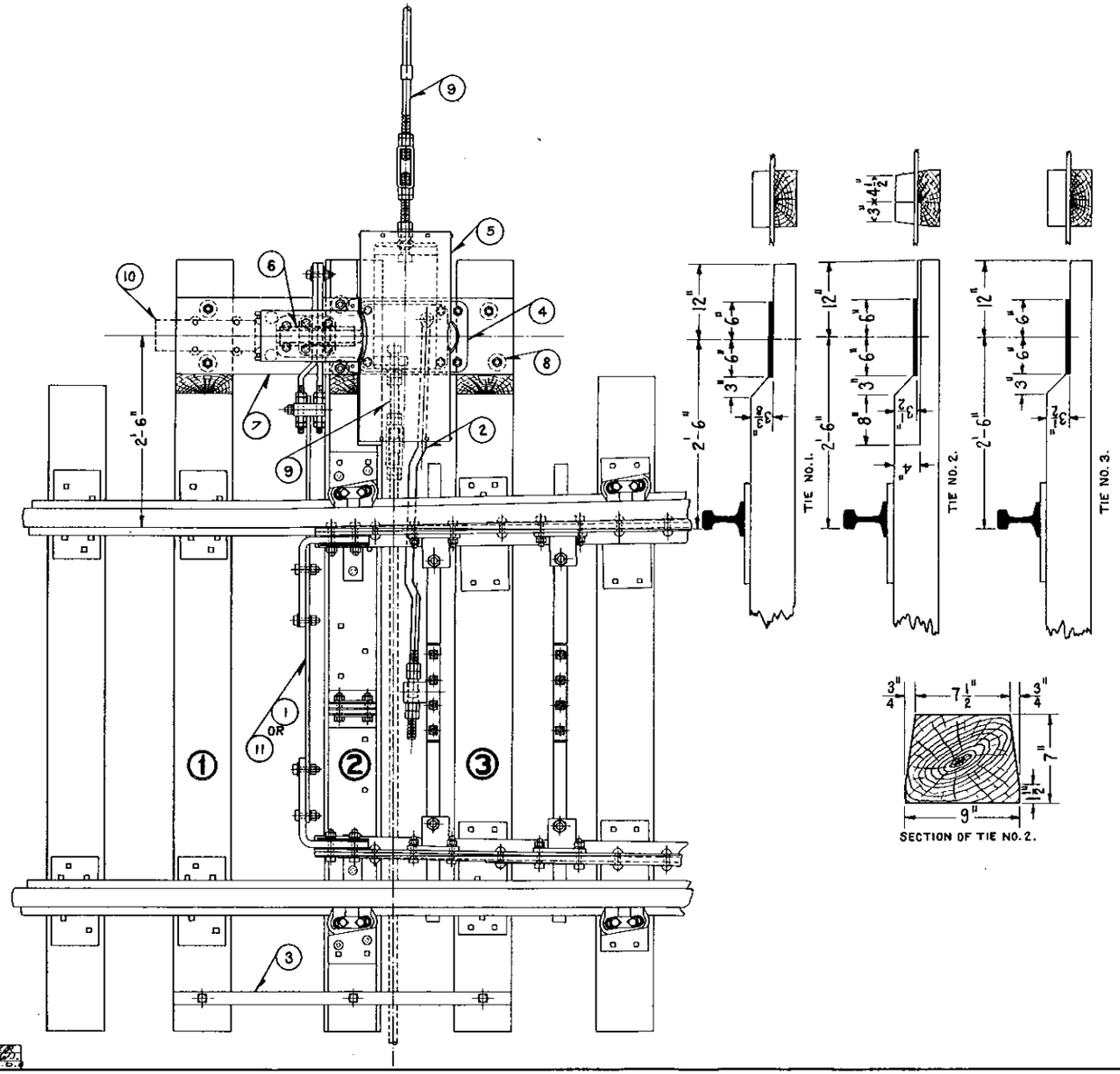
S-200-C

THE PENNSYLVANIA RAILROAD
STANDARD
LAYOUT
SINGLE SWITCH, TYPE "C" MECHANISM
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., FEBRUARY 16, 1926.

Approved
Chief Signal Engineer

Approved
Chief Engineer

E.C.C.
A.W.D.
C.D.



ASSEMBLAGE

ITEM	REQ'D.	NAME	FIG.	PLAN
1	1	FRONT & LOCK ROD 100 & 130 LB. RAIL.	3054	S-305
2	1	OPERATING ROD.	3312	S-331
3	1	TIE STRAP.	2002	S-200
4	1	L.H. TYPE "G" SWITCH MECHANISM.	2582	S-258
5	1	L.H. MECHANISM COVER.	25818	S-258
6	1	INDICATION BOX.		
7	1	BASE PLATE.	2586	S-258
8	6	WASHERS	2161	S-216
9	1	MECHANISM ROD.	25816	S-258
10	1	ELECTRIC LOCK (WHEN REQUIRED).		
11	1	FRONT & LOCK ROD 131 & 152 LB. RAIL.	30538	S-305

NOTE:-

SWITCH RODS, GAUGE PLATE AND RAIL BRACES SHALL BE FURNISHED WITH SWITCH POINTS; FOR DETAILS SEE STANDARD M.W. MATERIAL PLANS.

WHERE NO DETAIL REFERENCE IS GIVEN, THE MANUFACTURER'S STANDARD APPARATUS SHOULD BE FURNISHED.

REVISIONS
REDRAWN FROM APPROVED PLAN S-201-B, DATED 11-24-20, LAST REVISION 10-18-22 AND REVISED.
D-AUGUST 21, 1934.
APPROVED:-

1 SHEET

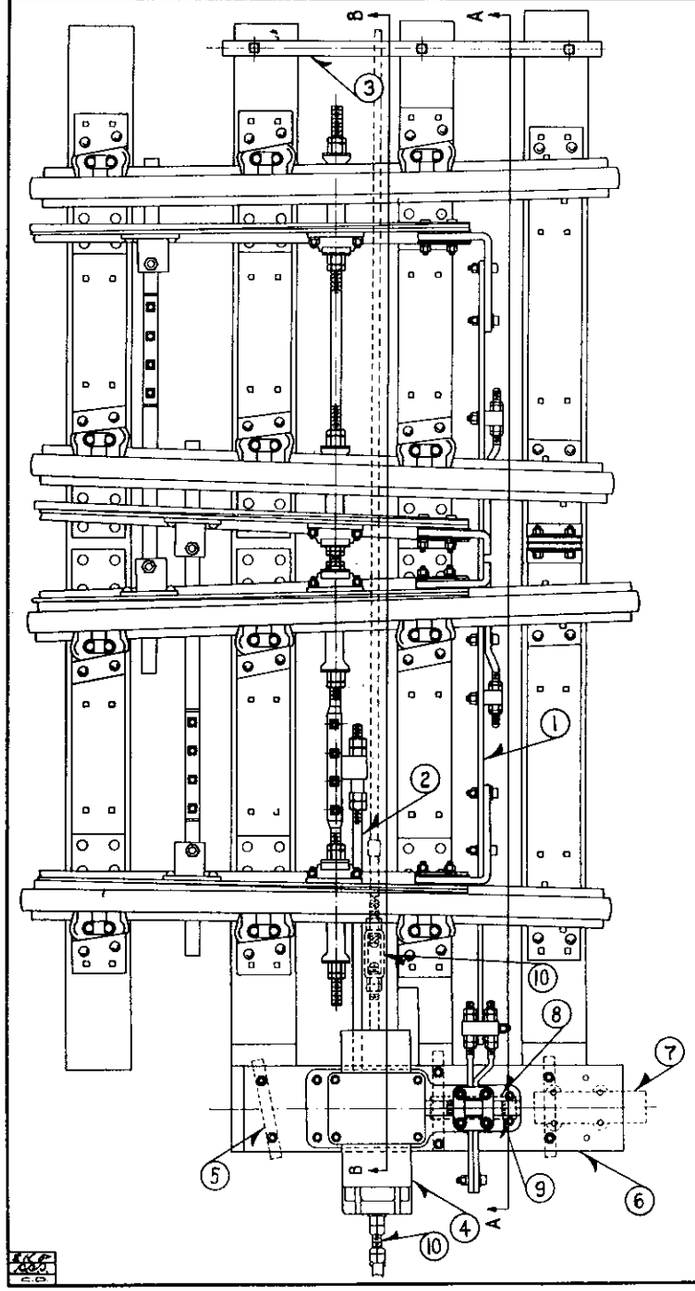
S-201-D

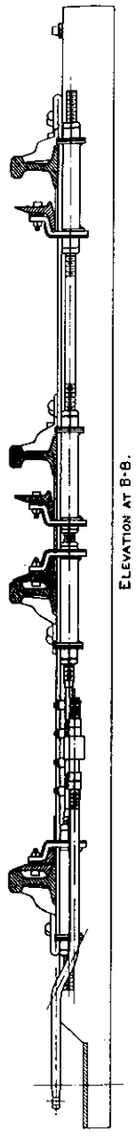
THE PENNSYLVANIA RAILROAD
STANDARD
LAYOUT
SINGLE SWITCH, TYPE "G" MECHANISM

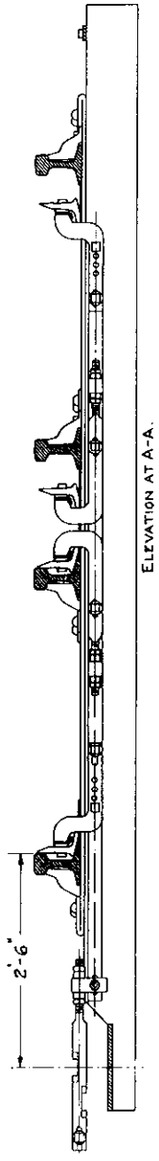
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., APRIL 16, 1926

Approved
Chief Signal Engineer

Approved
Chief Engineer







ASSEMBLAGE

ITEM	REQ'D.	NAME	FIGURE	PLAN
1	1	FRONT AND LOCK ROD.	30821	S-308
2	1	OPERATING ROD.	3331	S-333
3	1	TIE STRAP	2002	S-200
4	1	L.H.,MECHANISM.	2581	S-258
5	3	WASHER PLATES.	2001	S-200
6	1	BASE PLATE.	2586	S-258
7	1	ELECTRIC LOCK (WHEN REQUIRED).		
8	1	INDICATION BOX.	25812	S-258
9	2	CONTACT BLOCKS.	25819	S-258
10	1	MECHANISM ROD	25816	S-258

Note:-

Switch Rods, Gauge Plates and Rail Braces to be furnished with Switch Points: for details see Standard M.W. Plans.

Where no detail reference is given, the Manufacturer's Standard Apparatus should be furnished.

Mechanism for facing point switch in main track, shall be located on the normally closed side of the switch.

For details and parts of Mechanism see Plan S-258.
For framing of Timbers see Plan S-200.

REVISIONS
8-DEC., 3, 1926
APPROVED: A.H. Rudd

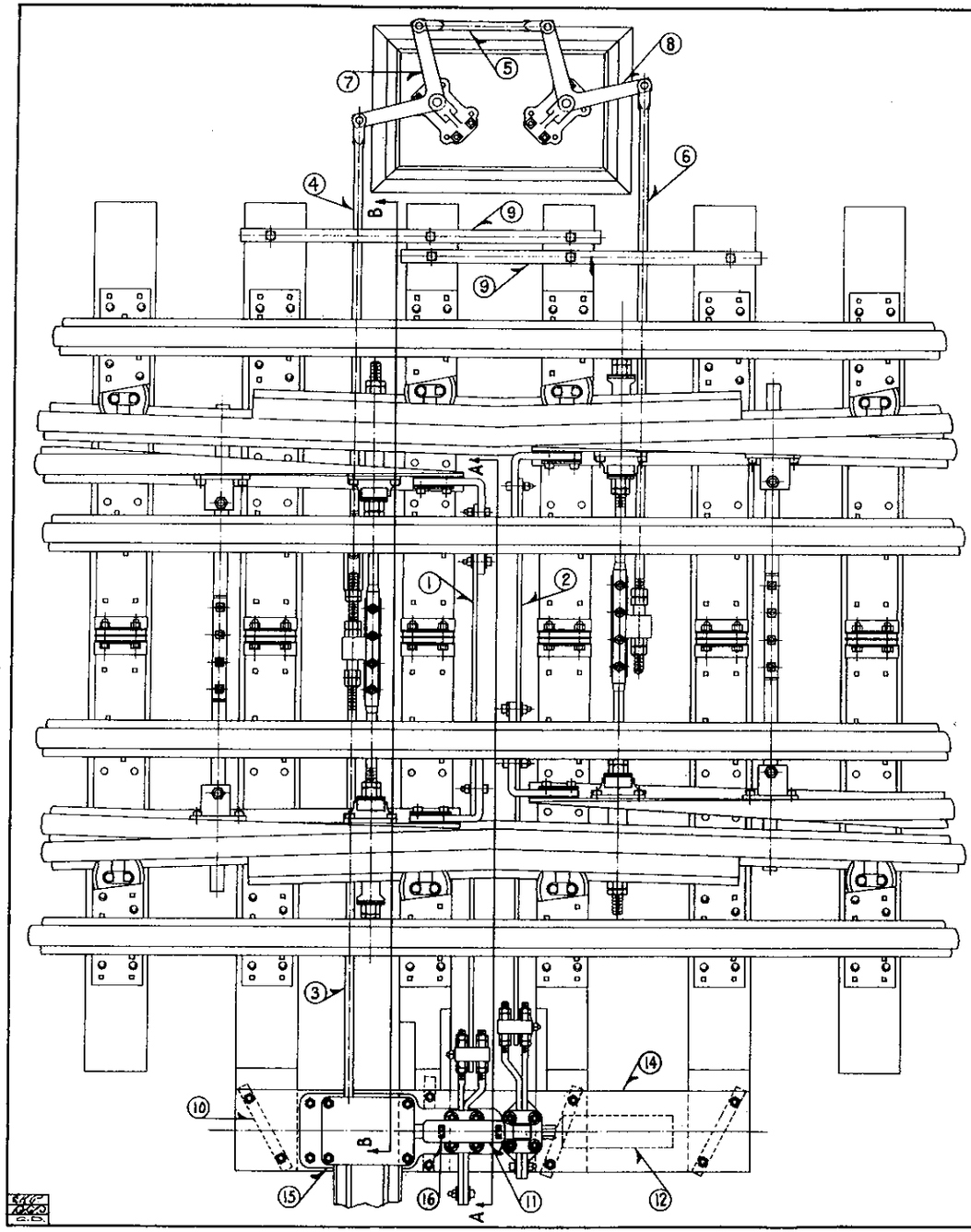
1 SHEET

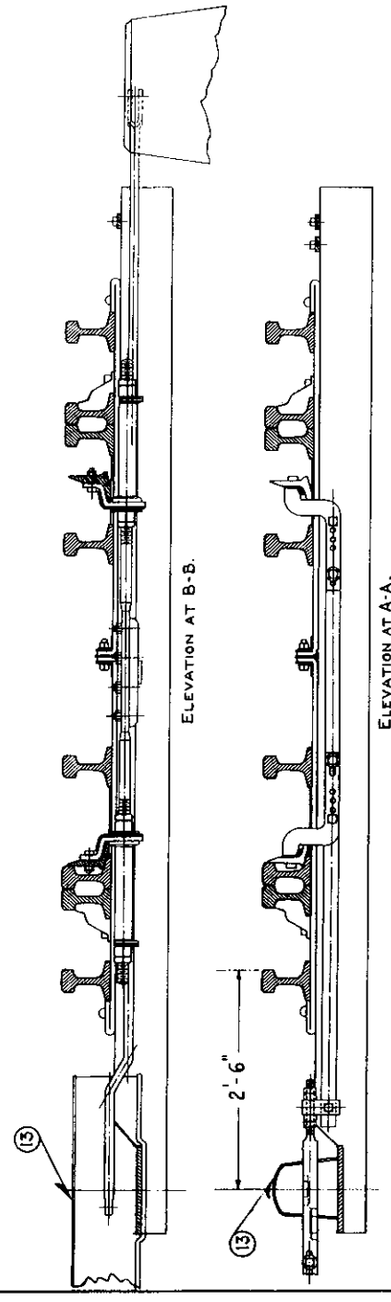
S-202-B

PENNSYLVANIA RAILROAD SYSTEM
STANDARD
LAYOUT
DOUBLE SLIP SWITCH TYPE "Q" MECHANISM
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., MAY 12, 1924.

Approved
A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer





Note:-

Switch Rods, Rail Braces and Bridle Plates to be furnished with Switch Points, for details see Standard M.W. Plans.

Where no detail reference is given, the Manufacturer's Standard Apparatus should be furnished.

For framing of Timbers see Plan S-200.

For details and parts of Mechanism see Plan S-258 (Except Slide Bar and extra Lock Rod Box which are special).

Movements should, where practicable, be located on side of track nearest pipe line, otherwise use motion plate with side connection. (Shown dotted on Plan S-202).

ASSEMBLAGE

ITEM	REQ'D.	NAME	FIGURE	PLAN
1	1	L.H. FRONT AND LOCK ROD.	3091	S-309
2	1	R.H. FRONT AND LOCK ROD.	3094	S-309
3	1	OPERATING ROD.	3351	S-335
4	1	OPERATING ROD.	3353	S-335
5	1	OPERATING ROD.	3357	S-335
6	1	OPERATING ROD.	3355	S-335
7	1	CRANK AND STAND.	1003	S-100
8	1	CRANK AND STAND.	1002	S-100
9	2	TIE STRAPS.	2002	S-200
10	4	WASHER PLATES.	2001	S-200
11	1	INDICATION BOX.	25812	S-258
12	1	ELECTRIC LOCK (WHEN REQUIRED).		
13	1	COVER (SIMILAR TO 25818).		
14	1	BASE PLATE.		
15	1	MECHANISM (L.H. SHOWN). When ordering specify R.H. or L.H.	Similar to 2581	S-258
16	2	CONTACT BLOCKS.	25819	S-258

REVISIONS

1 SHEET

S-203-A

PENNSYLVANIA RAILROAD SYSTEM
STANDARD
LAYOUT
M. P. FROGS TYPE "O" MECHANISM

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., MAY 12, 1924.

Approved

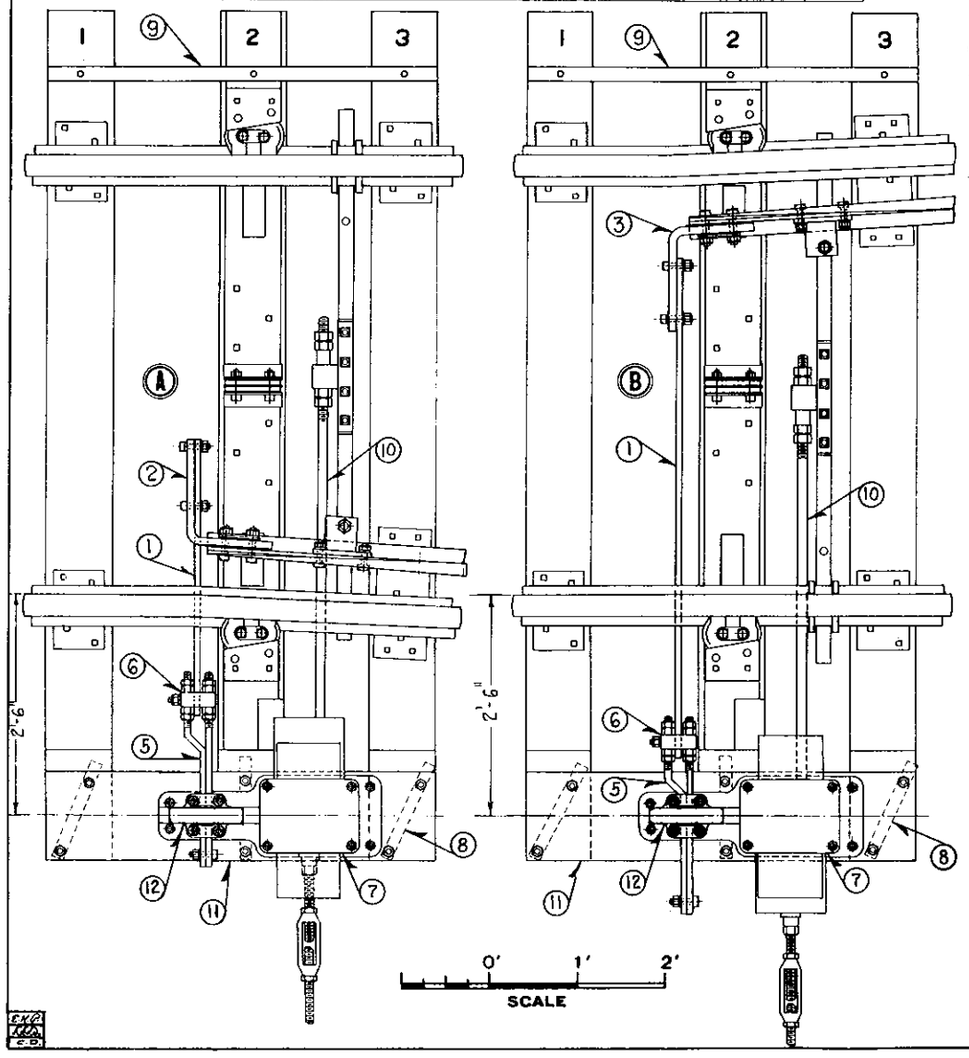
Chief Signal Engineer

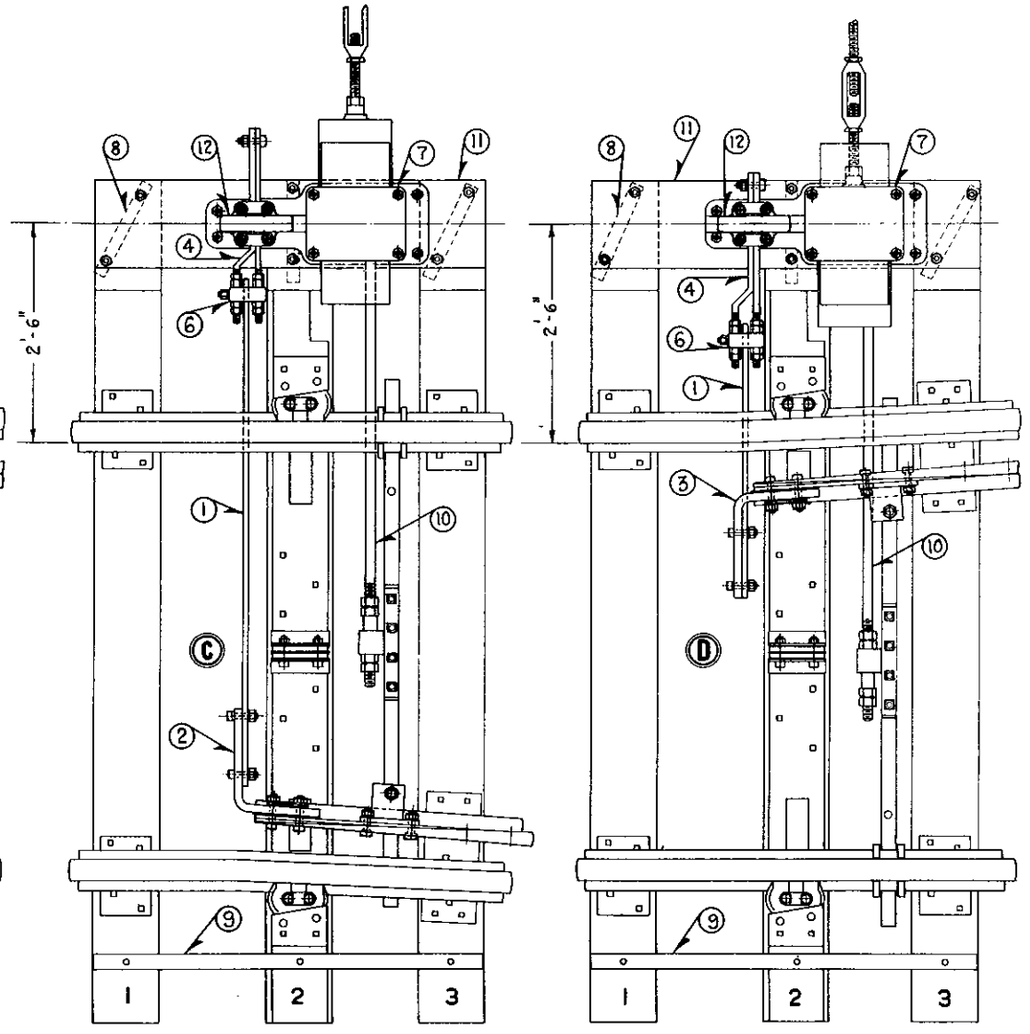
Approved

Chief Engineer

ASSEMBLAGE

Item.	Req'd.	Name.	Figure.	Plan.
1	*1	Bar	3211	S-321
2	1	Foot #3213 with 1-3214, 1-3215, 2-3216, 1-3219 and 2-¾" x 4" Sq. head bolts with hex. nuts and lock washers	..	S-321
3	1	Foot #3212 with 1-3214, 1-3215, 2-3216, 1-3219 and 2-¾" x 4" Sq. head bolts with hex. nuts and lock washers	..	S-321
4	1	Lock rods #3111 and #3113 and 1-¾" x 2½" Sq. hd. bolts with hex. nuts and flat washers	..	S-311
5	1	Lock rods #3111 and #3112 and 1-¾" x 2½" Sq. hd. bolts with hex. nuts and flat washers	..	S-311
6	1	Lug	3218	S-321
7	1	Type "G" Switch mechanism	2581	S-258
8	3	Washer plates	2001	S-200
9	1	Tie strap	2002	S-200
10	1	Operating rod	3311	S-331
11	1	Base plate	2586	S-258
12	1	Indication box.		





NOTES:-

* When movement is located on same side of track as switch point, bar 3211 must be cut to accommodate one foot as shown.

For framing of timbers see plan S-200.

Switch Rods, Bridle Plates, Rail Braces and Switch Rod Guides to be furnished with Switch Points; for details see Standard M. W. Material Plans.

Where no detail refereuce is given, the Manufacturer's Standard Apparatus should be furnished.

Ties Nos. 1, 2 and 3 are 9'-6" long.

REVISIONS

1 SHEET

S-206-A

PENNSYLVANIA SYSTEM

STANDARD

LAYOUTS

FOR DERAILS, TYPE "G" MECHANISM

OFFICE OF CHIEF SIGNAL ENGINEER. PHILA., PA., MAY 31 1922

Correct

Chief Signal Engineer

Approved

Chief Engineer

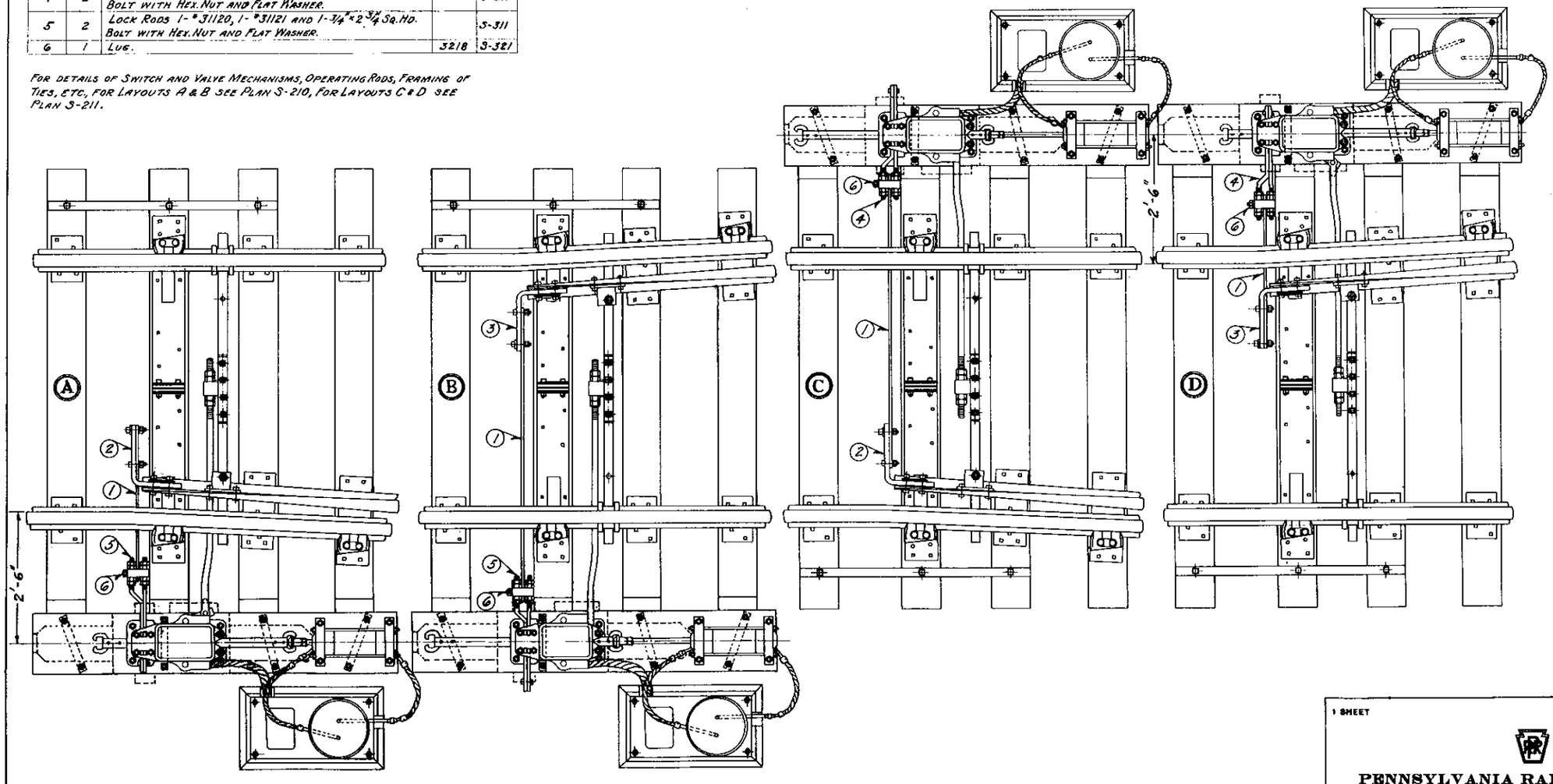
ASSEMBLAGE.

ITEM	REQ'D.	NAME	FIGURE	PLAN
1	1 *	BAR	3211	S-321
2	1	FOOT #3213 WITH 1-3214, 1-3215, 2-3216, 1-3219 AND 2-3/4" x 4" Sq. HD. BOLTS WITH HEX. NUTS AND LOCK WASHERS.		S-321
3	1	FOOT #3212 WITH 1-3214, 1-3215, 2-3216, 1-3219 AND 2-3/4" x 4" SQ. HD. BOLTS WITH HEX. NUTS AND LOCK WASHERS.		S-321
4	2	LOCK RODS 1-*31120, 1-*31122 AND 1-3/4" x 2 3/4" SQ. HD. BOLT WITH HEX. NUT AND FLAT WASHER.		S-311
5	2	LOCK RODS 1-*31120, 1-*31121 AND 1-3/4" x 2 3/4" SQ. HD. BOLT WITH HEX. NUT AND FLAT WASHER.		S-311
6	1	LUG.	3218	S-321

NOTE:-

* WHEN MOVEMENT IS LOCATED ON SAME SIDE OF TRACK AS SWITCH POINT, BAR #3211 MUST BE CUT TO ACCOM-MODATE ONE FOOT AS SHOWN.
SWITCH RODS, RAIL BRACES, BRIDLE PLATES & SW. ROD GUIDES TO BE FURNISHED WITH SWITCH POINTS, FOR DETAILS SEE STANDARD M.W. MATERIAL PLANS.

FOR DETAILS OF SWITCH AND VALVE MECHANISMS, OPERATING RODS, FRAMING OF TIES, ETC, FOR LAYOUTS A & B SEE PLAN S-210, FOR LAYOUTS C & D SEE PLAN S-211.



REVISIONS

1 SHEET

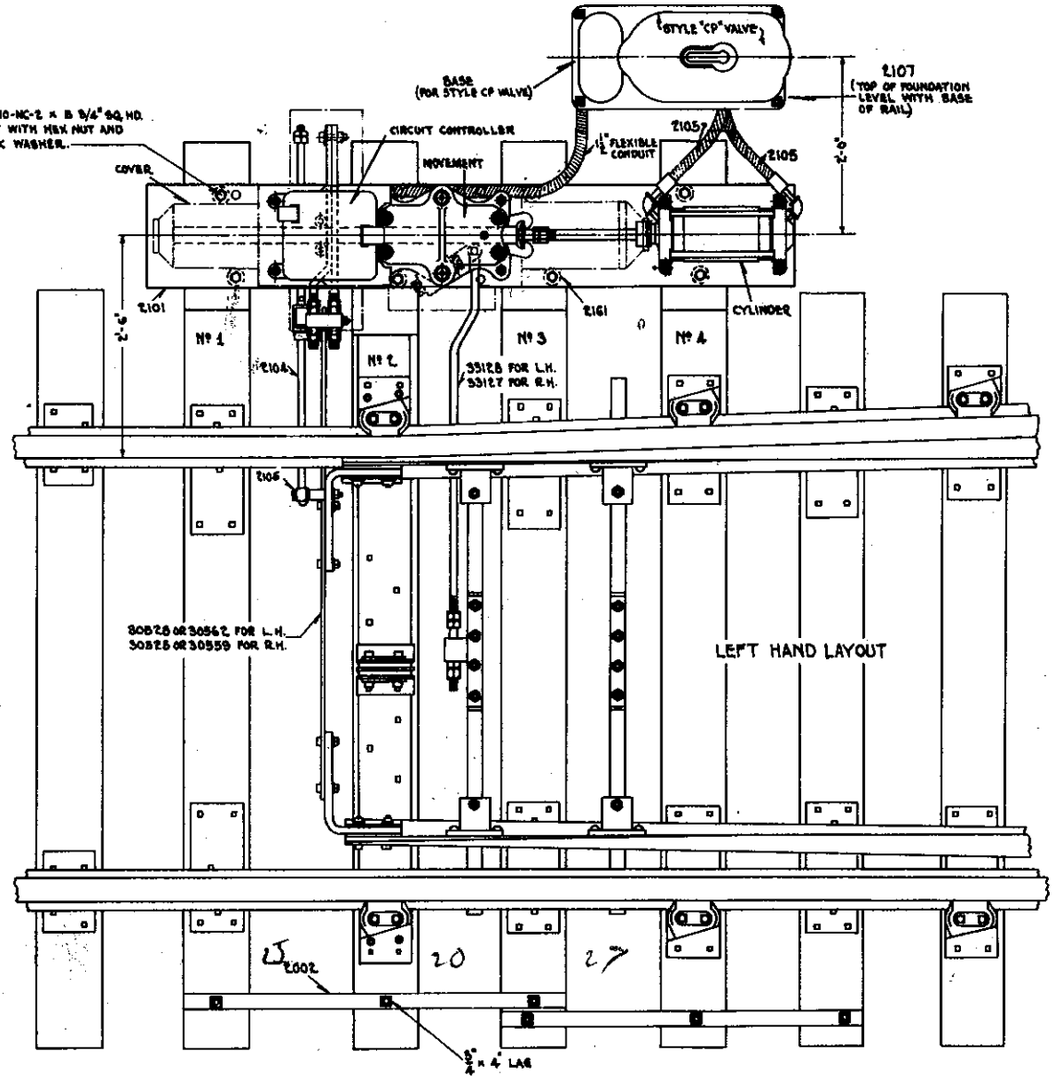
S-207-A

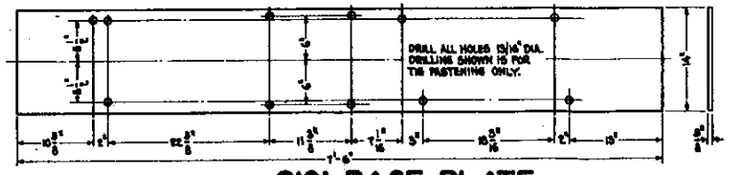
PENNSYLVANIA RAILROAD SYSTEM
STANDARD
LAYOUTS
FOR DERAILS, TYPE "AI" MECHANISM

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., JUNE 8, 1923.

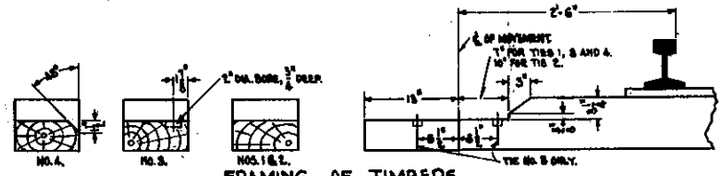
Approved
Chief Signal Engineer

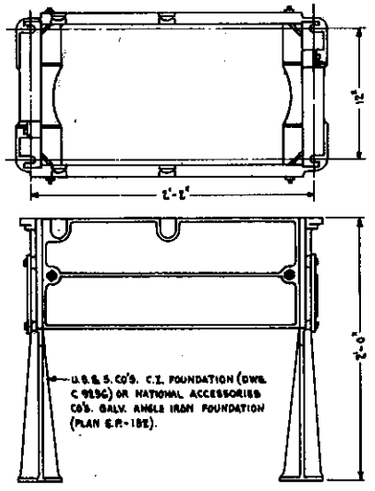
Approved
Asst. Chief Engineer





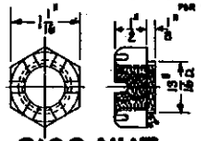
2101 BASE PLATE S.E.S.



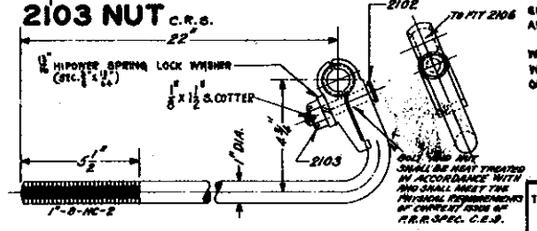


2107-FOUNDATION

FOR STYLE "CP" VALVES

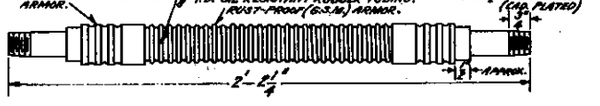


2103 NUT C.R.S.

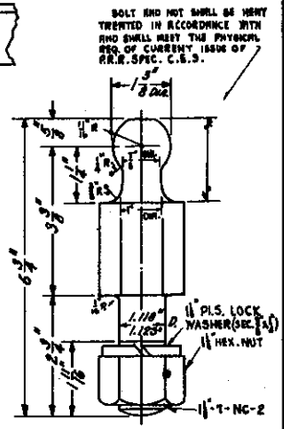


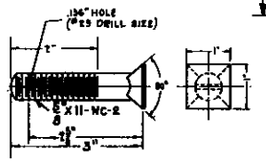
2104 CONNECTING ROD COMPLETE

O.H.S.



2105 - HOSE CONNECTION





2102 BOLT C.R.S.

2106 STUD

(FOR POINT DETECTOR)

NOTE:

1. DIMENSIONS OF BOLT HEADS AND NUTS SHALL BE IN ACCORDANCE WITH A.S.A. ROUGH OR SEMI FINISH SIZES.
2. SPRING LOCK WASHERS SHALL MEET THE REQUIREMENTS IN CURRENT ISSUE OF P.R.R. SPEC. C.E.7.
3. SWITCH RODS, GAGE PLATE AND RAIL BRACES TO BE FURNISHED WITH SWITCH POINTS; FOR DETAILS SEE STANDARD M.W. MATERIAL PLANS.
4. WHERE NO DETAIL REFERENCE IS GIVEN, THE MANUFACTURER'S STANDARD APPARATUS SHALL BE FURNISHED.
5. WHEN ORDERING MOVEMENT WITH OR WITHOUT CIRCUIT CONTROLLER OR COMPLETE WITH CYLINDER AND COVER - SPECIFY RIGHT OR LEFT HAND.

REVISIONS
REDRAWN FROM APPROVED PLAN S-210-B, DATED 10-28-26 AND REVISED.
D AUGUST 28, 1933. C.P. APPROVED A.H. Rudd
E JAN. 15, 1934 APPROVED A.H. Rudd
F JULY 20, 1934. APPROVED:- A.H. Rudd

T SHEET

S-210-F

THE PENNSYLVANIA RAILROAD

STANDARD

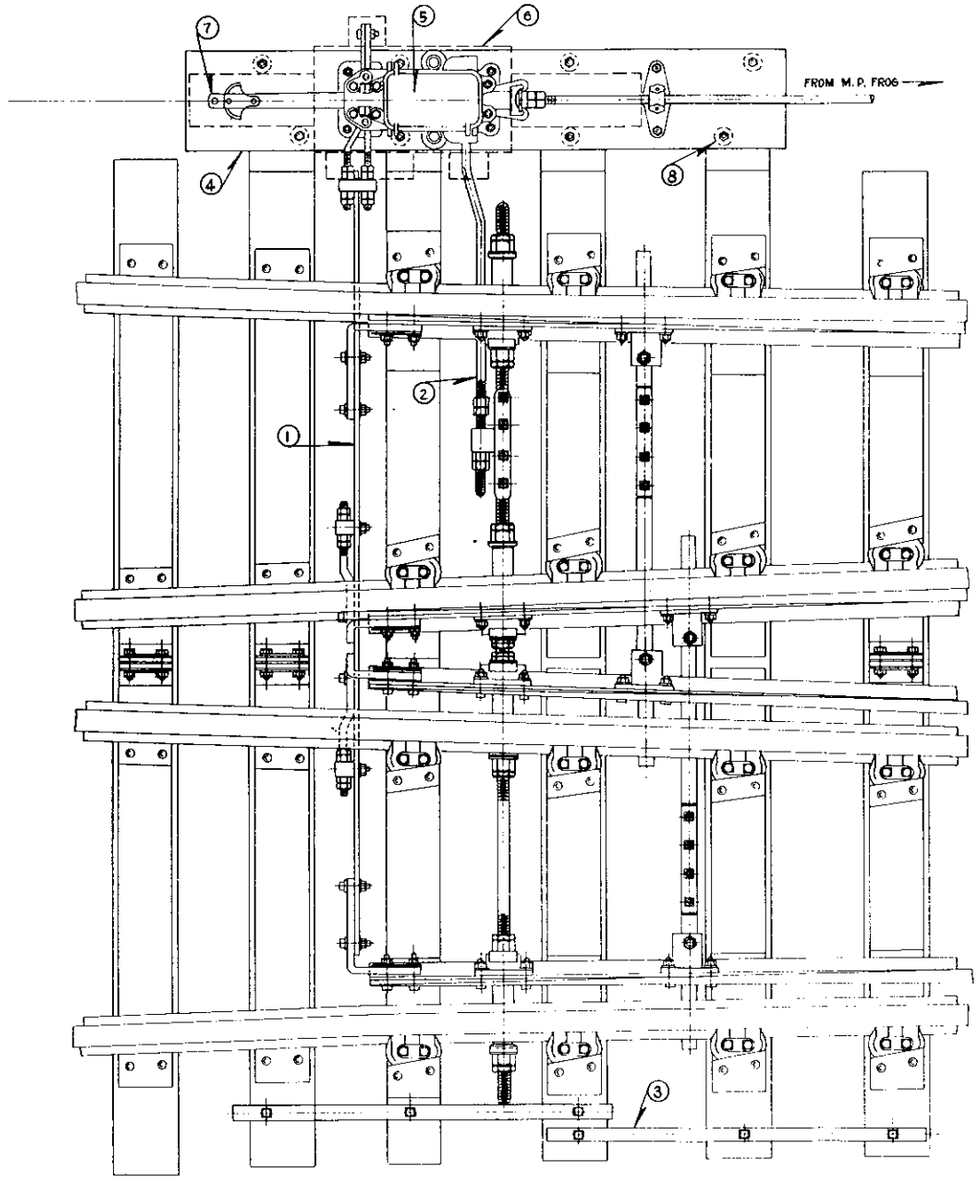
LAYOUT

SINGLE SWITCH - TYPE "A-S" MECHANISM

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. OCT. 11, 1932

Approved A.H. Rudd Chief Signal Engineer

Approved Chief Engineer



ASSEMBLAGE

ITEM	REQ'D	NAME	FIGURE	PLAN
1	1	FRONT AND LOCK ROD.	30822	S-308
2	1	OPERATING ROD.	3333	S-333
3	2	TIE STRAPS.	2002	S-200
4	1	BASE PLATE.		
5	1	MOVEMENT COMPLETE WITH CIRCUIT CONTROLLER.		
6	1	COVER COMPLETE.		
7	1	SWITCH MECHANISM COMPLETE WITH 4, 5, & 6.		
8	8	WASHERS.	2161	S-216

NOTE:-
SWITCH RODS, GAUGE PLATE AND RAIL BRACES TO BE FURNISHED WITH SWITCH POINTS; FOR DETAILS SEE STANDARD M.W. MATERIAL PLANS.
WHERE NO DETAIL REFERENCE IS GIVEN, THE MANUFACTURER'S STANDARD APPARATUS SHOULD BE FURNISHED.
FOR FRAMING OF TIMBERS SEE PLAN S-210.

REVISIONS

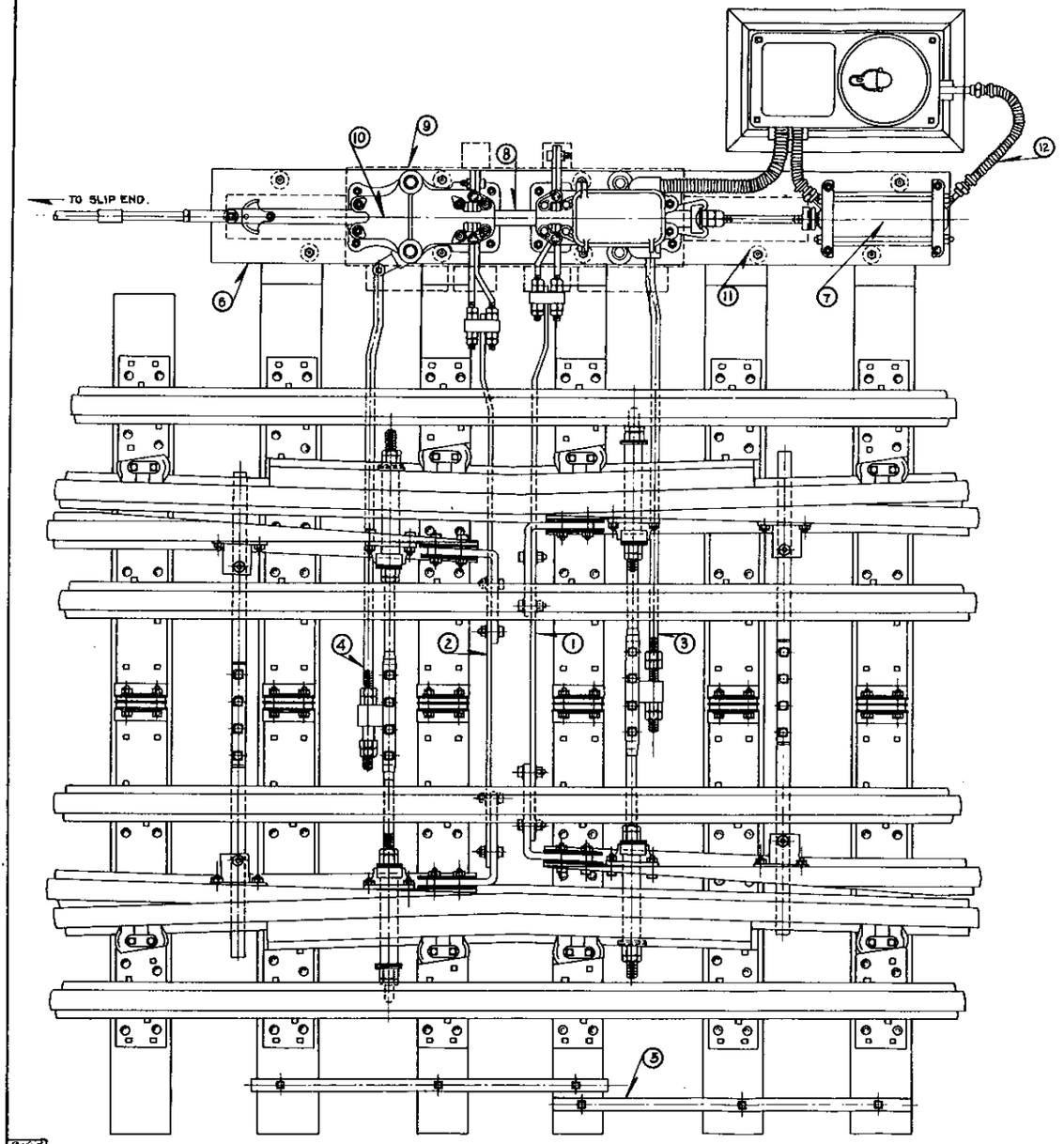
1 SHEET

S-212-A

THE PENNSYLVANIA RAILROAD
STANDARD
LAYOUT
SLIP SWITCH - "A" MECHANISM WITHOUT CYLINDER
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. NOV. 22, 1922

Approved
Chief Signal Engineer

Approved
Chief Engineer



ASSEMBLAGE

ITEM	REQ'D.	NAME	FIGURE	PLAN
1	1	L.H. FRONT AND LOCK ROD	3097	S-309
2	1	R.H. " " " "	30810	" "
3	1	OPERATING ROD	3317	S-331
4	1	" "	3318	"
5	2	TIE STRAPS	2002	S-200
6	1	BASE PLATE		
7	1	CYLINDER		
8	1	TANDEM MOVEMENT COMPLETE WITH SLIDE BAR AND CIRCUIT CONTROLLER		
9	1	COVER COMPLETE		
10	1	SWITCH MECHANISM COMPLETE WITH 6, 7, 8, & 9.		
11	10	WASHERS	2161	S-216
12	2	1/2" ARMORED HOSE CONNECTIONS		

NOTE :-

SWITCH RODS, GAUGE PLATE AND RAIL BRACES TO BE FURNISHED WITH SWITCH POINTS; FOR DETAILS SEE STANDARD M.W. MATERIAL PLANS.

WHERE NO DETAIL REFERENCE IS GIVEN, THE MANUFACTURER'S STANDARD APPARATUS SHOULD BE FURNISHED.

FOR DETAILS OF VALVE AND FRAMING OF TIMBERS SEE PLAN S-210.

REVISIONS

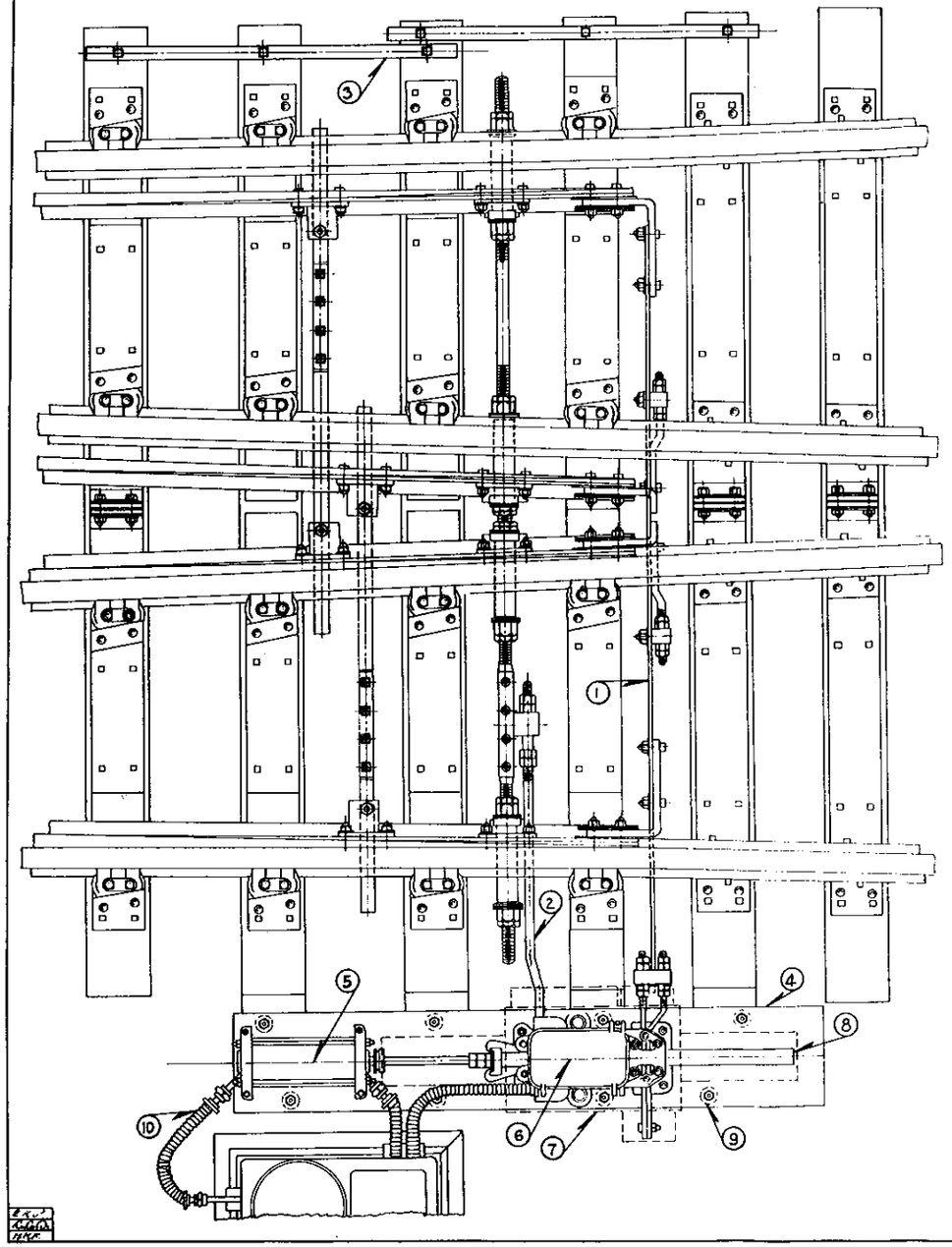
1 SHEET

S-213-A

THE PENNSYLVANIA RAILROAD
STANDARD
LAYOUT
M. P. FROGS - TYPE "AI" MECHANISM
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. NOV. 22, 1927.

Approved
Chief Signal Engineer

Approved
Chief Engineer



ASSEMBLAGE

ITEM	REQD.	NAME	FIGURE	PLAN
1	1	FRONT AND LOCK ROD	30822	S-308
2	1	OPERATING ROD	3953	S-333
3	2	TIE STRAPS	2002	S-200
4	1	BASE PLATE		
5	1	CYLINDER		
6	1	MOVEMENT COMPLETE WITH CIRCUIT CONTROLLER		
7	1	COVER COMPLETE		
8	1	SWITCH MECHANISM COMPLETE WITH 4, 5, 6 & 7.		
9	8	WASHERS	2161	S-216
10	2	1/2" ARMORED HOSE CONNECTIONS		

NOTE :-

SWITCH RODS, GAUGE PLATE AND RAIL BRACES TO BE FURNISHED WITH SWITCH POINTS; FOR DETAILS SEE STANDARD M.W. MATERIAL PLANS.

WHERE NO DETAIL REFERENCE IS GIVEN, THE MANUFACTURER'S STANDARD APPARATUS SHOULD BE FURNISHED.

FOR DETAILS OF VALVE AND FRAMING OF TIMBERS SEE PLAN S-210.

REVISIONS

1 SHEET

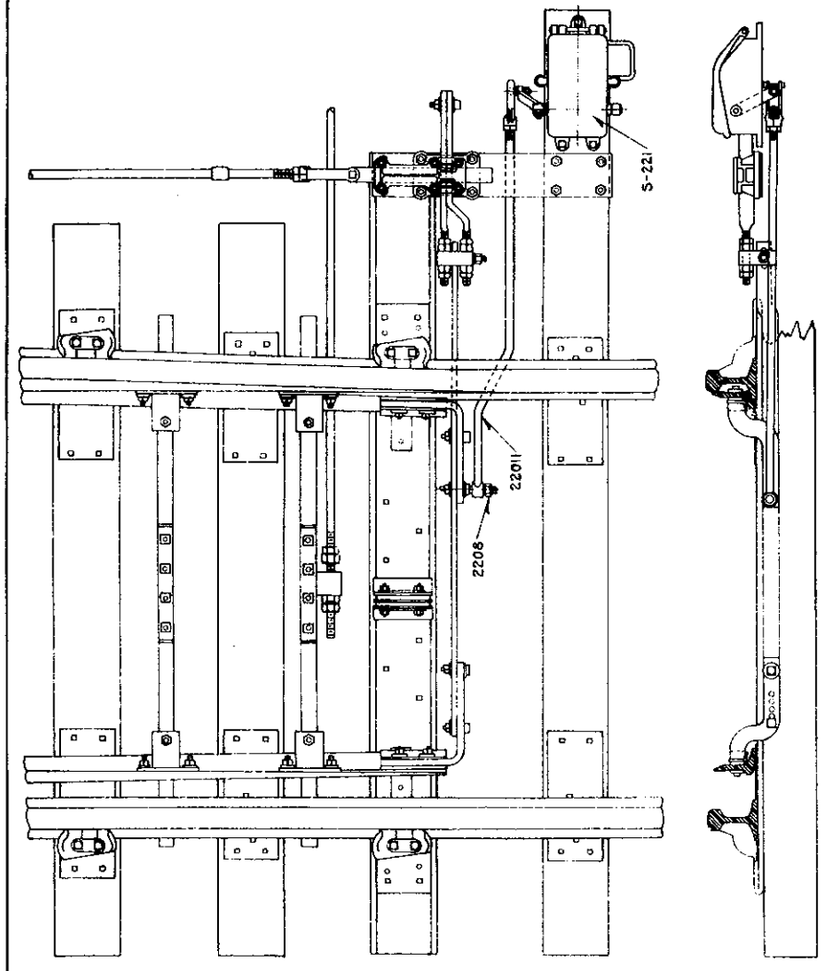
S-214-A

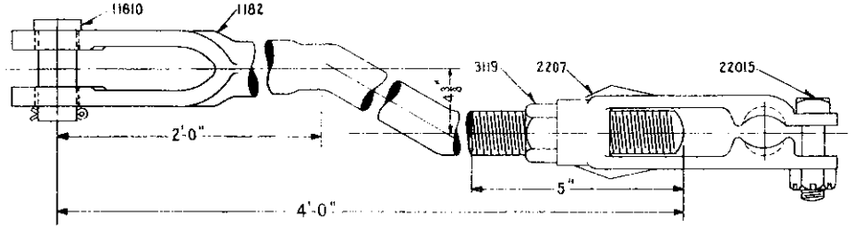
THE PENNSYLVANIA RAILROAD
STANDARD
LAYOUT
SLIP SWITCH "AI" MECHANISM WITH CYLINDER

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. NOV. 22, 1927.

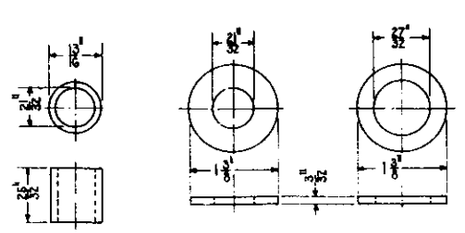
Approved
Chief Signal Engineer

Approved
Chief Engineer





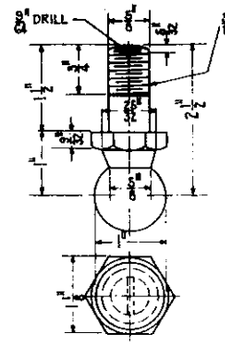
22016 - CONNECTING ROD



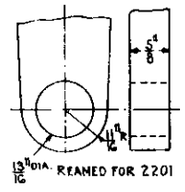
2201 - BUSHING
FIBRE
R.S.A. MAN. 1925

2202 - WASHER
STEEL
R.S.A. MAN. 1925

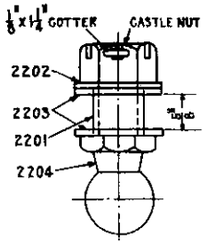
2203 - WASHER
FIBRE
R.S.A. MAN. 1925



2204 - INSULATING BALL STUD
ROLLED ALLOY STEEL
R.S.A. MAN. 1925

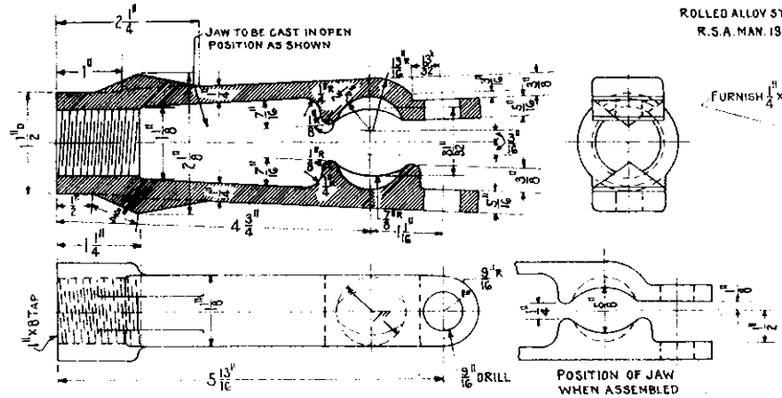


CIRCUIT CONTROLLER ARM

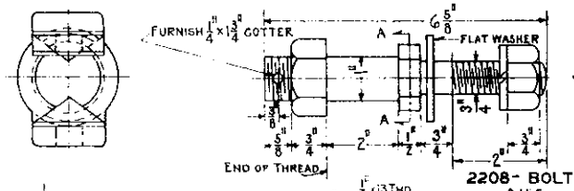


2208 - ASSEMBLY OF INSULATING BALL STUD
R.S.A. MAN. 1925

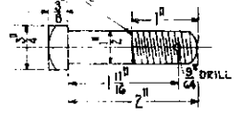
NOTE:-
FIBRE SHALL BE IN ACCORDANCE WITH P.R.R. SPECIFICATION C.E. 50



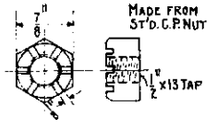
2207 - ADJ. SOCKET SCREW JAW
MALL. IRON
R.S.A. MAN. 1925



2208 - BOLT
O.H.S.

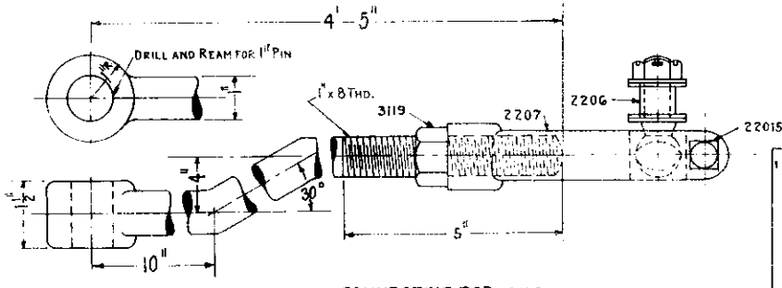


2209 - SQ. HD. BOLT O.H.S.
R.S.A. MAN. 1925



2210 - HEX. NUT
R.S.A. MAN. 1925

REVISIONS	
B - APRIL 23, 1925 APPROVED:-	A.H. Rudd
C - DEC. 14, 1925 APPROVED:-	A.H. Rudd
D - FEB. 21, 1927 APPROVED:-	A.H. Rudd



CONNECTING ROD O.H.S.

ORDERING REFERENCE FOR CONNECTING ROD

ORDER No.	REQUIRED
22011	CONNECTING ROD AS SHOWN.
22012	22011 WITHOUT 2206 AND 22014.
22013	22011 WITHOUT 2206.
22014	2207 WITH 22015.
22015	2209 WITH 22010 AND 1/8"x1 1/4" COTTER.

1 SHEET

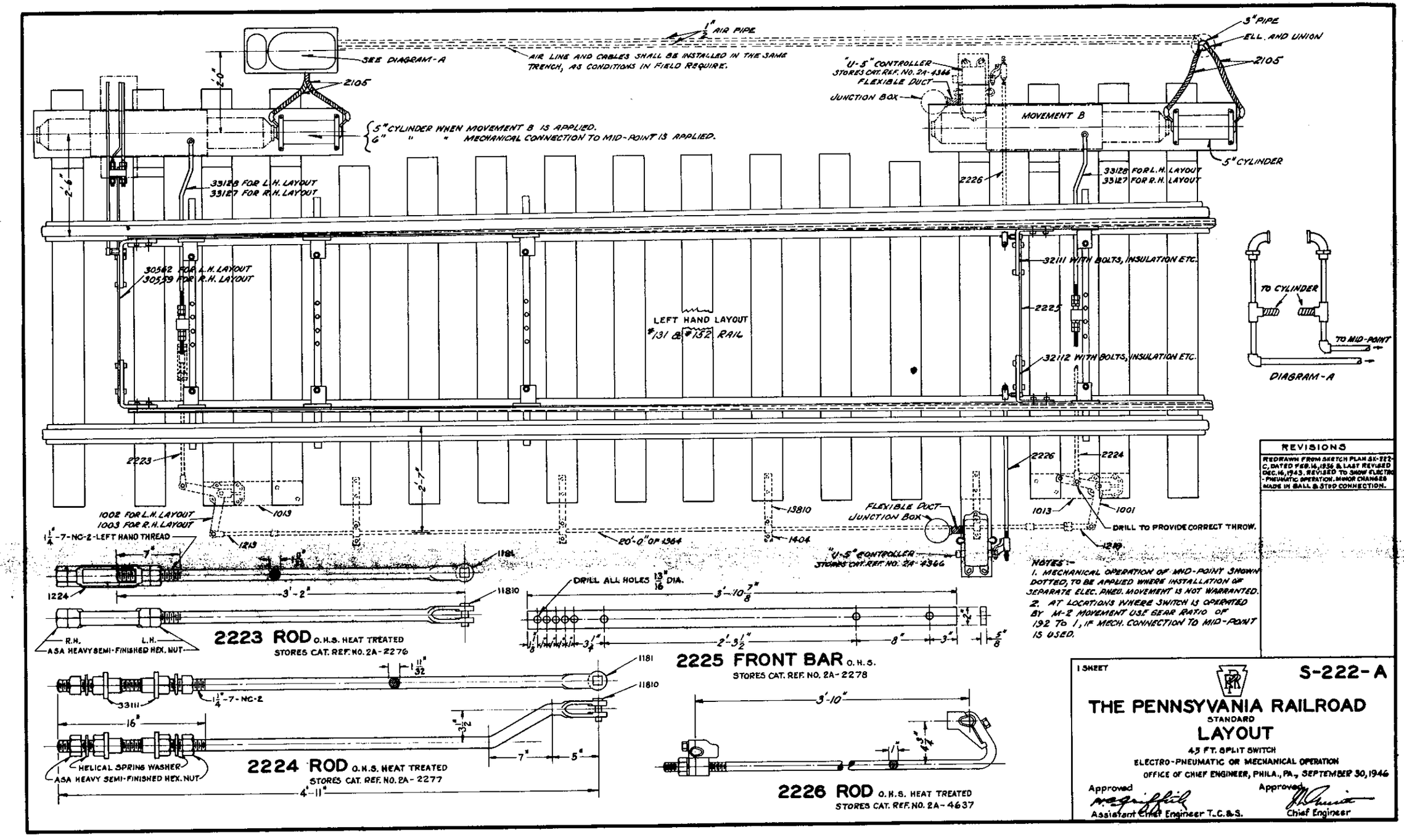
S-220-D

THE PENNSYLVANIA RAILROAD
STANDARD
SWITCH CIRCUIT CONTROLLER CONNECTION

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., SEPT. 11, 1924.

Approved A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer



REVISIONS

REDRAWN FROM SKETCH PLAN SK-722-C, DATED FEB. 14, 1936 & LAST REVISED DEC. 16, 1943. REVISED TO SHOW ELECTRO-PNEUMATIC OPERATION. MINOR CHANGES MADE IN BALL & STUD CONNECTION.

NOTES:-

1. MECHANICAL OPERATION OF MID-POINT SHOWN DOTTED, TO BE APPLIED WHERE INSTALLATION OF SEPARATE ELEC. PNEU. MOVEMENT IS NOT WARRANTED.
2. AT LOCATIONS WHERE SWITCH IS OPERATED BY M-2 MOVEMENT USE GEAR RATIO OF 192 TO 1, IF MECH. CONNECTION TO MID-POINT IS USED.

1 SHEET

S-222-A

THE PENNSYLVANIA RAILROAD

STANDARD

LAYOUT

45 FT. SPLIT SWITCH

ELECTRO-PNEUMATIC OR MECHANICAL OPERATION

OFFICE OF CHIEF ENGINEER, PHILA., PA., SEPTEMBER 30, 1946

Approved

Assistant Chief Engineer T.C.&S.

Approved

Chief Engineer

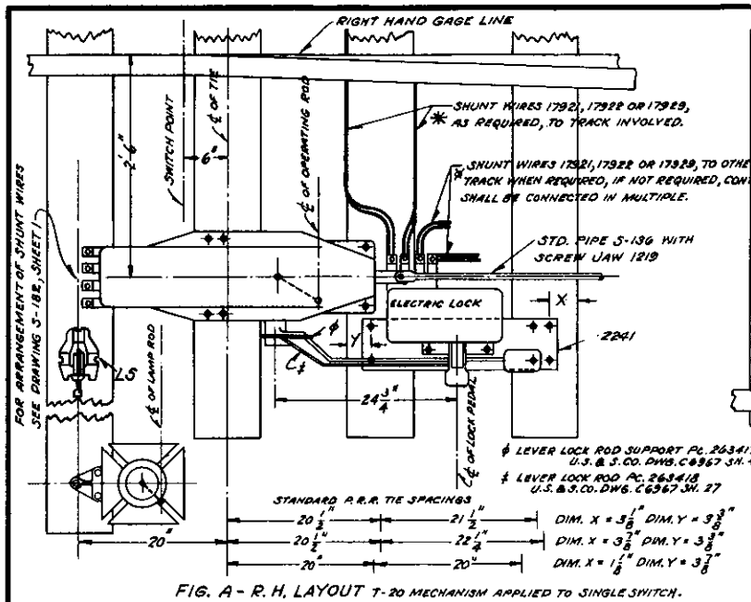


FIG. A - R. H. LAYOUT T-20 MECHANISM APPLIED TO SINGLE SWITCH.

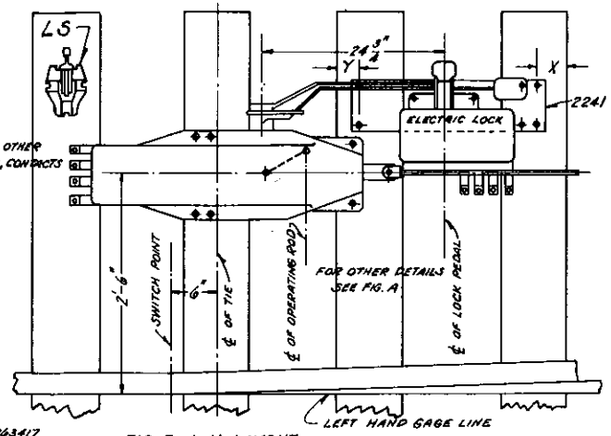
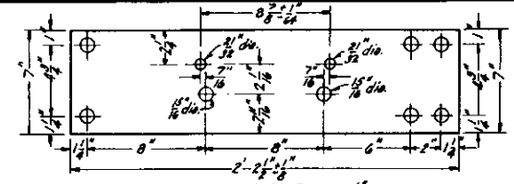
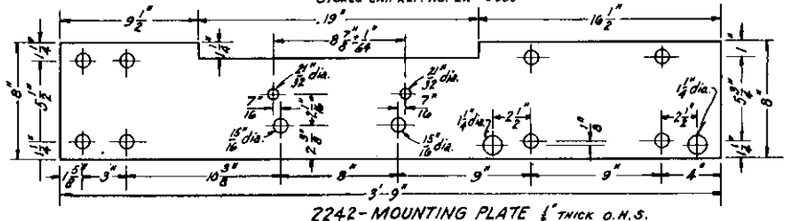


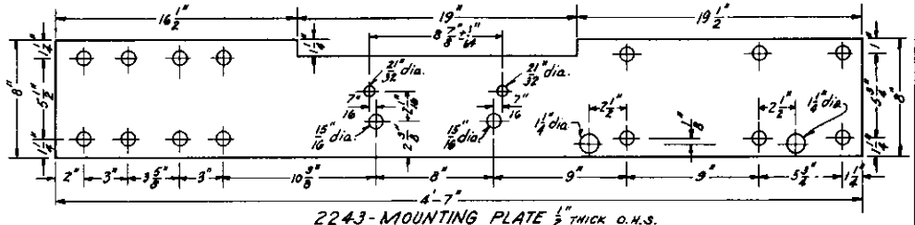
FIG. B - L. H. LAYOUT T-20 MECHANISM APPLIED TO SINGLE SWITCH.



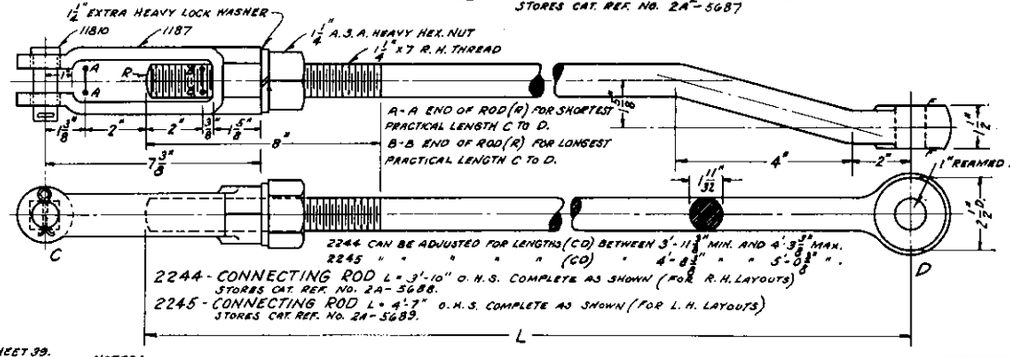
2241 - MOUNTING PLATE 1/4" THICK O.H.S.
STORES CAT. REF. NO. 2A-5685



2242 - MOUNTING PLATE 1/4" THICK O.H.S.
STORES CAT. REF. NO. 2A-5686



2243 - MOUNTING PLATE 1/2" THICK O.H.S.
STORES CAT. REF. NO. 2A-5687



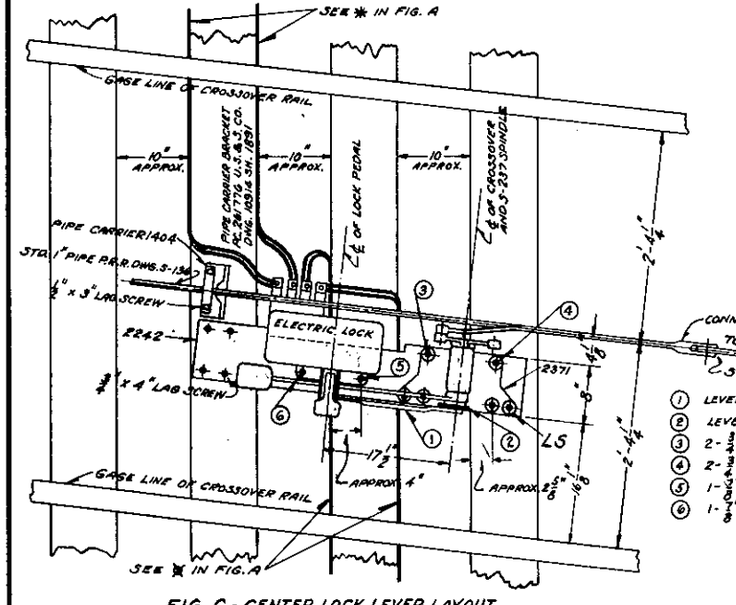


FIG. C - CENTER LOCK LEVER LAYOUT.

(1) LEVER LOCK ROD PC. 262360, U.S. & S.CO. DWG. C-6967, SHEET 39.
(2) LEVER LOCK ROD SUPPORT PC. 262361, U.S. & S.CO. DWG. C-6967, SHEET 39.
(3) 2-5/8" x 2 3/4" SQ. HD. BOLTS WITH HEX. NUTS & LOCK WASHERS.
(4) 2-3/4" x 11" SQ. HD. BOLTS WITH HEX. NUTS & WASHERS 2161 P.R.R. DWG. S-216.
(5) 1-3/4" x 12" SQ. HD. BOLTS WITH HEX. NUTS & WASHERS 2162 P.R.R. DWG. S-216.
(6) 1-5/8" x 3 3/4" SQ. HD. BOLTS WITH HEX. NUTS & LOCK WASHERS.

NOTES:-
1. EXCEPT AS SPECIFIED, ALL HOLES IN PLATES 2241, 2242 AND 2243 SHALL BE 13/16" IN DIAMETER.
2. IN FIGURE C, WHEN ELECTRIC LOCK IS APPLIED WHERE 100 LB. RAIL IS IN SERVICE, DROP MOUNTING PLATE APPROX. 1/2" SO THAT TOP OF ELECTRIC LOCK WILL NOT BE ABOVE TOP OF RAIL.
3. IN FIGURE C, WHEN ELECTRIC LOCK IS NOT INSTALLED, APPLY MOUNTING PLATE 2372 P.R.R. DRAWING S-237-C.
4. ELECTRIC LOCK TO BE ORDERED WITH OR WITHOUT BRACKETS, DEPENDING UPON REQUIREMENTS.
5. FOR CIRCUITS SHOWING SHUNTING ARRANGEMENTS, SEE DRAWINGS S-803 AND S-872.
6. TIE SPACING STANDARD FOR VARIOUS LAYOUTS.
7. WHERE ELECTRIC LOCK IS INSTALLED (SHTS. 1 & 2 OF THIS DWG.) ONLY ONE LEVER STAND LS (FOR REVERSE POSITION OF LEVER) SHALL BE APPLIED.

SHEET 1 OF 2

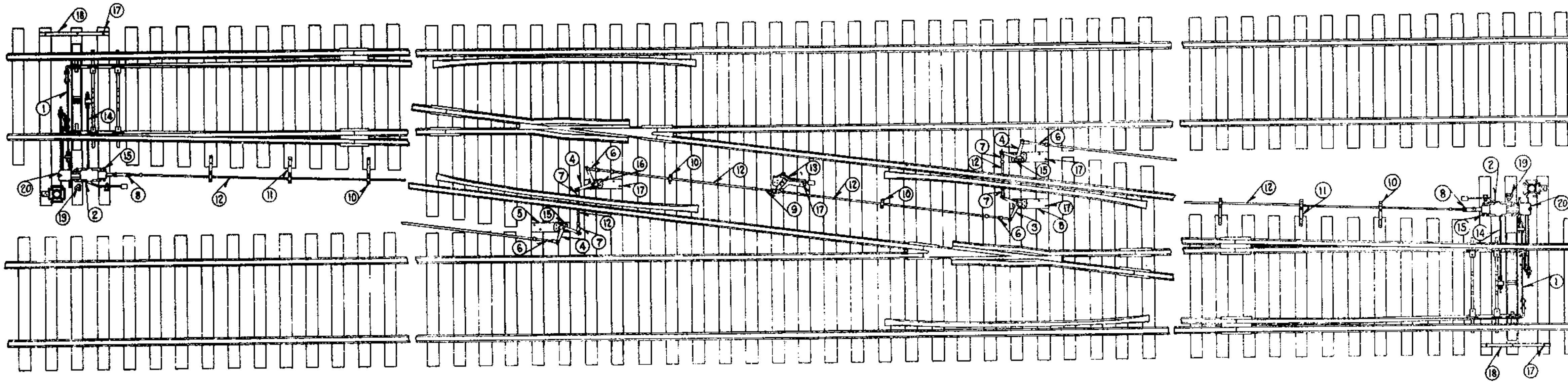
S-224-A

THE PENNSYLVANIA RAILROAD
STANDARD
MOUNTING OF T-20 H.O. MECHANISM AND SL-26 ELECTRIC SWITCH LOCK.

OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 21, 1949.

Approved H.C. Griffith
Assistant Chief Engineer-T.C.&S.

Approved J. Minnich
Chief Engineer



ASSEMBLAGE

ITEM	REQ'D.	NAME	FIG.	PLAN
1	2	FRONT AND LOCK RODS.	30815	S-305
2	2	SWITCH MECHANISMS.		73905
3	1	CRANK AND STAND.	1002	S-100
4	3	CRANKS AND STANDS.	1003	
5	4	SUPPORTING PLATES.	1013	S-101
6	4	SOLID JAWS.	1213	S-121
7	4	SOLID JAWS.	1214	
8	2	SCREW JAWS.	1219	
9	1	DOUBLE JAW.	1211	
10	22	PIPE CARRIERS - NO. 8 CROSSOVER.	1404	S-140
	26	PIPE CARRIERS - NO. 10 CROSSOVER.		
11	20	PIPE CARRIER SUPPORTS - NO. 8 CROSSOVER.	13810	S-138
	24	PIPE CARRIER SUPPORTS - NO. 10 CROSSOVER.		
12	185'	SIGNAL PIPE AND COUPLINGS - NO. 8 CROSSOVER.	1364	S-136
	220'	SIGNAL PIPE AND COUPLINGS - NO. 10 CROSSOVER.		
13	1	LEVER AND STAND.	2361	S-236
14	2	OPERATING RODS	33114	S-331
15	16	3/4" X 6 3/4" SQ. HD. BOLTS WITH PLATE WASHERS & HEX. NUTS.		
16	8	3/4" X 2" SQ. HD. BOLTS WITH HEX. NUTS.		
17	18	3/4" X 4 1/2" GAL. IRON LAG SCREWS.		
18	2	TIE STRAPS	2002	S-200
19	4	LEVER STANDS	176886	73905
20	2	CIRCUIT CONTROLLER WITH POINT DETECTOR AND ROD.		73905

NOTE:-

1. PIPE CARRIERS SHALL BE NOT MORE THAN 8'-0" CENTERS.
2. FOR BONDING AND INSULATION SEE PLAN S-803.
3. WHERE SWITCHES ARE PROTECTED BY SIGNAL:
   CROSSOVER BETWEEN MAIN TRACKS SHALL BE EQUIPPED AS SHOWN WITH LOCK LEVER 13 IN CENTER OF CROSSOVER.
4. WHERE SWITCHES ARE NOT PROTECTED BY SIGNALS AND MECH. SWITCH LOCKING IS APPROVED BY THE GENERAL MANAGER:
   (a) CROSSOVER BETWEEN MAIN TRACK AND SIDING WHERE DERAIL PROTECTION ONLY IS DESIRED, THE PIPE LINE SHALL BE OPERATED BY THE MAIN TRACK SWITCH STAND, OMITTING LOCK LEVER 13.
   (b) IF A SWITCH IS LOCATED LESS THAN 200 FT. FROM A SWITCH OF A CROSSOVER BETWEEN MAIN TRACKS, OR MAIN TRACK AND SIDING, AND BECAUSE OF LOCAL CONDITIONS, THESE SWITCH STANDS ARE LOCATED ON SAME SIDE OF TRACK, THE CROSSOVER SWITCH MUST BE LOCKED NORMAL BY PIPE LINE OPERATED BY THE SWITCH STAND ON OTHER END OF CROSSOVER, OMITTING LOCK LEVER 13.
   (c) CIRCUIT CONTROLLERS SHALL BE OMITTED.

REVISIONS
REDRAWN FROM APPROVED PLAN S-228-A, DATED 2-20-22 AND REVISED.
C OCTOBER 9, 1926 APPROVED:- [signature]
D DECEMBER 30, 1932. APPROVED:- [signature]

1 SHEET

S-228-D

THE PENNSYLVANIA RAILROAD
STANDARD

ARRANGEMENT FOR LOCKING NON-INTERLOCKED CROSSOVER

OFFICE OF CHIEF SIGNAL ENGINEER PHILA. PA APR[illegible] 1926

Approved [signature] Chief Signal Engineer — Approved [signature] Engr. of Standards — Approved [signature] Chief Engineer

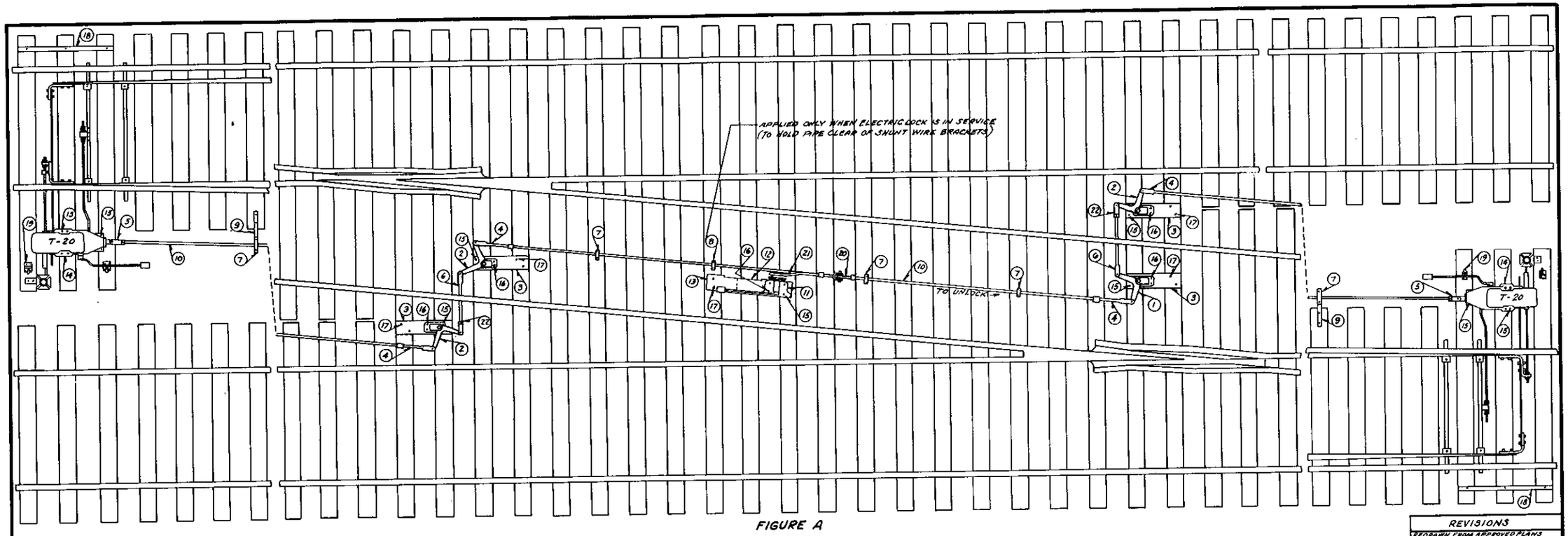


FIGURE A

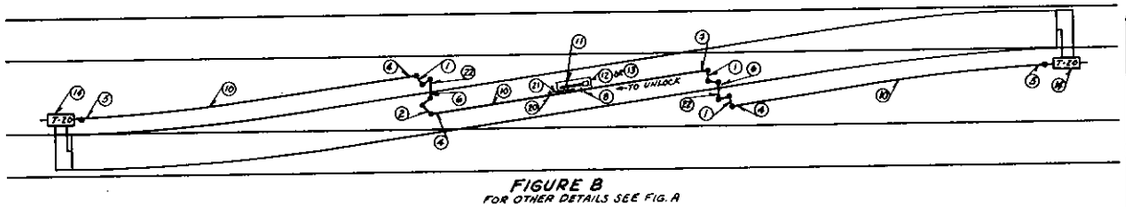


FIGURE B
FOR OTHER DETAILS SEE FIG. A

BILL OF MATERIAL

NO.	FIG. A REQ'D.	FIG. B REQ'D.	NAME	FIG.	DWG.	S.C.R.
1	1	3	CRANK AND STAND	1002	S-100	2A-840
2	3	1	CRANK AND STAND	1003	S-100	2A-841
3	4	4	SUPPORTING PLATES	1018	S-101	2A-1770
4	4	4	SOLID JAWS	1213	S-121	2A-1246
5	2	2	SCREW JAWS WITH TANG END	1219	S-121	2A-1238
6	2	2	SOLID JAWS SEE NOTE 10	1217	S-121	2A-1243
7	AS REQUIRED		PIPE CARRIERS	1406	S-140	2A-510
8	1	1	PIPE CARRIER 1404 & BRACKET PC. 26176 U.S.R.S. CO. DWG. 10314 SH. 1891			
9	AS REQUIRED		PIPE CARRIER SUPPORTS	13810	S-138	2A-2741
10	"	"	STANDARD 1" PIPE	1364	S-136	2A-1711
11	1	1	LEVER AND STAND 2371 OR 2374.		S-237	2A-4880 2A-2430
12	1	1	SUPPORTING PLATE WHERE ELEC. LOCK IS NOT USED	2372	S-237	2A-4891
13	1	1	SUPPORTING PLATE WHERE ELEC. LOCK IS USED	2242	S-224	2A-5686
14	2	2	T-20 MOVEMENT WITH LOOSE LOCK BAR			2A-3035 2A-3036
15	18	18	3/4" x 8 3/4" SQ. HD. BOLTS, PLATE WASHERS AND HEX. NUTS.			
16	10	10	3/4" x 2" SQ. HD. BOLTS WITH HEX. NUTS AND LOCK WASHERS.			
17	16	16	3/4" x 4 1/2" GALV. LAG SCREWS			
18	2	2	TIE STRAPS	2002	S-200	2A-2687
19	4	4	LEVER STAND FOR T-20 PC 105173 DWG B-8373 SH. 6 U.S.R.S. CO.			2A-3910
20	1	1	PIPE LUG	12111	S-121	2A-1434
21	1	1	CONNECTING ROD	2573	S-237	2A-4892
22	2	2	SCREW JAW	1187	S-118	2A-1237

NOTE:-

1. WHERE SWITCH OR SWITCHES ARE PROTECTED BY SIGNAL:
   (a) CROSSOVER BETWEEN MAIN TRACKS, OR BETWEEN MAIN TRACK AND SIDING, SHALL BE EQUIPPED AS SHOWN IN FIGURE A OR B WITH LOCK LEVER IN CENTER OF CROSSOVER.
   (b) WHERE FIELD CONDITIONS ARE SUCH THAT FIGURE A OR B CANNOT BE APPLIED, THE ARRANGEMENT MAY BE MODIFIED UPON APPROVAL OF THE CHIEF ENGINEER P.R.R.
2. WHERE SWITCH OR SWITCHES ARE NOT PROTECTED BY SIGNAL:
   (a) CROSSOVER BETWEEN MAIN TRACK AND SIDING, MAY BE EQUIPPED IN ACCORDANCE WITH FIGURE A OR B, WHEN APPROVED BY THE GENERAL MANAGER AND CHIEF ENGINEER P.R.R.
   (b) WHERE TRACK CIRCUITS ARE NOT IN SERVICE, OR IF NO OTHER CIRCUITS ARE INVOLVED, THE CIRCUIT CONTROLLER FOR T-20 MOVEMENT SHALL BE OMITTED.
3. FOR BONDING, AND INSULATING JOINT LOCATIONS, SEE DRAWING S-803.
4. FOR ARRANGEMENT OF SHUNTING TRACK AT T-20 MOVEMENT SEE DRAWING S-182.
5. FOR ARRANGEMENT OF SHUNTING TRACK AT CENTER LOCK LEVER BY ACTUATION OF ELECTRIC SWITCH LOCK, WHERE APPLIED, AND FOR SPACING OF TIMBERS, SEE DRAWING S-224.
6. FOR ARRANGEMENT OF LOCKING T-20 MOVEMENT WHEN LOCK LEVER S-237 IS LOCATED AT EITHER END OF CROSSOVER, SEE DRAWING S-224.
7. FOR SPECIFICATIONS COVERING INSTALLATION OF PIPE LINE, SEE INSTRUCTIONS Nos 145 TO 148 INCL. OF C.E. 223, AND C.S.E. 30.
8. UNLESS OTHERWISE SPECIFIED T-20 MOVEMENTS SHALL BE EQUIPPED WITH POINT DETECTOR AND POINT DETECTOR BAR.
9. FOR FRONT AND LOCK RODS, OPERATING RODS, ETC. SEE DRAWINGS COVERING THE ITEMS REQUIRED.
10. WHEN ORDERING SOLID JAW (6) SPECIFY LENGTH L AND TO BE PROVIDED WITH 7" OF 1 1/4"-7-NC-2 THREAD.

REVISIONS

REDRAWN FROM APPROVED PLANS S-228-D, DATED APRIL 2, 1926, LAST REVISED DEC. 30, 1932 AND S-229-C, DATED OCT. 2, 1916, LAST REVISED DEC. 30, 1932 AND REVISED DRAWINGS S-230-C AND S-231-C OBSOLETE.

1 SHEET

S-228-E

THE PENNSYLVANIA RAILROAD

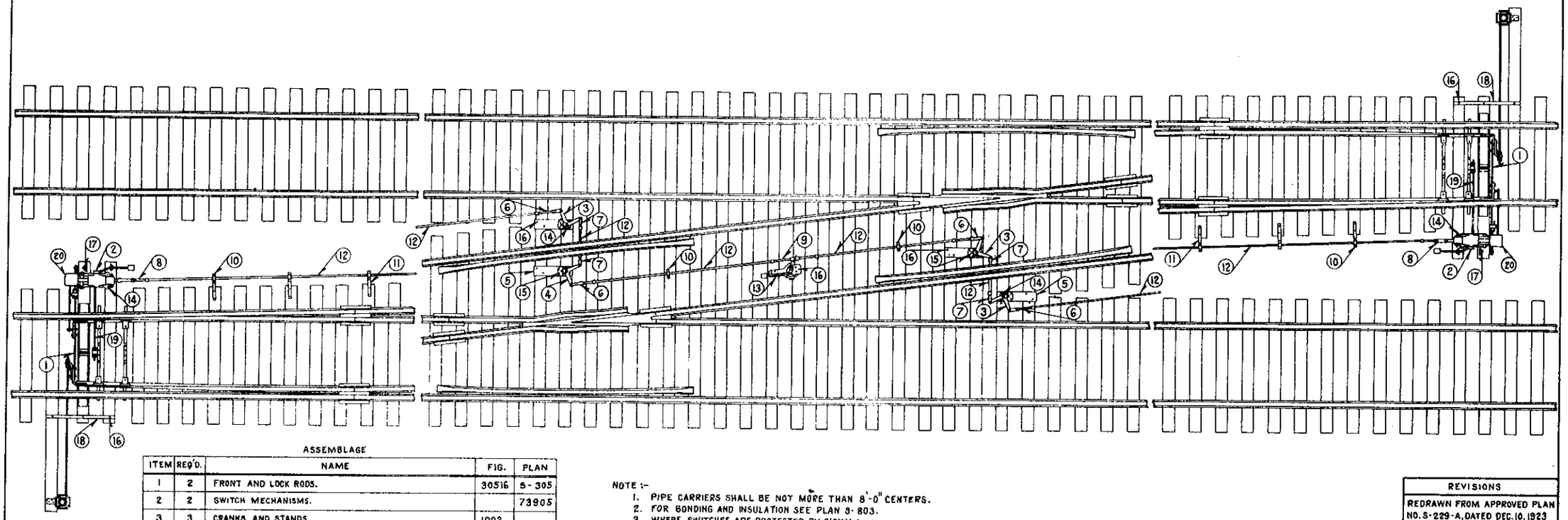
STANDARD

ARRANGEMENT FOR LOCKING NON-INTERLOCKED CROSSOVER

OFFICE OF CHIEF ENGINEER, PHILA., PA. FEBRUARY 6, 1950.

Approved,
W. G. Salmonson
Assistant Chief Engineer-Signals

Approved,
Chief Engineer



ASSEMBLAGE

ITEM	REQ'D.	NAME	FIG.	PLAN
1	2	FRONT AND LOCK RODS.	30516	S-305
2	2	SWITCH MECHANISMS.		73905
3	3	CRANKS AND STANDS.	1002	S-100
4	1	CRANK AND STAND.	1003	
5	4	SUPPORTING PLATES.	1013	S-101
6	4	SOLID JAWS.	1213	S-121
7	4	SOLID JAWS.	1214	
8	2	SCREW JAWS.	1219	
9	1	DOUBLE JAW.	1211	
10	22	PIPE CARRIERS - NO. 8 CROSSOVER.	1404	S-140
	26	PIPE CARRIERS - NO. 10 CROSSOVER.		
11	20	PIPE CARRIER SUPPORTS - NO. 8 CROSSOVER.	13810	S-138
	24	PIPE CARRIER SUPPORTS - NO. 10 CROSSOVER.		
12	185'	SIGNAL PIPE AND COUPLINGS - NO. 8 CROSSOVER.	1364	S-136
	220'	SIGNAL PIPE AND COUPLINGS - NO. 10 CROSSOVER.		
13	1	LEVER AND STAND.	2361	S-236
14	16	3/4" X 8-3/4" SQ. HD. BOLTS WITH HEX. NUTS & PL. WASHERS.		
15	8	3/4" X 2" SQ. HD. BOLTS WITH HEX. NUTS.		
16	18	3/4" X 4-1/2" GAL. IRON LAG SCREWS.		
17	4	LEVER STANDS.	176866	73905
18	2	TIE STRAPS.	2002	S-200
19	2	OPERATING RODS	33114	S-331
20	2	CIRCUIT CONTROLLER WITH POINT DETECTOR AND ROD.		73905

NOTE :-

1. PIPE CARRIERS SHALL BE NOT MORE THAN 8'-0" CENTERS.
2. FOR BONDING AND INSULATION SEE PLAN S-803.
3. WHERE SWITCHES ARE PROTECTED BY SIGNALS:
   CROSSOVER BETWEEN MAIN TRACKS SHALL BE EQUIPPED AS SHOWN WITH LOCK LEVER 13 IN CENTER OF CROSSOVER.
4. WHERE SWITCHES ARE NOT PROTECTED BY SIGNALS AND MECHANICAL SWITCH LOCKING IS APPROVED BY THE GENERAL MANAGER.
   (a) CROSSOVER BETWEEN MAIN TRACK AND SIDING WHERE DERAIL PROTECTION ONLY IS DESIRED, THE PIPE LINE SHALL BE OPERATED BY THE MAIN TRACK SWITCH STAND, OMITTING LOCK LEVER 13.
   (b) IF A SWITCH IS LOCATED LESS THAN 200 FT. FROM A SWITCH OF A CROSSOVER BETWEEN MAIN TRACKS, OR MAIN TRACK AND SIDING, AND BECAUSE OF LOCAL CONDITIONS, THESE SWITCH STANDS ARE LOCATED ON SAME SIDE OF TRACK, THE CROSSOVER SWITCH MUST BE LOCKED NORMAL BY THE PIPE LINE OPERATED BY THE SWITCH STAND ON OTHER END OF CROSSOVER, OMITTING LOCK LEVER 13.
   (c) CIRCUIT CONTROLLERS SHALL BE OMITTED.

REVISIONS
REDRAWN FROM APPROVED PLAN NO. S-229-A, DATED DEC. 10, 1923 AND REVISED.
C DECEMBER 30, 1932
APPROVED:- A H Rudd

1 SHEET

S-229-C

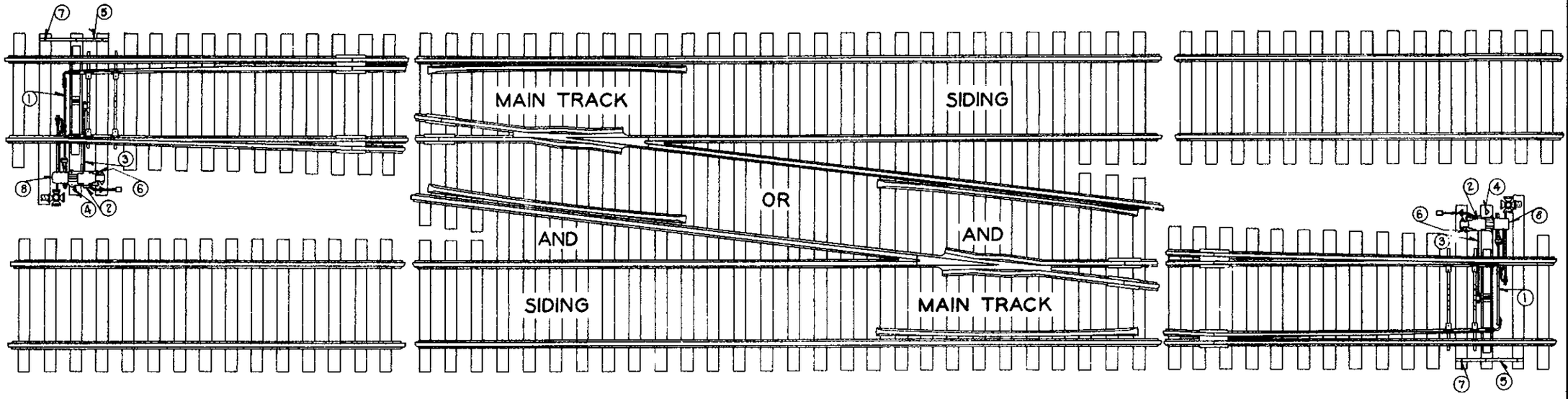
THE PENNSYLVANIA RAILROAD
STANDARD

ARRANGEMENT FOR LOCKING NON-INTERLOCKED CROSSOVER

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., OCTOBER [illegible]

Approved: A H Rudd
Chief Signal Engineer

Approved: M K Cregar
Engineer



ASSEMBLAGE

ITEM	REQ'D.	NAME	FIGURE	PLAN
1	2	FRONT AND LOCK RODS	30515	S-305
2	2	SWITCH MECHANISMS		73905
3	2	OPERATING RODS	33114	S-331
4	4	LEVER STANDS	176686	73905
5	2	TIE STRAPS	2002	S-200
6	8	$\frac{7}{8}$"x8$\frac{1}{2}$" SQ.HD. BOLTS WITH PL. WASHERS AND HEX. NUTS		
7	6	$\frac{7}{8}$"x4$\frac{1}{4}$" GAL. IRON LAG SCREWS		
8	2	CIRCUIT CONTROLLER WITH POINT DETECTOR AND ROD.		73905

NOTE:-

1. FOR BONDING AND INSULATION SEE PLAN S-803.
2. IF LOCAL CONDITIONS WILL NOT PERMIT A SWITCH STAND BEING INSTALLED WITH THROWING ROD IN TENSION WHEN SWITCH POINTS ARE SET NORMAL FOR MAIN TRACK TRAFFIC, AND EITHER SWITCH OF THE CROSSOVER MIGHT BE OPERATED IN ERROR FOR ANOTHER SWITCH WITHIN 200 FT., ARRANGEMENT SHOWN ON PLAN S-228 OR S-229 NOTE 4-(b) SHALL BE INSTALLED.

REVISIONS
REDRAWN FROM APPROVED PLAN S-230-A, DATED 2-20-22 AND REVISED.
C DECEMBER 30, 1932.
APPROVED:- A.H. Rudd

1 SHEET

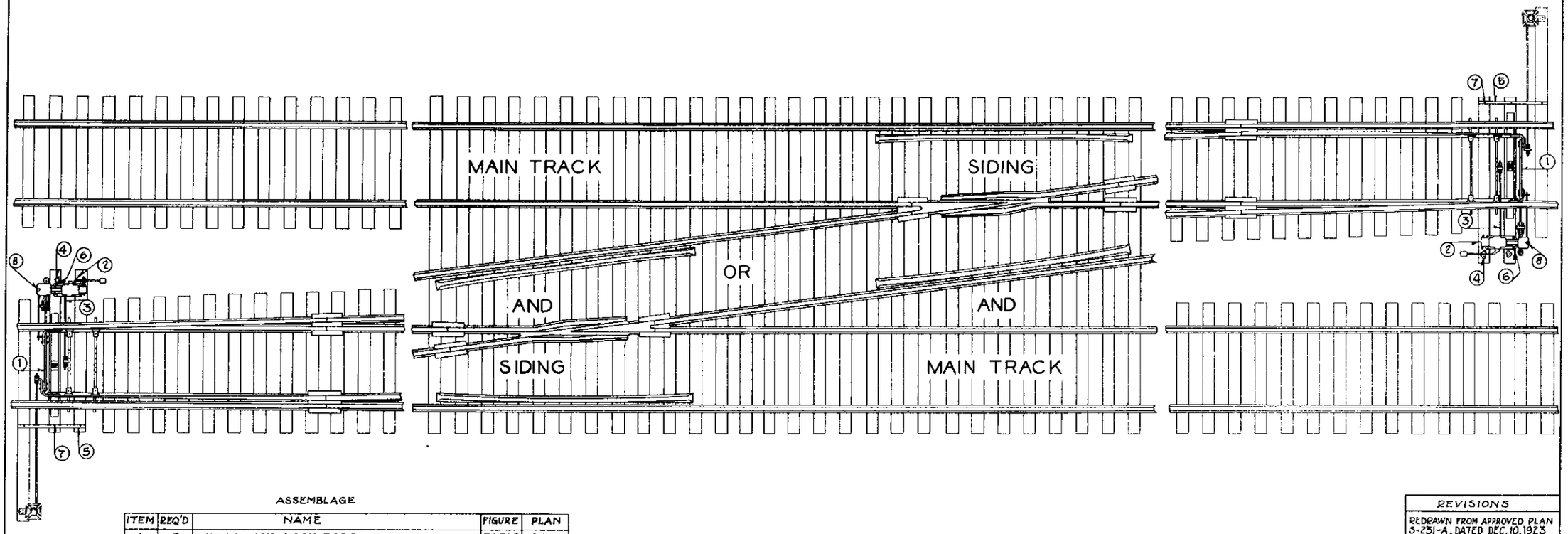
S-230-C

THE PENNSYLVANIA RAILROAD
STANDARD

ARRANGEMENT FOR LOCKING NON-INTERLOCKED CROSSOVER PROTECTED BY SIGNAL

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., NOV. 26, 1920

Approved A.H. Rudd — Chief Signal Engineer
Approved W.K. Cushing — Engineer of Standards
Approved



ASSEMBLAGE

ITEM	REQ'D	NAME	FIGURE	PLAN
1	2	FRONT AND LOCK RODS	30516	S-305
2	2	SWITCH MECHANISMS		73905
3	2	OPERATING RODS	33114	S-331
4	4	LEVER STANDS	176886	73905
5	2	TIE STRAPS	2002	S-200
6	8	3/4X8-3/4" SQ.H. BOLTS WITH HEX. NUTS & PL. WASHERS		
7	6	3/4" X 4 1/2" GAL. IRON SCREWS		
8	2	CIRCUIT CONTROLLER WITH POINT DETECTOR AND ROD.		73905

NOTE :-

1. FOR BONDING AND INSULATION SEE PLAN S-803.
2. IF LOCAL CONDITIONS WILL NOT PERMIT A SWITCH STAND BEING INSTALLED WITH THROWING ROD IN TENSION WHEN SWITCH POINTS ARE SET NORMAL FOR MAIN TRACK TRAFFIC, AND EITHER SWITCH OF THE CROSSOVER MIGHT BE OPERATED IN ERROR FOR ANOTHER SWITCH WITHIN 200 FT., ARRANGEMENT SHOWN ON PLAN S-228 OR S-229 NOTE 4-(b) SHALL BE INSTALLED.

REVISIONS

REDRAWN FROM APPROVED PLAN S-231-A, DATED DEC. 10, 1923 AND REVISED.

C DECEMBER 30, 1930.

APPROVED:- A.H. Rudd

1 SHEET

S-231-C

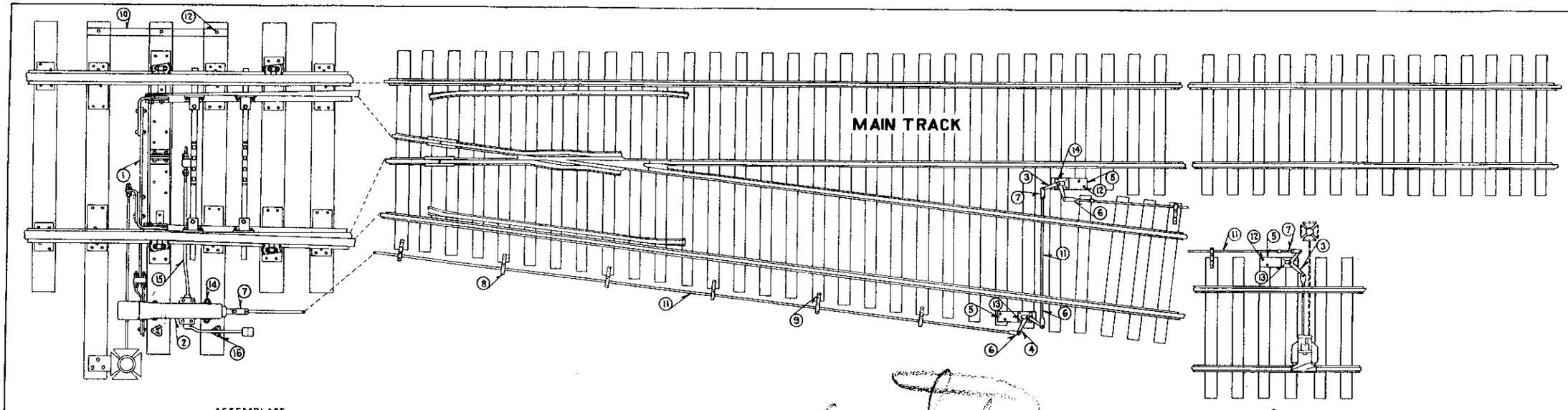
THE PENNSYLVANIA RAILROAD
STANDARD

ARRANGEMENT FOR LOCKING NON-INTERLOCKED CROSSOVER PROTECTED BY SIGNAL

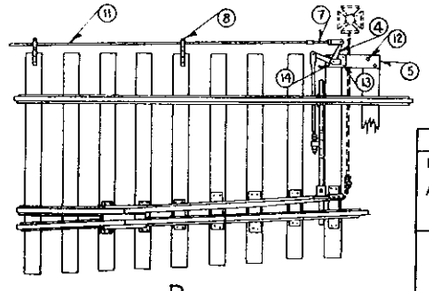
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., NOV. 20, 1926

Approved A.H. Rudd
Chief Signal Engineer

Approved
Engineer of Standards



A



B

ASSEMBLAGE

ITEM	REQ'D.	NAME	FIG.	PLAN
1	1	FRONT AND LOCK ROD.	30515	S-305
2	1 ⊖	HAND OPERATED SWITCH & LOCK MACHINE.	2602	S-260
3	1	* CRANK AND STAND. ✓	1002	S-100
4	1	† CRANK AND STAND. ✓	1003	S-100
5	3	SUPPORTING PLATES. ✓	1013	S-101
6	3	SOLID JAWS. ✓	1213	S-121
7	3	SCREW JAWS. ✓	1219	S-121
8	20	PIPE CARRIERS - NO. 8 TURNOUT. ✓	1404	S-140
	24	PIPE CARRIERS - NO. 10 TURNOUT. ✓		
9	20	PIPE CARRIER SUPPORTS - NO. 8 TURNOUT. ✓	13810	S-138
	24	PIPE CARRIER SUPPORTS - NO. 10 TURNOUT. ✓		
10	1	TIE STRAP. ✓	2002	S-200
11	175"	SIGNAL PIPE & COUPLINGS - NO. 8 TURNOUT. ✓	1364	S-136
	200"	SIGNAL PIPE & COUPLINGS - NO. 10 TURNOUT. ✓		
12	9	3/4" x 4 1/2" GALV. IRON LAG SCREWS. ✓		
13	6	3/4" x 2" SQ. HD. BOLTS & HEX. NUTS.		
14	10	3/4" x 8 3/4" SQ. HD. BOLTS, WITH PL. WASHERS & HEX. NUTS.		
15	1	OPERATING ROD.	33114	S-331
16	2	PADLOCK STANDS.	26024	S-260

NOTE:- * FURNISH TWO (2) CRANKS AND STANDS 1002 WHEN DERAIL A IS INSTALLED.
† " " " " " " 1003 " " B " "
PIPE CARRIERS SHALL BE NOT MORE THAN 8'-0" CENTERS.
FOR BONDING AND INSULATION SEE PLAN NO. S-803.
LAMPS AND CONNECTIONS SHALL BE FURNISHED BY M.W. DEPT.
⊖ SPECIFY ARRANGEMENT OF CONTACTS.

Alterations

REVISIONS
B - NOV. 9, 1926.
APPROVED:- A.H. Rudd W.C. Cushing

1 SHEET

S-232-B

THE PENNSYLVANIA RAILROAD

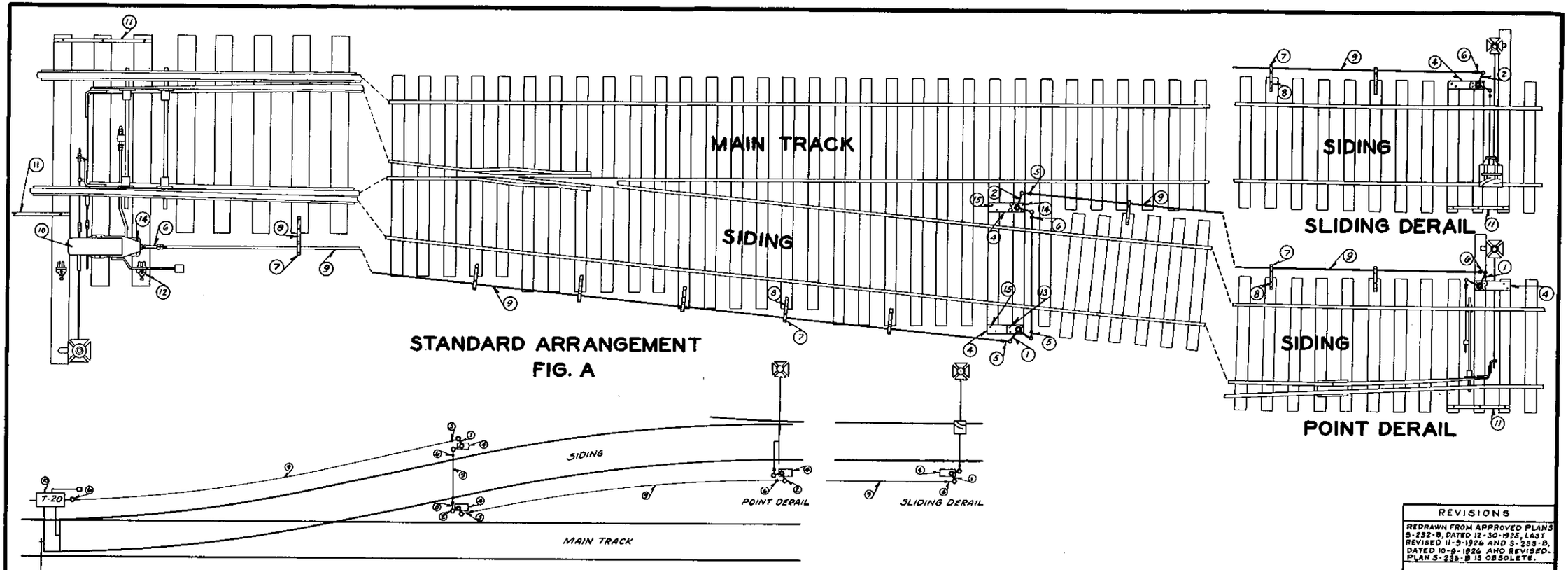
ARRANGEMENT FOR LOCKING NON-INTERLOCKED TURNOUT PROTECTED BY SIGNAL

OFFICE OF CHIEF SIGNAL ENGINEER PHILA., PA. DEC 30, 1925.

Approved A.H. Rudd Chief Signal Engineer

Approved W.C. Cushing Engr. of Stand

Approved



STANDARD ARRANGEMENT
FIG. A

STANDARD ARRANGEMENT
FIG. B

BILL OF MATERIAL

NO.	FIG. A REQ'D.	FIG. B REQ'D.	NAME	FIG. NO.	DWG. NO.	STORES CAT. REF.
1	1	2	CRANK AND STAND (WITH SLIDING DERAIL)	1003	S-100	2A-841
	2	1	CRANK AND STAND (WITH POINT DERAIL)			
2	2	1	CRANK AND STAND (WITH SLIDING DERAIL)	1002	S-100	2A-840
	1	2	CRANK AND STAND (WITH POINT DERAIL)			
4	3	3	SUPPORTING PLATE	1013	S-101	2A-1770
5	3	3	SOLID JAW	1213	S-121	2A-1240
6	3	3	TANG END WITH SCREW JAW	1219	S-121	2A-1238
7	AS REQUIRED		PIPE CARRIERS	1404	S-140	2A-510
8	AS REQUIRED		PIPE CARRIER SUPPORTS	13810	S-138	2A-2741
9	AS REQUIRED		STAND 1 IN. PIPE	1364	S-136	2A-1711
10	1	1	T-20 MOVEMENT			2A-3044 2A-3038
11	3	3	TIE STRAP	2002	S-200	2A-2687
12	2	2	LEVER STAND FOR T-20 PC 105173 DWG. B-8373, SN-6 U. S. & S. CO.			2A-3916
13	6	6	3/4" x 2" SQ. HD. BOLTS WITH HEX. NUTS & LOCK WASHERS			
14	10	10	3/4" x 8 3/4 SQ. HD. BOLTS WITH HEX. NUTS & LOCK WASHERS			
15	15	15	3/8" x 4 1/2" GALV. LAG SCREWS			

NOTES :-

1. WHERE DIFFICULTIES IN MAINTAINING PROPER ADJUSTMENTS OF PIPE LINE OR OPERATING THE DERAIL ARE ENCOUNTERED, CENTER LOCK LEVER LOCKING IN ACCORDANCE WITH DRAWING S-228 SHOULD BE INSTALLED.
2. FOR BONDING AND INSULATING JOINT LOCATIONS, SEE DRAWING S-803.
3. FOR ARRANGEMENT OF SHUNTING TRACK AT T-20 MOVEMENT, SEE DRAWING S-182.
4. FOR SPECIFICATIONS COVERING INSTALLATION OF PIPE LINE, SEE INSTRUCTIONS 145 TO 148 INCL. OF C.E. 223 AND C.S.E. 30.
5. UNLESS OTHERWISE SPECIFIED T-20 MOVEMENTS SHALL BE EQUIPPED WITH POINT DETECTOR.
6. FOR FRONT AND LOCK RODS, OPERATING RODS, ETC., SEE DRAWINGS COVERING THE ITEMS REQUIRED.
7. WHERE TRACK CIRCUITS ARE NOT IN SERVICE, OR IF NO OTHER CIRCUITS ARE INVOLVED, THE CIRCUIT CONTROLLER FOR T-20 MOVEMENT SHALL BE OMITTED.
8. EXCEPT AS INDICATED, ARRANGEMENT FIGURE B SHALL BE SAME AS FOR FIGURE A.

REVISIONS

REDRAWN FROM APPROVED PLANS S-232-B, DATED 12-30-1925, LAST REVISED 11-5-1926 AND S-238-B, DATED 10-9-1926 AND REVISED. PLAN S-238-B IS OBSOLETE.

1 SHEET

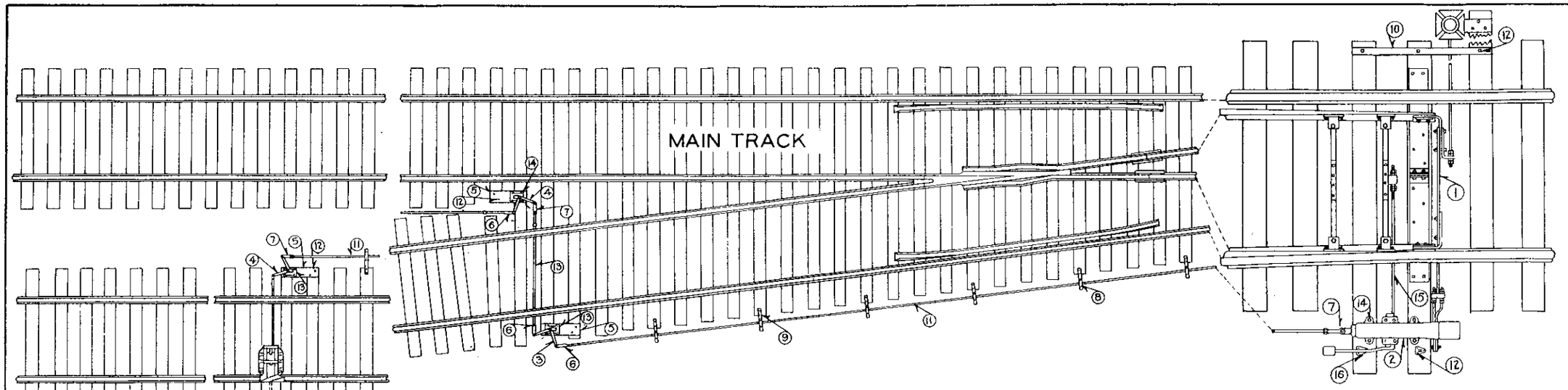
S-232-C

THE PENNSYLVANIA RAILROAD
STANDARD
LOCKING FOR NON-INTERLOCKED TURNOUTS EQUIPPED WITH DERAIL

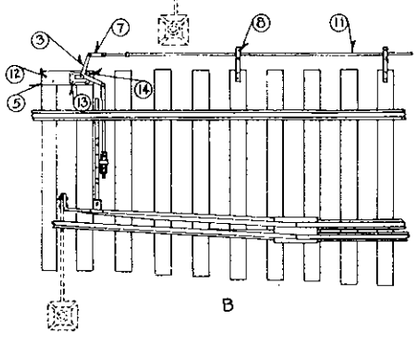
OFFICE OF CHIEF ENGINEER, PHILA., PA., JANUARY 25, 1930

Approved
W. G. Salmonson
Assistant Chief Engineer-Signals

Approved
J. Barnett
Chief Engineer



A



B

NOTE :
PIPE CARRIERS SHALL BE NOT MORE THAN 8'-0" CENTERS.
LAMPS AND CONNECTIONS SHALL BE FURNISHED BY M.W. DEPT.
FOR BONDING AND INSULATION SEE PLAN S-803.
* FURNISH TWO (2) CRANKS AND STANDS 1003 WHEN DERAIL "A" IS INSTALLED.
† FURNISH TWO (2) CRANKS AND STANDS 1002 WHEN DERAIL "B" IS INSTALLED.
⊖ SPECIFY ARRANGEMENT OF CONTACTS.

ASSEMBLAGE

ITEM	REQ'D	NAME	FIGURE	PLAN
1	1	FRONT AND LOCK ROD	30516	S-305
2	1 ⊖	HAND OPERATED S. AND L. MECHANISM	2602	S-260
3	1	† CRANK AND STAND	1002	S-100
4	1	* CRANK AND STAND	1003	S-100
5	3	SUPPORTING PLATES	1013	S-101
6	3	SOLID JAWS	1213	S-121
7	3	SCREW JAWS	1219	S-121
8	20	PIPE CARRIERS NO. 8 CROSSOVER	1404	S-140
	24	" " NO. 10 "		
9	20	PIPE CARRIER SUPPORTS NO. 8 "	13810	S-138
	24	" " " NO. 10 "		
10	1	TIE STRAP	2002	S-200
11	175'	SIGNAL PIPE AND COUPLINGS - NO. 8 CROSSOVER	1384	S-138
	200'	" " " " - NO. 10 "		
12	15	3/4" x 4 1/2" GAL. IRON LAG SCREWS		
13	6	3/4" x 2" SQ. HD. BOLTS WITH HEX. NUTS		
14	10	3/8" x 8 3/4" SQ HD. BOLTS WITH PLATE WASHERS AND HEX. NUTS		
15	1	OPERATING ROD	33114	S-331
16	2	PADLOCK STANDS	26024	S-260

REVISIONS
REDRAWN FROM APPROVED PLAN S-233-A, DATED 12-10-23 AND REVISED.

1 SHEET

S-233-B

THE PENNSYLVANIA RAILROAD
STANDARD

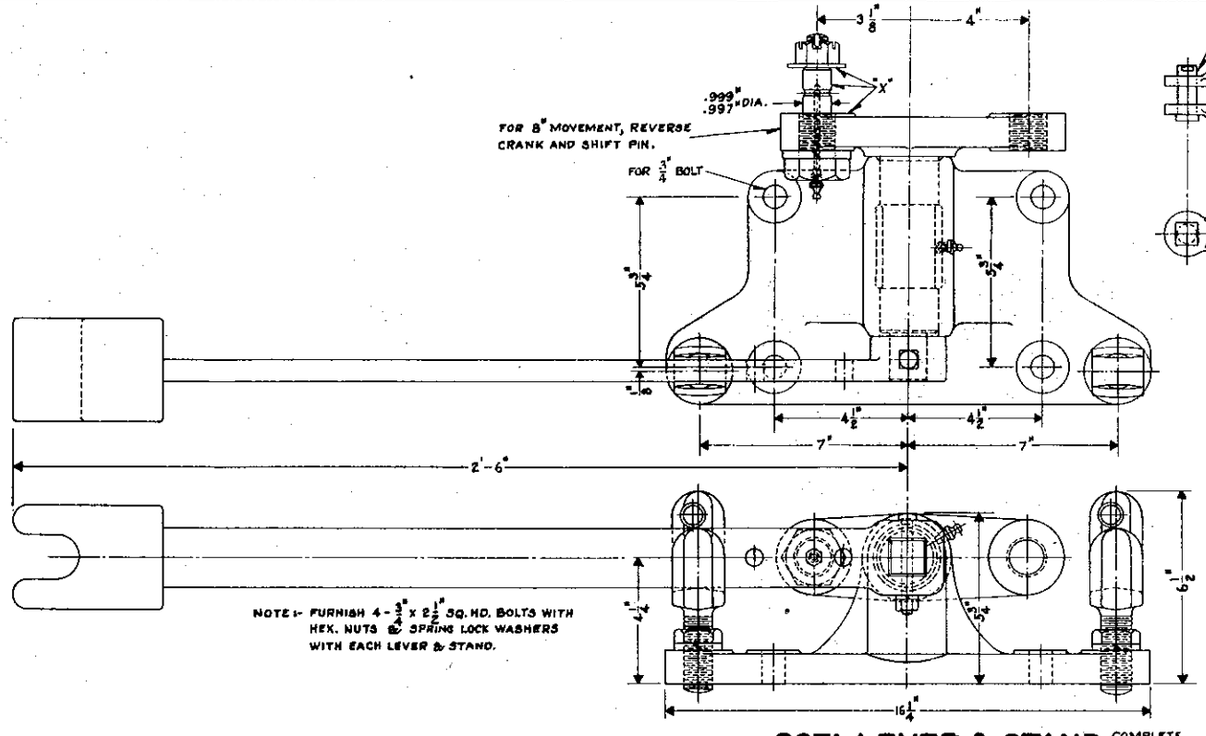
ARRANGEMENT FOR LOCKING NON-INTERLOCKED TURNOUT PROTECTED BY SIGNAL

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., OCT. 9, 1928

Approved
Chief Signal Engineer

Approved
Engineer of Standards

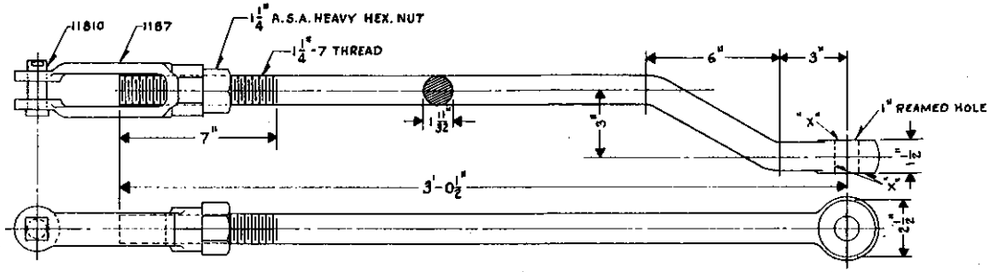
Approved
Chief E



2371 LEVER & STAND COMPLETE AS SHOWN.

STORES CAT. REF. NO. 2A-4890

02-285755



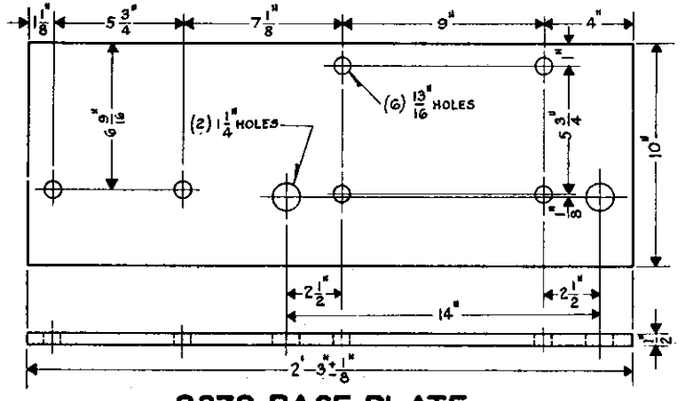
2373 CONNECTION COMPLETE AS SHOWN. O. H. S.

STORES CAT. REF. NO. 2A-4892

02-139459

NOTE:-

1. BEFORE SHIPMENT, MANUFACTURER SHALL PAINT ALL EXPOSED SURFACES OF APPARATUS, EXCEPT SURFACES MARKED "X", WITH A GOOD GRADE OF BLACK PAINT. SURFACES MARKED "X" SHALL BE WELL GREASED.



2372 BASE PLATE O. H. S.

STORES CAT. REF. NO. 2A-4891.

02-353751

REVISIONS
SUPERSEDES PLAN S-236-C, DATED OCT. 21, 1924 AND LAST REVISED DEC. 15, 1926.

1 SHEET

S-237-A

THE PENNSYLVANIA RAILROAD

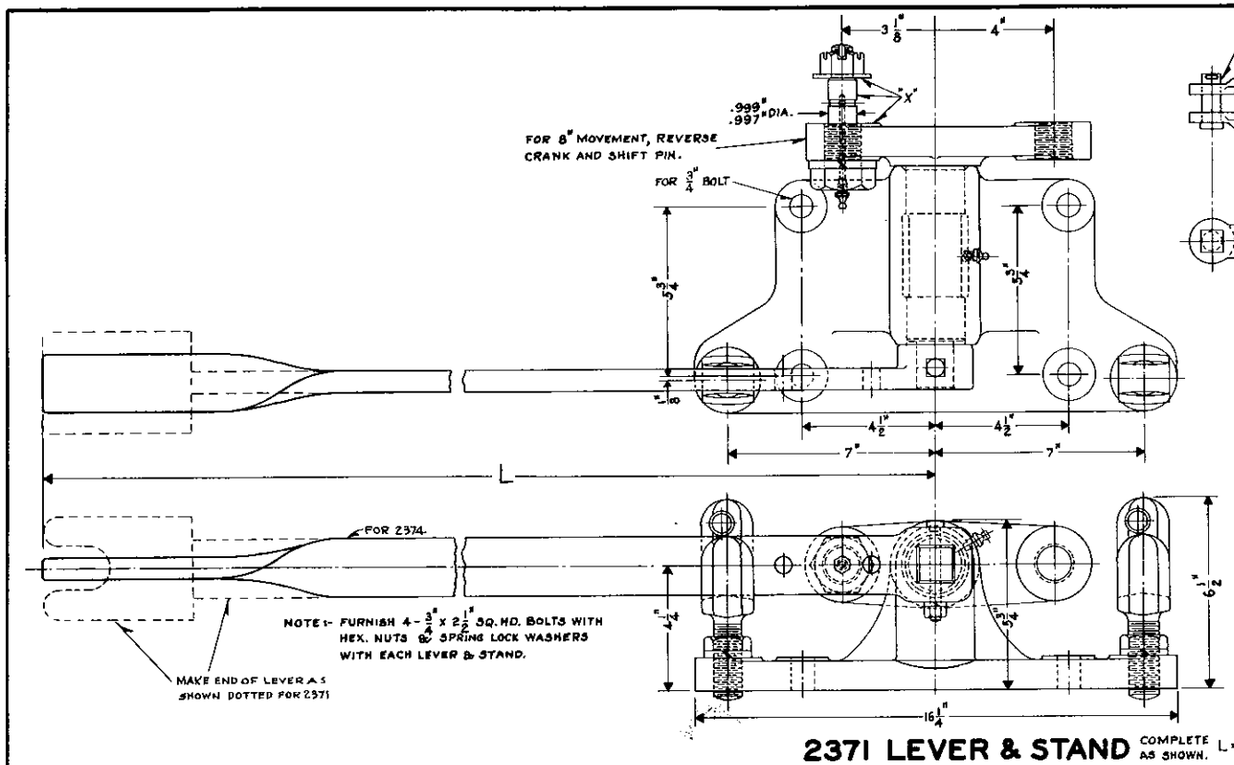
STANDARD

LEVER AND STAND

OFFICE OF CHIEF ENGINEER, PHILA., PA. JUNE 15, 1944.

Approved
M. L. Stanton
Assistant Chief Engineer-Signals

Approved
J. T. Emmett
Chief Engineer



2371 LEVER & STAND

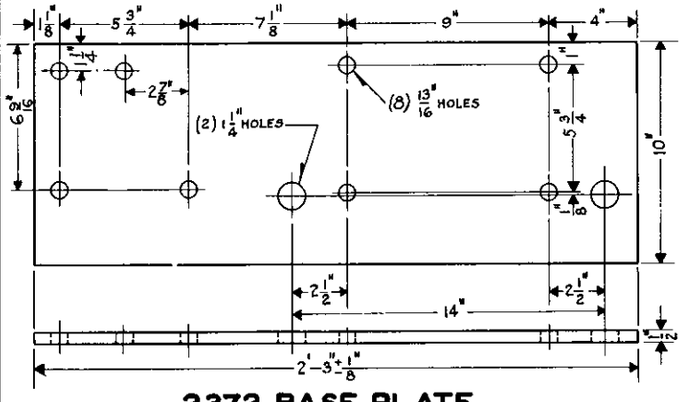
COMPLETE AS SHOWN. L = 2'-6"

STORES CAT. REF. NO. 2A-4890

2374

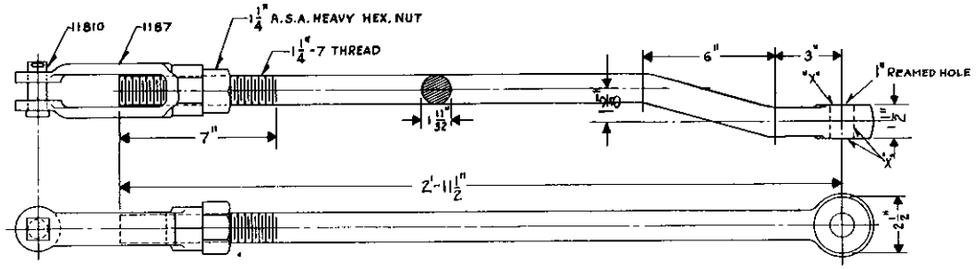
" " COMPLETE AS SHOWN L = 4'-0"

STORES CAT. REF. NO. 2A-5430



2372 BASE PLATE O. H. S.

STORES CAT. REF. NO. 2A-4891.



2373 CONNECTION COMPLETE AS SHOWN. O. H. S.

STORES CAT. REF. NO. 2A-4892

NOTE:-

1. BEFORE SHIPMENT, MANUFACTURER SHALL PAINT ALL EXPOSED SURFACES OF APPARATUS, EXCEPT SURFACES MARKED "X", WITH A GOOD GRADE OF BLACK PAINT. SURFACES MARKED "X" SHALL BE WELL GREASED.

REVISIONS

SUPERSEDES PLAN S-236-C, DATED OCT. 21, 1924 AND LAST REVISED DEC. 15, 1926.

REVISED: 3-3-45. B
THROW LEVER FORMERLY 2'-6" LONG. END OF THROW LEVER REORIENTED.
APPROVED:

REVISED OCT. 25-1946 C
2'-11 1/2" DIM. IN 2373 WAS 3'-0 1/2".
1 7/8" SIDE SET IN 2373 WAS 3".
2374 ADDED. TWO 13/16 DIA. HOLES ADDED IN UPPER LEFT END OF 2372 FOR LAGS WHEN REQUIRED.
REV. OF 3-3-45 CANCELLED.
APPROVED:
H. C. Griffith

1 SHEET

S-237-C

THE PENNSYLVANIA RAILROAD

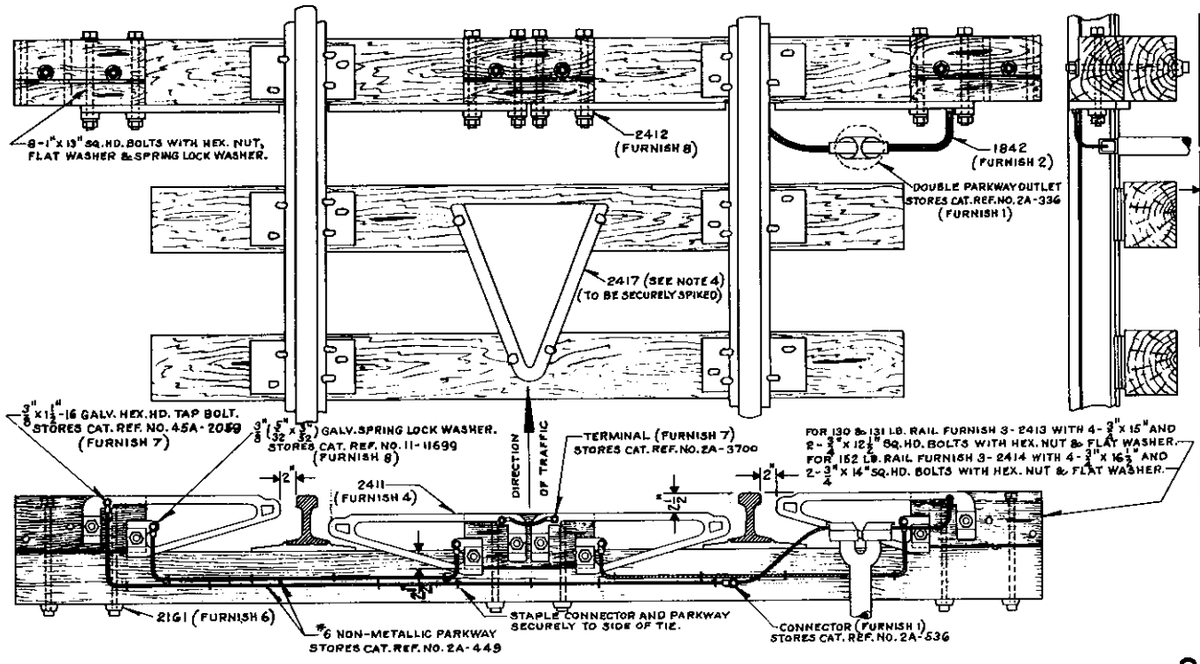
STANDARD

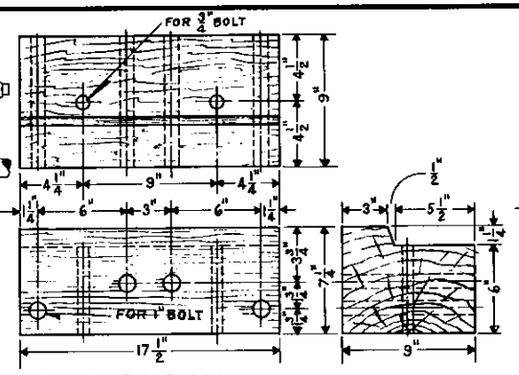
LEVER AND STAND

OFFICE OF CHIEF ENGINEER, PHILA., PA. JUNE 15, 1944.

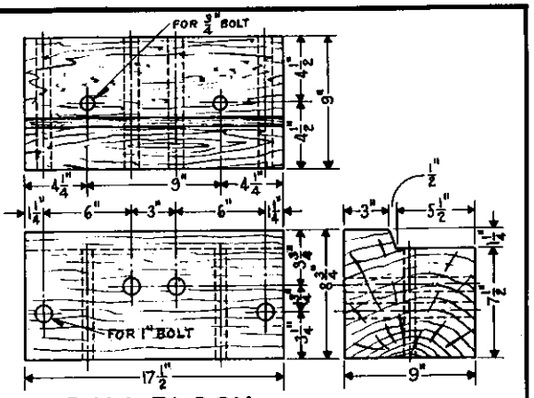
Approved
N. L. Stanton
Assistant Chief Engineer-Signals

Approved
Chief Engineer

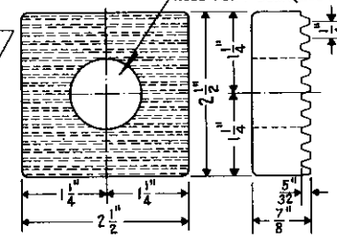




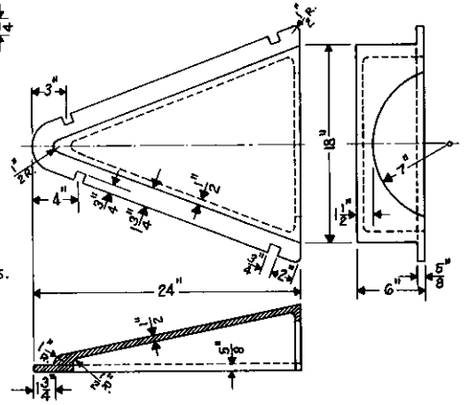
2413 BLOCK FOR 130 LB. P.S. & 131 LB. R.E.-M RAIL.
STORES CAT. REF. NO. 2A-174



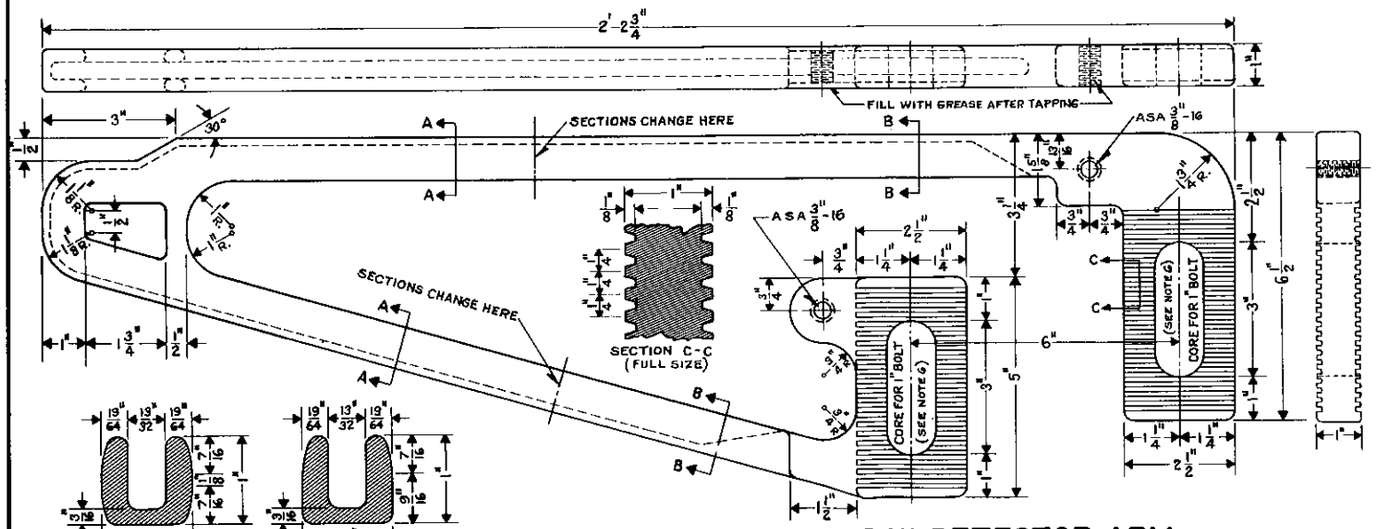
2414 BLOCK FOR 152 LB. P.S. RAIL
STORES CAT. REF. NO. 2A-175.



2412 WASHER PLATE
GRAY CAST IRON A.S.T.M. SPEC. A48-35T CLASS 25.
STORES CAT. REF. NO. 2A-1782.



2417 RAMP MALLEABLE IRON.
STORES CAT. REF. NO. 2A-1815.



2411 DETECTOR ARM
GRAY CAST IRON A.S.T.M. SPEC. A48-35T CLASS 25.
STORES CAT. REF. NO. 2A-3599

NOTES :-
1. FOR TYPICAL CIRCUITS SEE PLAN NO. S-879.
2. DETECTOR ARMS SHALL BE BOXED FOR SHIPMENT IN LOTS OF NOT EXCEEDING EIGHT.
3. WHERE 152 LB. RAIL IS USED, RAMP 2417 SHALL BE INSTALLED WITH WOOD FILLER BLOCKS 2 INCHES THICK UNDER EACH END AND SECURED WITH 4-3/4" x 8" LAG SCREWS.
4. WHERE TRACK IS SIGNALED FOR TRAFFIC IN BOTH DIRECTIONS, A RAMP 2417 SHALL BE LOCATED ON EACH SIDE OF DETECTOR ARMS.
5. BLOCKS 2413 AND 2414 SHALL BE OF OAK FREE OF SPLITS AND KNOTS.
6. CORE FOR 1" BOLT IN 2411 AND HOLE FOR 1" BOLT IN 2412 SHALL BE GROUND OUT FREE OF ROUGH SPOTS, SO THAT 1" BOLT WILL NOT BIND ON SIDES.
7. BLOCKS 2413 AND 2414 SHALL BE CREOSOTED, UNDER PRESSURE, AFTER BEING FRAMED AND DRILLED. THE BOLT HOLES SHALL BE OF SUCH DIAMETER THAT AFTER CREOSOTING, THE BOLTS WILL NOT BIND WHEN BEING APPLIED.

REVISIONS
REDRAWN FROM APPROVED PLAN S-241-H, DATED DEC. 22, 1937, LAST REVISED AUG. 29, 1940 AND REVISED.
J JUNE 5, 1942.
APPROVED N. L. Stanton

1 SHEET

S-241-J

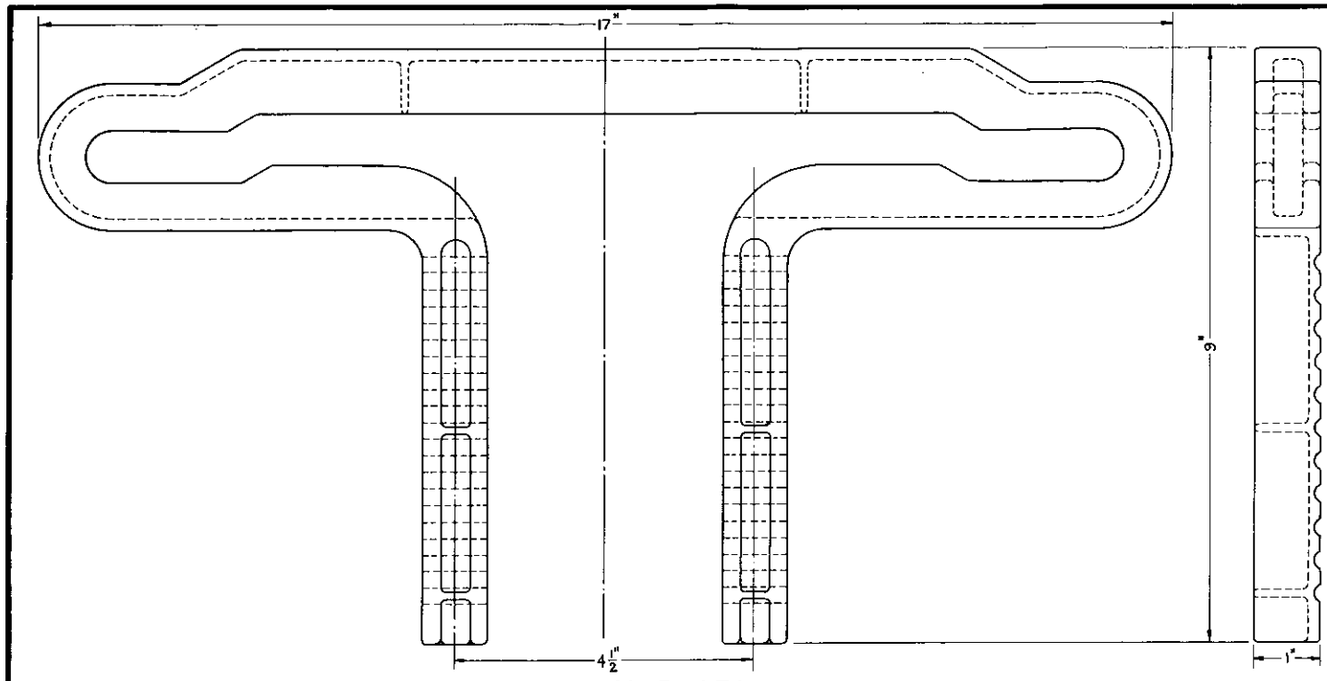
THE PENNSYLVANIA RAILROAD
STANDARD
DRAGGING EQUIPMENT DETECTOR

OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 18, 1941.

Approved
N. L. Stanton
Assistant Chief Engineer-Signals

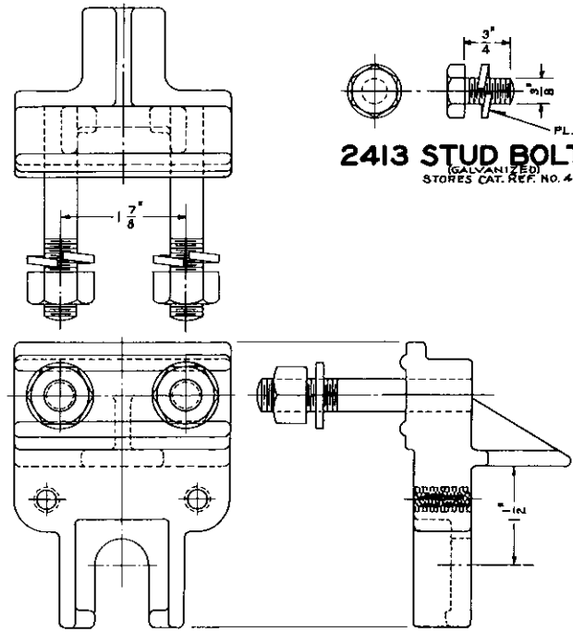
Approved
W. Sheppard
Chief Engineer

C.D.
E.D.



2411 DETECTOR ARM GALVANIZED.

GRAY CAST IRON A.S.T.M. SPEC. A48 - 37 CLASS 25.
STORES CAT. REF. NO. 2A-856

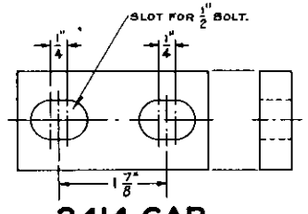


2413 STUD BOLT (GALVANIZED) SAE-1020 STEEL.

STORES CAT. REF. NO. 45A-3498

2412 SUPPORT GALVANIZED

MALLEABLE IRON
STORES CAT. REF. NO. 2A-2751



2414 CAP O.H. STEEL GALVANIZED.

STORES CAT. REF. NO. 2A-878

2416 CONNECTOR LENGTH = 12 INCHES

STORES CAT. REF. NO. 2A-5556

2418 CONNECTOR LENGTH = 18 INCHES

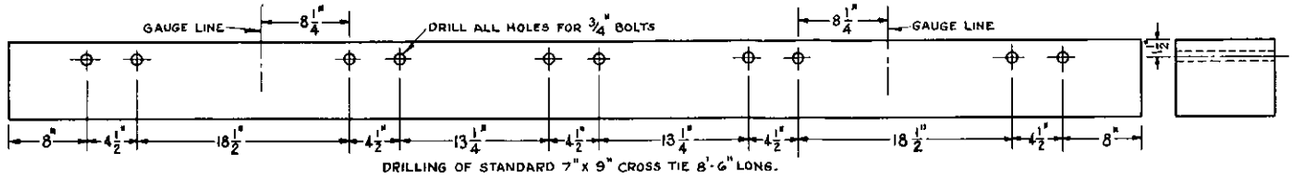
STORES CAT. REF. NO. 2A-5558

2417 CONNECTOR LENGTH = 14 INCHES

STORES CAT. REF. NO. 2A-5557

2419 CONNECTOR LENGTH = 10 FEET

STORES CAT. REF. NO. 2A-5559



DRILLING OF STANDARD 7" x 9" CROSS TIE 8'-6" LONG.

REVISIONS
SUPERSEDES PLAN S-241-J, DATED FEB. 18, 1941, LAST REVISED JUNE 5, 1942. DESIGN OF ALL PARTS CHANGED.

FOR ORDERING AND INSTALLATION SEE SHEET 2.

SHEET 1 OF 2

S-241-K

THE PENNSYLVANIA RAILROAD

STANDARD

DRAGGING EQUIPMENT DETECTOR

PARTS AND DETAILS.

OFFICE OF CHIEF ENGINEER, PHILA., PA., AUG. 20-1947

Approved
Assistant Chief Engineer-T.C.&S.

Approved
Chief Engineer

BILL OF MATERIAL FOR 1 TRACK.

ITEM	NUMBER REQUIRED	NAME	STORES CAT. REF. NUMBER	FIGURE	PLAN
1	5	DETECTOR ARM	2A-856	2411	S-241
2	10	SUPPORT	2A-2751	2412	S-241
3	10	CAP	2A-878	2414	S-241
4	10	STUD BOLT	45A-3498	2413	S-241
5	10	$\frac{3}{4}$" x 11" STD. SQ. HD. BOLT WITH HEX. NUT & PLATE WASHER.			
6	2	CONNECTOR	2A-5556	2416	S-241
7	2	CONNECTOR	2A-5558	2418	S-241
8	1 FOR FIG. A 2 FOR FIG. B	CONNECTOR	2A-5557	2417	S-241
9	1 FOR FIG. A	CONNECTOR	2A-5559	2419	S-241
10	10 FOR FIG. A 4 FOR FIG. B	CLIP	2A-398	1846	S-184
11	1 FOR FIG. A	PARKWAY OUTLET	2A-336	24115	S-241
12	2 FOR FIG. B	PARKWAY OUTLET	2A-1544	1844	S-184

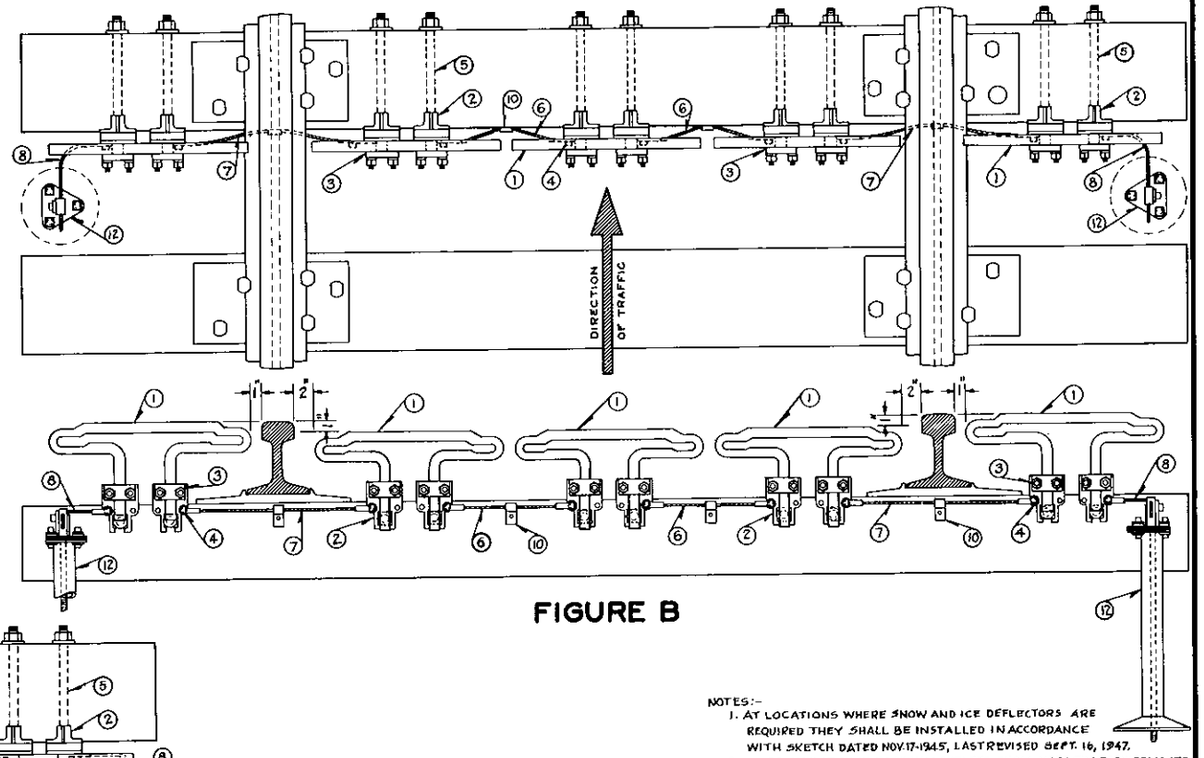


FIGURE B

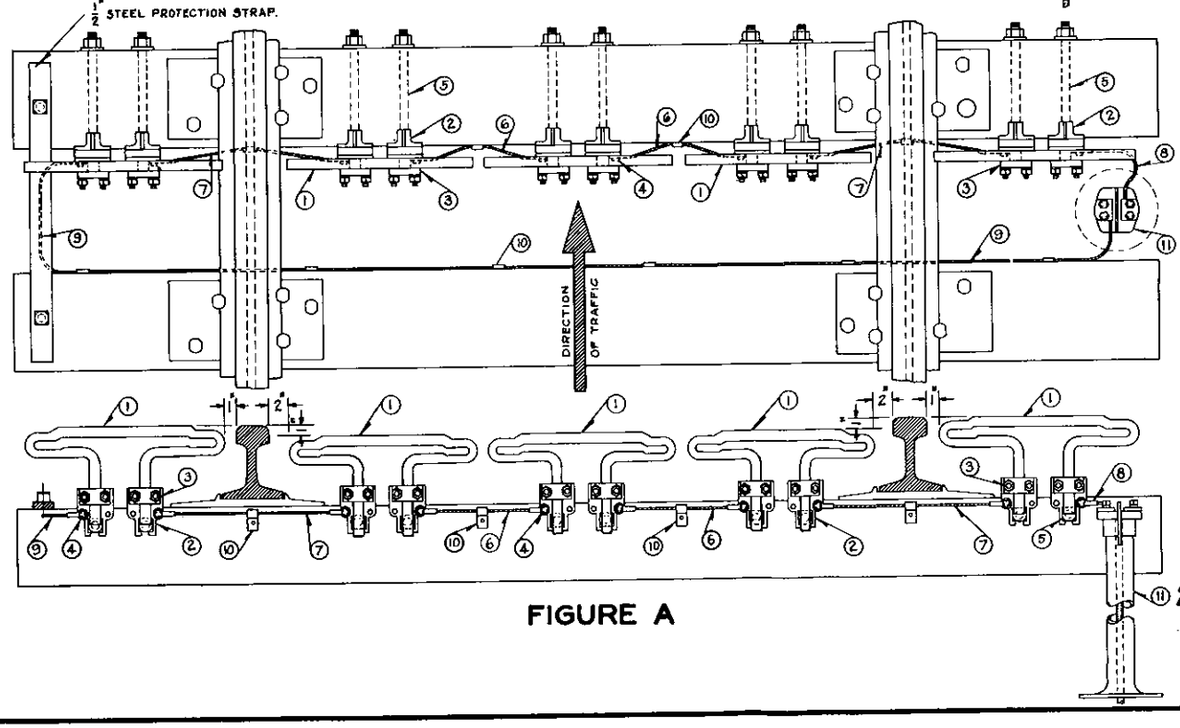


FIGURE A

24115 PARKWAY OUTLET COMPLETE
STORES CAT. REF. NO. 2A-336

NOTES:-

1. AT LOCATIONS WHERE SNOW AND ICE DEFLECTORS ARE REQUIRED THEY SHALL BE INSTALLED IN ACCORDANCE WITH SKETCH DATED NOV. 17-1945, LAST REVISED SEPT. 16, 1947.
2. FIBRE INSULATION IN PARKWAY OUTLETS SHALL MEET THE REQUIREMENTS OF THE ELECTRICAL AND ABSORBTION TEST OF P.R.R. SPEC. C.E. 50 (b).
3. FOR TYPICAL CIRCUITS SEE STANDARD CIRCUIT PLAN S-879.
4. DETECTOR ARMS SHALL BE SHIPPED IN LOTS OF NOT EXCEEDING 5, AND PREPARED FOR SHIPMENT TO PROTECT AGAINST BREAKAGE
5. SUPPORTS WITH CAPS SHALL BE SHIPPED IN LOTS OF NOT EXCEEDING 10 AND PREPARED FOR SHIPMENT TO PROTECT AGAINST BREAKAGE.
6. WHEN IN PLACE, CONNECTOR AND TOP OF HEAD OF PARKWAY OUTLET SHALL BE GIVEN A HEAVY COAT OF A RUST PREVENTIVE APPROVED BY THE ASSISTANT CHIEF ENGINEER-T.C.&S.
7. PARKWAY OUTLETS SHALL BE INSTALLED AS SHOWN WITH TOP OF OUTLET $\frac{1}{2}$ INCH BELOW TOP OF TIE.
8. THE FILL AROUND PARKWAY CABLE SHALL BE FREE OF CINDERS.
9. PARKWAY CABLE SHALL BE NOT LESS THAN 2 FEET 6 INCHES BELOW THE BOTTOM OF TIE.
10. PARKWAY OUTLETS SHALL BE FILLED WITH SAND OR COMPOUND.

FOR PARTS AND DETAILS SEE SHEET 1.

SHEET 2 OF 2.

S-241-K

THE PENNSYLVANIA RAILROAD

STANDARD

DRAGGING EQUIPMENT DETECTOR

LAYOUTS

OFFICE OF CHIEF ENGINEER, PHILA., PA., AUG. 20-1947

Approved
H.C. Griffith
Assistant Chief Engineer-T.C.&S.

Approved
W. Wallace
Chief Engineer

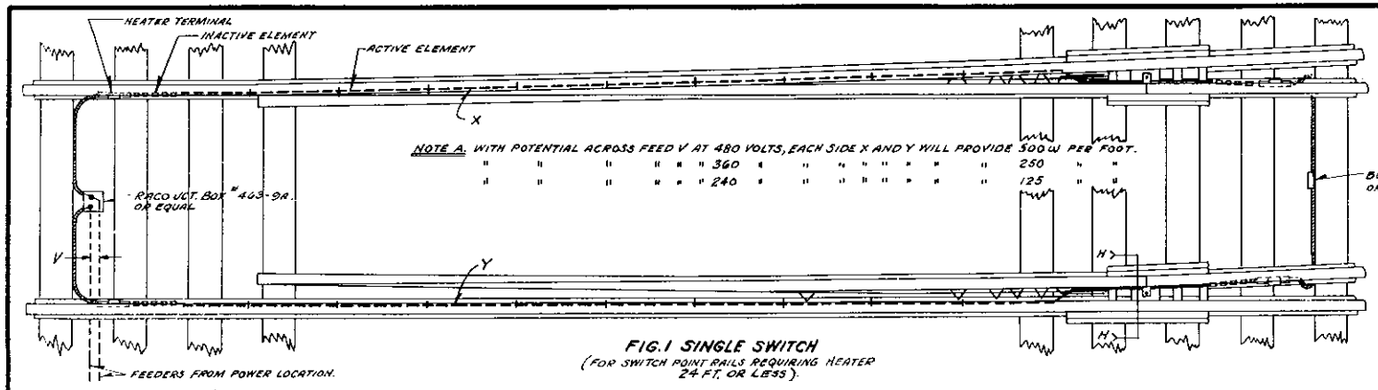


FIG. 1 SINGLE SWITCH
(FOR SWITCH POINT RAILS REQUIRING HEATER 24 FT. OR LESS).

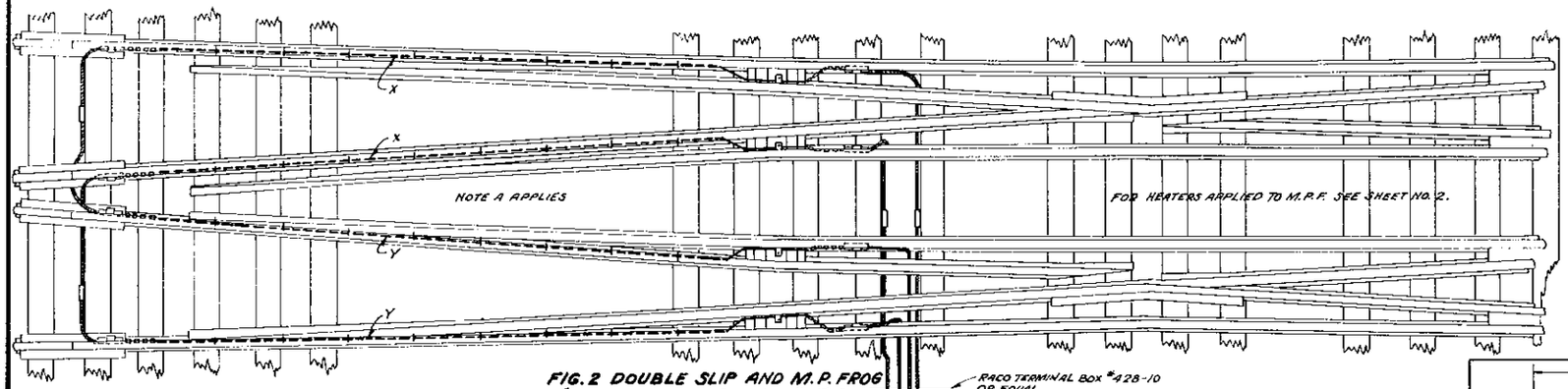


FIG. 2 DOUBLE SLIP AND M.P. FROG
(FOR SLIP SWITCH RAILS REQUIRING HEATER 24 FT. OR LESS).

RACO TERMINAL BOX #428-10 OR EQUAL
FEEDERS FROM POWER LOCATION.
V

NOTES:-

GENERAL - APPLIES TO ALL HEATERS.

1. THE APPLIED HEATERS SHALL MEET THE REQUIREMENTS OF SPEC. C.E. 252(a) AND M.W. DWG. 69898, OR APPROVED REVISIONS THEREOF, TO SUIT CONDITIONS OF INSTALLATION.
2. THE ACTIVE ELEMENT OF HEATER SHALL BE CARRIED OVER THE HEEL BLOCK TO THE FAR END, THE INACTIVE PORTION TERMINATED THELVE INCHES BEYOND, EXCEPT AT HEEL END OF M.P.F. SWITCH RAIL, WHERE TERMINAL SHALL BE LOCATED TO SUIT LOCAL CONDITIONS.
3. THE ACTIVE HEATING ELEMENT SHALL EXTEND TWO FEET BEYOND SWITCH POINT, THE HEATER TERMINAL BEING MOUNTED AS INDICATED IN FIG. I (SEE FIG. H) WHERE THE NEAREST JOINT BAR PERMITS. WHERE THIS IS NOT PRACTICABLE THE HEATING ELEMENT SHALL EXTEND BEYOND THE SWITCH POINT THE MAXIMUM DISTANCE PERMITTED BY FIELD CONDITIONS, MOUNTING TERMINAL AS INDICATED IN FIG. O.
4. AT THE TERMINAL, THE INACTIVE PORTION OF CALROD SHALL BE SO FORMED AS TO PERMIT THE TERMINAL TO REST LOOSELY IN CLIP AS SHOWN IN FIG. N. WHERE SUFFICIENT DISTANCE BETWEEN SWITCH POINT AND NEAR END OF JOINT BAR DOES NOT PERMIT MOUNTING THE TERMINAL AS INDICATED IN FIG. N, THE INACTIVE PORTION SHALL BE FORMED SO THAT TERMINAL MAY BE SUPPORTED BY THE FIRST JOINT BAR BOLT IN ACCORDANCE WITH FIG. O.
5. FEEDER CONDUCTORS FROM POWER LOCATION, AS INDICATED ON THIS DRAWING ARE TYPICAL, THEY SHALL BE ARRANGED TO MEET THE CONDITIONS IN THE FIELD AS TO TYPE OF POWER USED, CURRENT CONSUMPTION AND METHOD OF INSTALLATION.
6. POWER SUPPLY AND EQUIPMENT SHALL BE IN ACCORDANCE WITH SPECIFICATION C.E. 500 AND C.E. 501.
7. INACTIVE PORTION OF CALROD SHOWN THUS □□□□□
8. WHERE INTERFERENCE TO THE MOUNTING OF HEATER BENEATH HEAD OF RAIL EXISTS, DUE TO REINFORCING BAR, FOOTGUARD, OR OTHER SWITCH DEVICES, ARRANGEMENT SHALL BE MADE TO GRIND SUCH DEVICES TO PROVIDE SUFFICIENT CLEARANCE FOR HEATER AS REQUIRED BY M.W. DRAWING NO 69898 F.
9. WRAP RUBBER TAPE AND ADHESIVE TAPE AROUND HYLINKS YSGC-L.
10. APPLY $\frac{5}{8}$" RUBBER HOSE (SINGLE PLY FABRIC) TO COVER LEADS BETWEEN TERMINALS AND HYLINKS AND PARKWAY RISERS. STAPLE LEADS TO TIES.
11. USE BURNDY OR EQUAL, TERMINALS ON WIRES IN RISERS, APPLIED WITH PROPER CRIMPING TOOL.
12. CALROD SHALL BE SECURED TO WEB OF RAIL AS PER M.W. DWG. 69898 F EXCEPT, AT CENTER OF SWITCH RAIL, CALROD SHALL BE CLAMPED TO PREVENT MOVEMENT.

OPERATION - A.C. OR D.C.

FOR A.C. OPERATION.

(a) EACH HEATER X AND Y FIGS. 1 & 2 (SH. 1) 24 FT. OR LESS IN LENGTH OF ACTIVE ELEMENT, IS RATED 500 WATTS PER FT. AT A POTENTIAL OF 240 VOLTS, AND CONNECTED IN SERIES. THIS ARRANGEMENT WILL PROVIDE WATTAGE IN ACCORDANCE WITH NOTE "A" FIGS. 1 & 2 (SH. 1).
(b) EACH HEATER X AND Y FIGS. 3 & 4 (SH. 2) OVER 24 FT. IN LENGTH OF ACTIVE ELEMENT, IS RATED 500 WATTS PER FOOT AT A POTENTIAL OF 480 VOLTS, AND CONNECTED IN MULTIPLE. THIS ARRANGEMENT WILL PROVIDE WATTAGE IN ACCORDANCE WITH NOTE "B" FIGS. 3 & 4 (SH. 2).

FOR D.C. OPERATION.

(a) EACH HEATER X AND Y FIGS. 5 & 6 AND F^1 & F^2 FIG. 6 (SH. 2) OF ALL LENGTHS OF ACTIVE ELEMENT, IS RATED 500 WATTS PER FT. AT A POTENTIAL OF 700 VOLTS, AND NORMALLY CONNECTED IN SERIES. WHEN CONNECTED IN SERIES, OR IN MULTIPLE THIS ARRANGEMENT WILL PROVIDE WATTAGE IN ACCORDANCE WITH NOTE "C" FIG. 5 & 6 (SH. 2)

FIELD NOTES:-

IN JUNCTION & TERMINAL BOXES, ETC., WHERE IT IS PRACTICABLE, CABLES SHALL BE TERMINATED BY APPLYING BURNDY HYLUGS, OR EQUAL, AS FOLLOWS:-
(a) FOR #6-19 STRANDS CABLE USE YAVGC-L10 FOR $\frac{1}{4}$" TERMINAL POST. YAVGC-L4 FOR AAR BINDING POST.
(b) FOR #2/0-61 STRANDS CABLE USE YAV25E-L38 FOR $\frac{1}{2}$" TERMINAL POST. YAV25E-L28 FOR AAR BINDING POST
(c) FOR #4/0 19 STRANDS USE YSGC-L (HYLINK)
TO APPLY (a) & (c) USE HYTOOL MY14G C.
TO APPLY (b) USE HYTOOL MY2926-1

REVISIONS

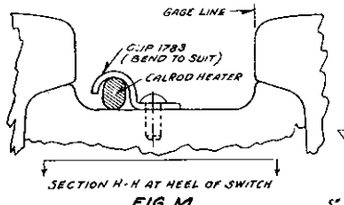


FIG. M

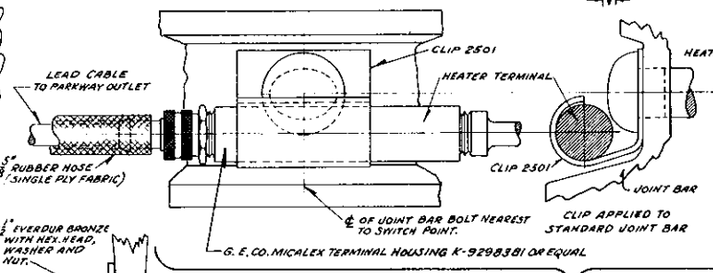


FIG. O

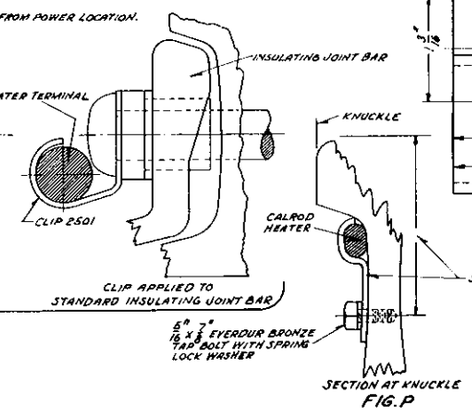


FIG. P

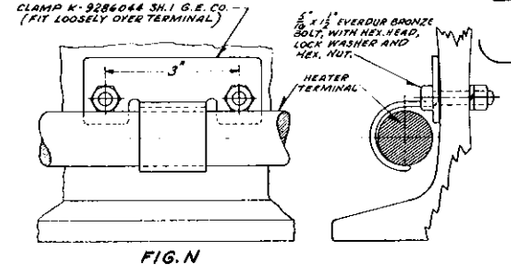
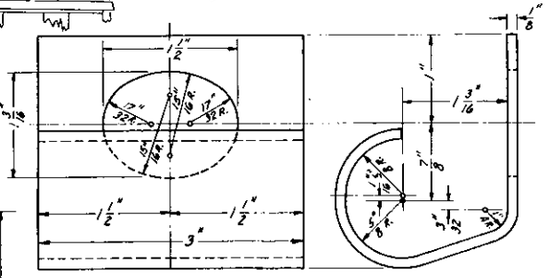


FIG. N



2501 CLIP GALV. STEEL
STORES CAT. REF. NO. 25E-

SHEET 1 OF 2 SHEETS

S-250-A

THE PENNSYLVANIA RAILROAD
STANDARD
ELECTRIC SWITCH HEATERS
ACTIVE ELEMENT 24 FEET OR LESS IN LENGTH
A.C. OPERATION

OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 19, 1950.

Approved
W. G. Salmonson
Assistant Chief Engineer-Signals

Approved
Chief Engineer

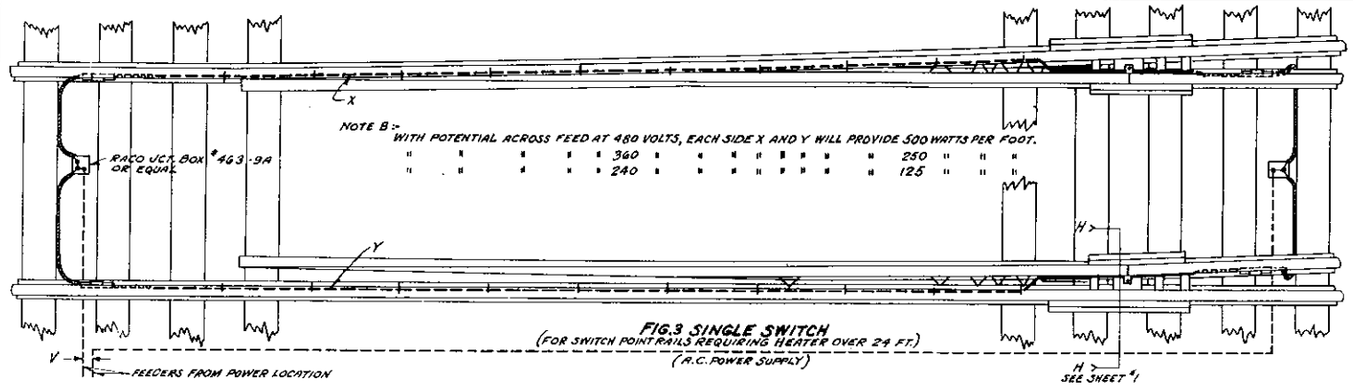


FIG. 3 SINGLE SWITCH
(FOR SWITCH POINT RAILS REQUIRING HEATER OVER 24 FT.)
(A.C. POWER SUPPLY)

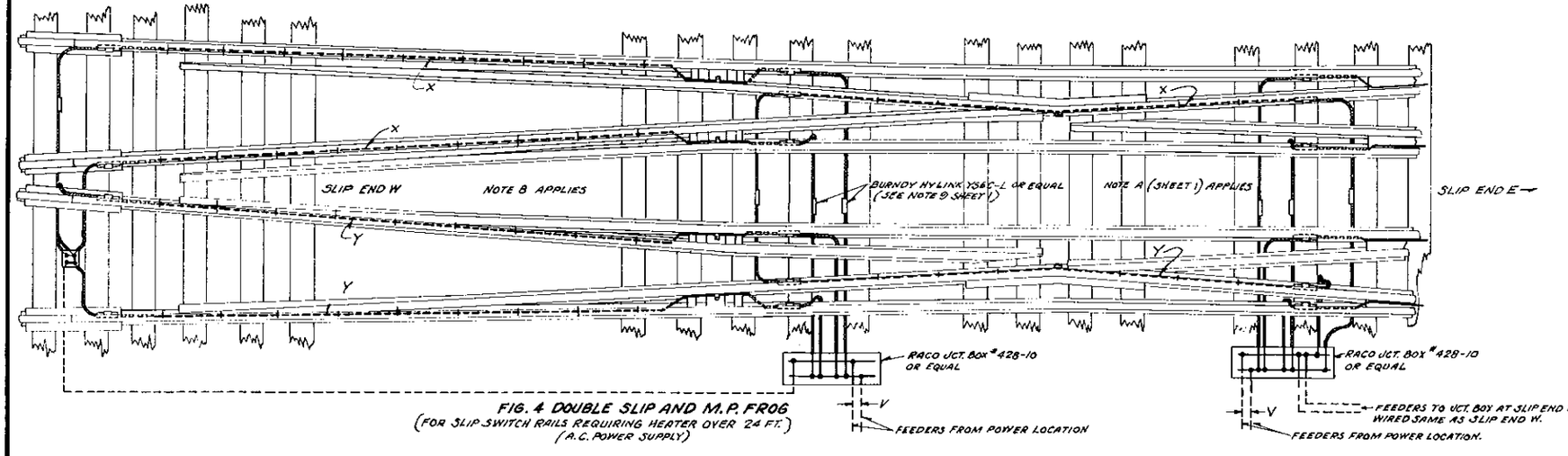


FIG. 4 DOUBLE SLIP AND M.P. FROG
(FOR SLIP SWITCH RAILS REQUIRING HEATER OVER 24 FT.)
(A.C. POWER SUPPLY)

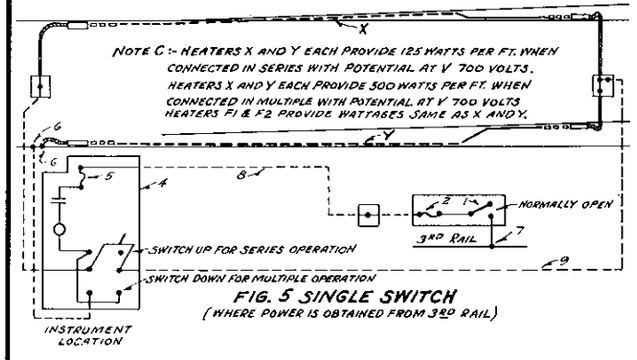


FIG. 5 SINGLE SWITCH
(WHERE POWER IS OBTAINED FROM 3RD RAIL)

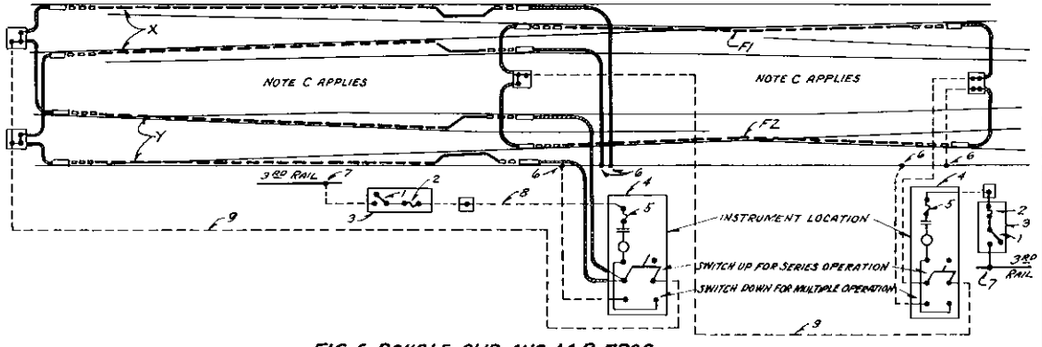


FIG. 6 DOUBLE SLIP AND M.P. FROG
(WHERE POWER IS OBTAINED FROM 3RD RAIL)

REFERENCES FOR PARTS INDICATED BY NUMBERS IN FIGURES 5 AND 6.

1. 25-E-SPECIAL. SWITCH, 3RD RAIL HEATER, 60 AMP., 600 VOLT, FUSED UNDER BLADE, QUICK BREAK, SHIELD ELECTRIC CO. REF. NO. 652-1, DRAWING NO. 1054.
2. 25E-2020 FUSES, ENCLOSED, KNIFE BLADE CONTACT NEC STANDARD 150 AMP.
3. ASBESTOS BOX, WITH HINGED LID, TO BE MADE BY FIELD FORCES.
4. 25E-SPECIAL. CONTROL CABINET INCLUDING CONTROL SWITCHES, FUSE MOUNTING AND INTERNAL WIRING. SIMILAR TO W.E. & M.CO. DRAWING #NA-13682, OR LATER DEVELOPEMENT.
5. 25E-1274. FUSES, ENCLOSED, FERRULE CONTACT NEC STANDARD, 60 AMP., 600 VOLTS.
6. 2A-349. BONDS, A.C. TRACTION 3/4" MODIFIED SIGNAL TYPE. USE ONE-HALF AND SWEDGE TO W.E. & M.CO. BATTERY CONNECTION.
7. 25E-148. CLAMPS, BRASS WITHOUT SCREWS, 3RD RAIL LIGHTING, MACHINED AND TAPPED FOR SET SCREWS, L.I.R.R. DRAWING 7770-16.
8. 2A-SPECIAL. WIRE, NON-METALLIC, UNDERGROUND, No. 6 A.W.G., 7 STRANDS, ANNEALED COPPER, INSULATION IN ACCORDANCE WITH SPEC. C.E. 210 (d) FOR 750 VOLT SERVICE.
9. WIRE, 1 CONDUCTOR No 6, SIMILAR TO ITEM 8.
10. FOR NOTES RELATING TO INSTALLATION, SEE SHEET No 1.

REVISIONS

SHEET 2 OF 2 SHEETS

S-250-A

THE PENNSYLVANIA RAILROAD

STANDARD

ELECTRIC SWITCH HEATERS

ACTIVE ELEMENT MORE THAN 24 FEET LONG, A.C. OPERATION, AND D.C. OPERATION ANY LENGTH

OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 19, 1950.

Approved
H. G. Salamon
Assistant Chief Engineer-Signals

Approved
J. H. Hesselett
Chief Engineer

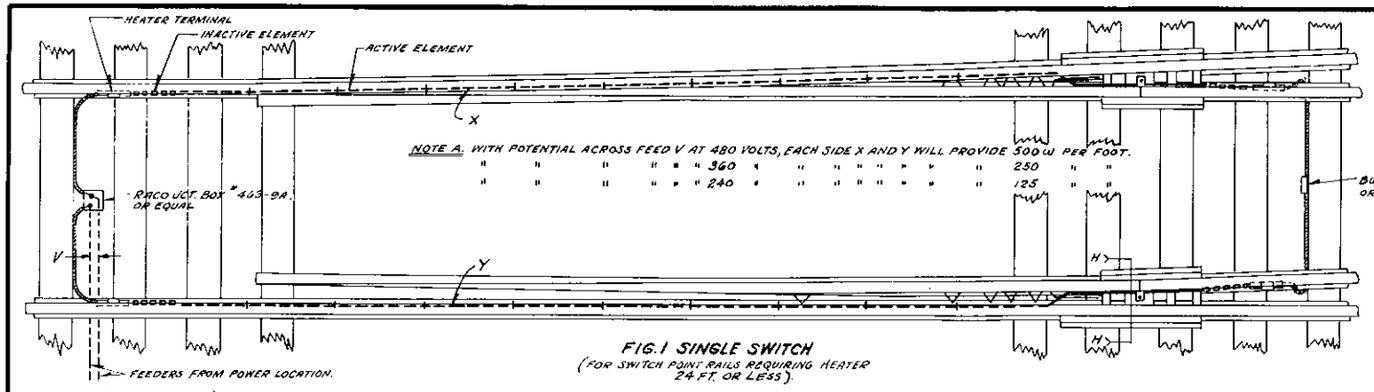


FIG. 1 SINGLE SWITCH
(FOR SWITCH POINT RAILS REQUIRING HEATER 24 FT. OR LESS).

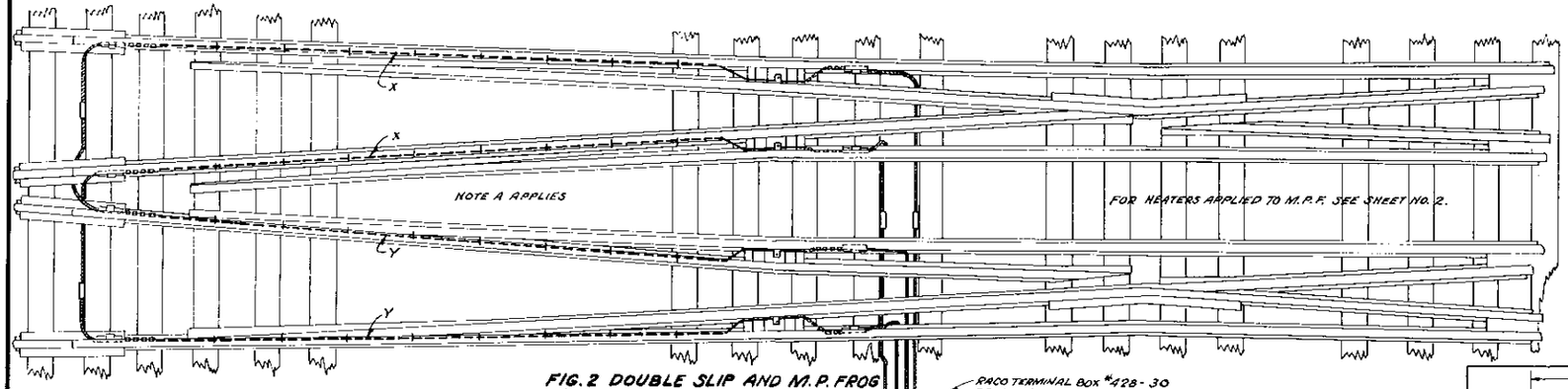
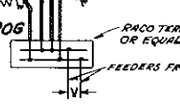


FIG. 2 DOUBLE SLIP AND M.P. FROG
(FOR SLIP SWITCH RAILS REQUIRING HEATER 24 FT. OR LESS)



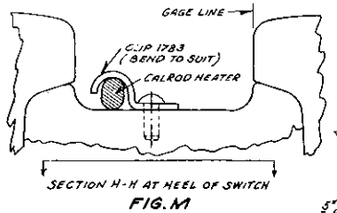


FIG. M

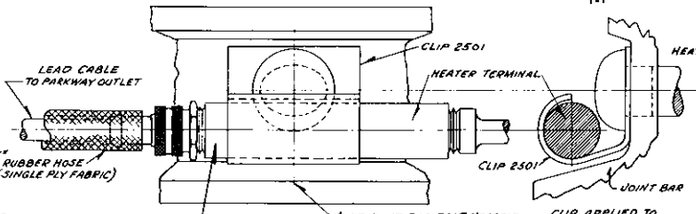


FIG. O

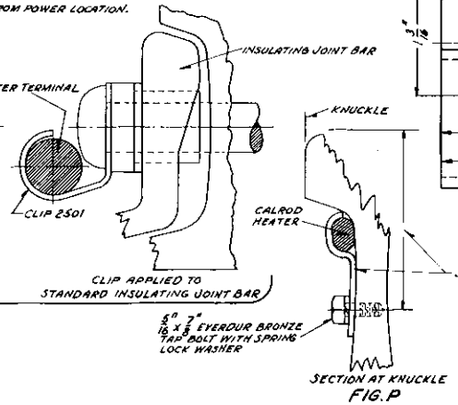


FIG. P

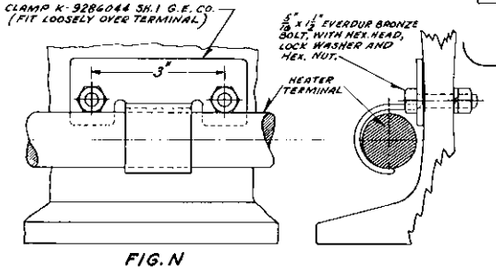


FIG. N

NOTES:-

GENERAL - APPLIES TO ALL HEATERS.

1. THE APPLIED HEATERS SHALL MEET THE REQUIREMENTS OF SPEC. C.E. 252(a) AND M.W. DWG. 69898, OR APPROVED REVISIONS THEREOF, TO SUIT CONDITIONS OF INSTALLATION.
2. THE ACTIVE ELEMENT OF HEATER SHALL BE CARRIED OVER THE HEEL BLOCK TO THE FAR END, THE INACTIVE PORTION TERMINATED TWELVE INCHES BEYOND, EXCEPT AT HEEL END OF M.P.F. SWITCH RAIL, WHERE TERMINAL SHALL BE LOCATED TO SUIT LOCAL CONDITIONS.
3. THE ACTIVE HEATING ELEMENT SHALL EXTEND TWO FEET BEYOND SWITCH POINT, THE HEATER TERMINAL BEING MOUNTED AS INDICATED IN FIG. 1 (SEE FIG. N) WHERE THE NEAREST JOINT BAR PERMITS. WHERE THIS IS NOT PRACTICABLE THE HEATING ELEMENT SHALL EXTEND BEYOND THE SWITCH POINT THE MAXIMUM DISTANCE PERMITTED BY FIELD CONDITIONS, MOUNTING TERMINAL AS INDICATED IN FIG. O.
4. AT THE TERMINAL, THE INACTIVE PORTION OF CALROD SHALL BE SO FORMED AS TO PERMIT THE TERMINAL TO REST LOOSELY IN CLIP AS SHOWN IN FIG. N. WHERE SUFFICIENT DISTANCE BETWEEN SWITCH POINT AND HEAR END OF JOINT BAR DOES NOT PERMIT MOUNTING THE TERMINAL AS INDICATED IN FIG. N, THE INACTIVE PORTION SHALL BE FORMED SO THAT TERMINAL MAY BE SUPPORTED BY THE FIRST JOINT BAR BOLT IN ACCORDANCE WITH FIG. O.
5. FEEDER CONDUCTORS FROM POWER LOCATION, AS INDICATED ON THIS DRAWING ARE TYPICAL, THEY SHALL BE ARRANGED TO MEET THE CONDITIONS IN THE FIELD AS TO TYPE OF POWER USED, CURRENT CONSUMPTION AND METHOD OF INSTALLATION.
6. POWER SUPPLY AND EQUIPMENT SHALL BE IN ACCORDANCE WITH SPECIFICATION C.E. 500 AND C.E. 501.
7. INACTIVE PORTION OF CALROD SHOWN THUS □□□□□□
8. WHERE INTERFERENCE TO THE MOUNTING OF HEATER BENEATH HEAD OF RAIL EXISTS, DUE TO REINFORCING BAR, FOOTGUARD, OR OTHER SWITCH DEVICES, ARRANGEMENT SHALL BE MADE TO GRIND SUCH DEVICES TO PROVIDE SUFFICIENT CLEARANCE FOR HEATER AS REQUIRED BY M.W. DRAWING NO. 69898 F.
9. WRAP RUBBER TAPE AND ADHESIVE TAPE AROUND HYLINKS YSGC-L.
10. APPLY 5/8" RUBBER HOSE (SINGLE PLY FABRIC) TO COVER LEADS BETWEEN TERMINALS AND, HYLINKS AND PARKWAY RISERS. STAPLE LEADS TO TIES.
11. USE BURNDY OR EQUAL, TERMINALS ON WIRES IN RISERS, APPLIED WITH PROPER CRIMPING TOOL.
12. CALROD SHALL BE SECURED TO WEB OF RAIL AS PER M.W. DWG. 69898 F EXCEPT, AT CENTER OF SWITCH RAIL, CALROD SHALL BE CLAMPED TO PREVENT MOVEMENT.

OPERATION - A.C. OR D.C.

FOR A.C. OPERATION.

(a) EACH HEATER X AND Y FIGS. 1 & 2 (SH. 1) 24 FT. OR LESS IN LENGTH OF ACTIVE ELEMENT, IS RATED 500 WATTS PER FT. AT A POTENTIAL OF 240 VOLTS, AND CONNECTED IN SERIES. THIS ARRANGEMENT WILL PROVIDE WATTAGE IN ACCORDANCE WITH NOTE "A" FIGS. 1 & 2 (SH. 1).
(b) EACH HEATER X AND Y FIGS. 3 & 4 (SH. 2) OVER 24 FT. IN LENGTH OF ACTIVE ELEMENT, IS RATED 500 WATTS PER FOOT AT A POTENTIAL OF 480 VOLTS, AND CONNECTED IN MULTIPLE. THIS ARRANGEMENT WILL PROVIDE WATTAGE IN ACCORDANCE WITH NOTE "B" FIGS. 3 & 4 (SH. 2).

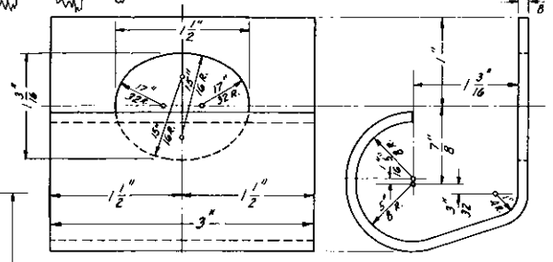
FOR D.C. OPERATION.

(c) EACH HEATER X AND Y FIGS. 5 & 6 AND F1 & F2 FIG. 6 (SH. 2) OF ALL LENGTHS OF ACTIVE ELEMENT, IS RATED 500 WATTS PER FT. AT A POTENTIAL OF 700 VOLTS, AND NORMALLY CONNECTED IN SERIES. WHEN CONNECTED IN SERIES, OR IN MULTIPLE THIS ARRANGEMENT WILL PROVIDE WATTAGE IN ACCORDANCE WITH NOTE "C" FIG. 5 & 6 (SH. 2)

FIELD NOTES:-

IN JUNCTION & TERMINAL BOXES, ETC., WHERE IT IS PRACTICABLE, CABLES SHALL BE TERMINATED BY APPLYING BURNDY HYLUGS, OR EQUAL, AS FOLLOWS:-

(a) FOR #6-19 STRANDS CABLE USE YAV6C-L10 FOR 1/4" TERMINAL POST. YAV6C-L4 FOR AAR BINDING POST.
(b) FOR #2/0-61 STRANDS CABLE USE YAV25E-L38 FOR 1/2" TERMINAL POST. YAV25E-L28 FOR AAR BINDING POST
(c) FOR #4/0 STRANDS USE YSGC-L (HYLINK) TO APPLY (a) & (c) USE HYTOOL MY14G C. TO APPLY (b) USE HYTOOL MY29ZG-1



2501 CLIP GALV. STEEL
STORES CAT. REF. NO. 1C-315

REVISIONS

8-AUG. 12, 1954. RACO BOX #428-30 FORMERLY #428-10. S.C.R. ADDED FOR 2501. REFERS TO SLIP END E FORMERLY SHOWN. WITH TWO CABLES.

APPROVED W. G. Salmonson

SHEET 1 OF 2 SHEETS

S-250-B

THE PENNSYLVANIA RAILROAD
STANDARD
ELECTRIC SWITCH HEATERS
ACTIVE ELEMENT 24 FEET OR LESS IN LENGTH
A.C. OPERATION

OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 19, 1950.

Approved
W. G. Salmonson
Assistant Chief Engineer-Signals

Approved
J. H. Prevost
Chief Engineer

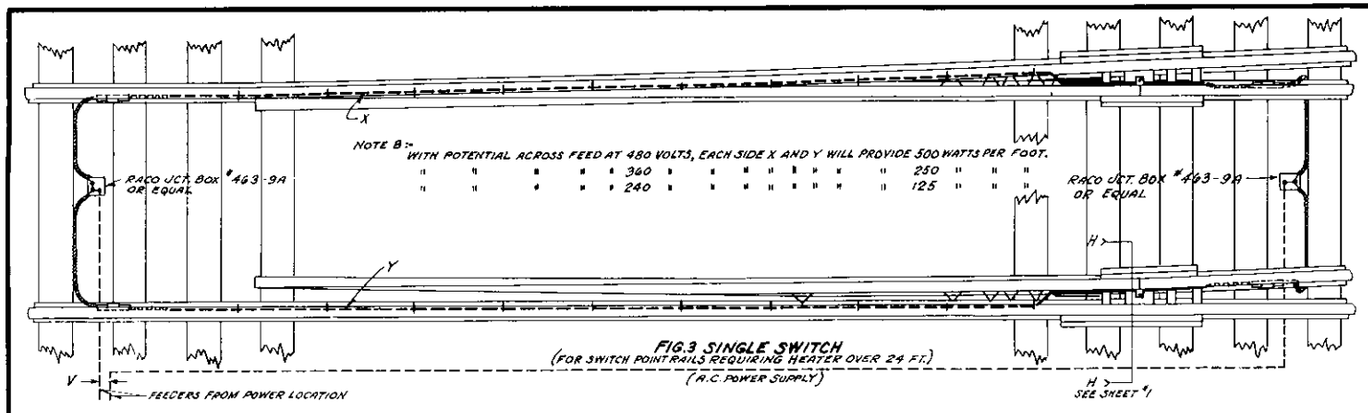


FIG. 3 SINGLE SWITCH
(FOR SWITCH POINT RAILS REQUIRING HEATER OVER 24 FT.)
(A.C. POWER SUPPLY)

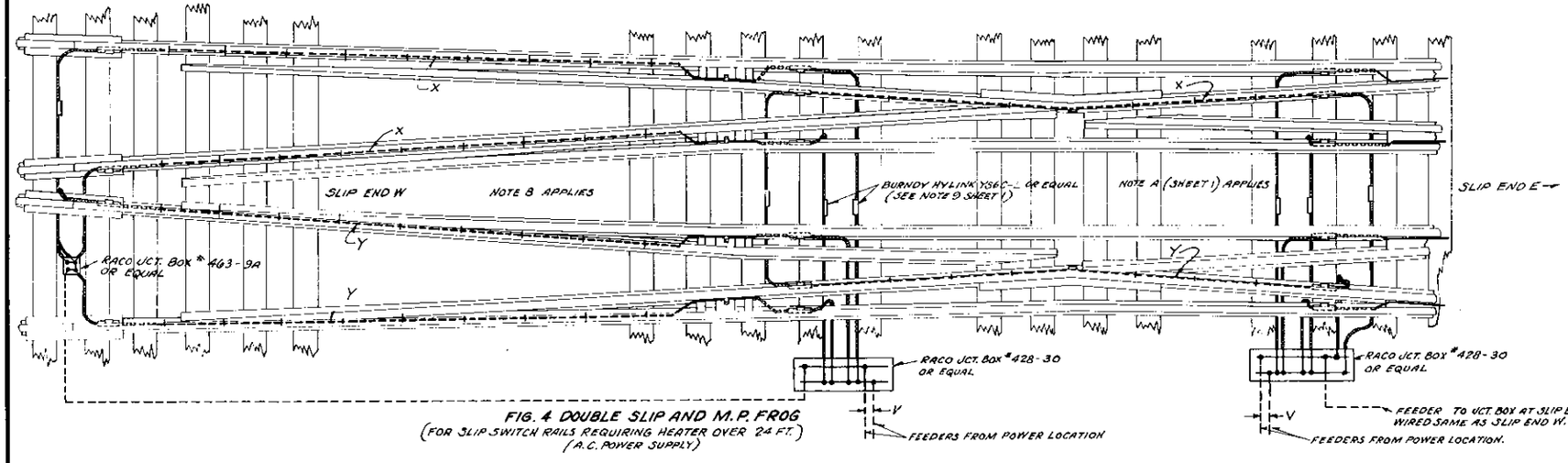


FIG. 4 DOUBLE SLIP AND M.P. FROG
(FOR SLIP SWITCH RAILS REQUIRING HEATER OVER 24 FT.)
(A.C. POWER SUPPLY)

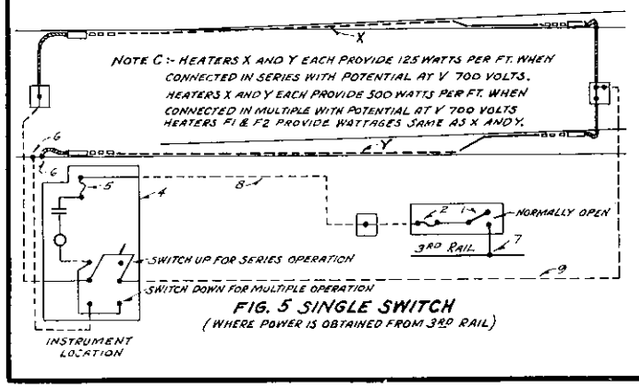


FIG. 5 SINGLE SWITCH
(WHERE POWER IS OBTAINED FROM 3RD RAIL)

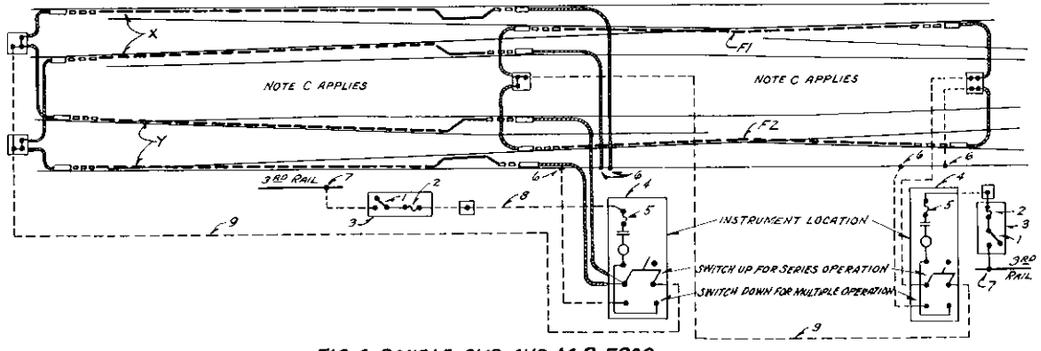


FIG. 6 DOUBLE SLIP AND M.P. FROG
(WHERE POWER IS OBTAINED FROM 3RD RAIL)

REFERENCES FOR PARTS INDICATED BY NUMBERS IN FIGURES 5 AND 6.

1. 25-E-SPECIAL. SWITCH, 3RD RAIL HEATER, 60 AMP., 600 VOLT, FUSED UNDER BLADE, QUICK BREAK, SHIELD ELECTRIC CO. REF. No. 652-1, DRAWING No. 1064.
2. 25E-2020 FUSES, ENCLOSED, KNIFE BLADE CONTACT NEC STANDARD 150 AMP.
3. ASBESTOS BOX, WITH HINGED LID, TO BE MADE BY FIELD FORCES.
4. 25E-SPECIAL. CONTROL CABINET INCLUDING CONTROL SWITCHES, FUSE MOUNTING AND INTERNAL WIRING. SIMILAR TO W.E.&M.CO. DRAWING #NA-13682, OR LATER DEVELOPEMENT.
5. 25E-1274. FUSES, ENCLOSED, FERRULE CONTACT NEC STANDARD, 60 AMP., 600 VOLTS.
6. 2A-349. BONDS, A.C. TRACTION 34" MODIFIED SIGNAL TYPE. USE ONE-HALF AND SWEDGE TO W.E.&M.CO. BATTERY CONNECTION.
7. 25E-148. CLAMPS, BRASS WITHOUT SCREWS, 3RD RAIL LIGHTING, MACHINED AND TAPPED FOR SET SCREWS, L.I.R.R. DRAWING 7770-16.
8. 2A-SPECIAL. WIRE, NON-METALLIC, UNDERGROUND, No. 4 A.W.G., 7 STRANDS, ANNEALED COPPER, INSULATION IN ACCORDANCE WITH SPEC. C.E. 210(a) FOR 750 VOLT SERVICE.
9. WIRE, 1 CONDUCTOR No 6, SIMILAR TO ITEM 8.
10. FOR NOTES RELATING TO INSTALLATION, SEE SHEET No 1.

SHEET 2 OF 2 SHEETS

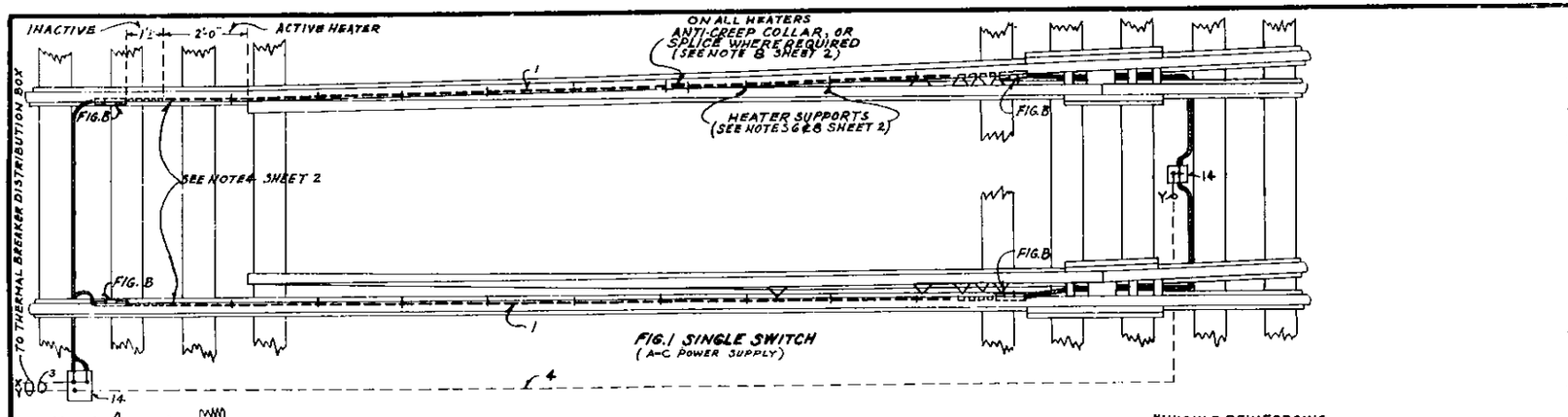
S-250-B

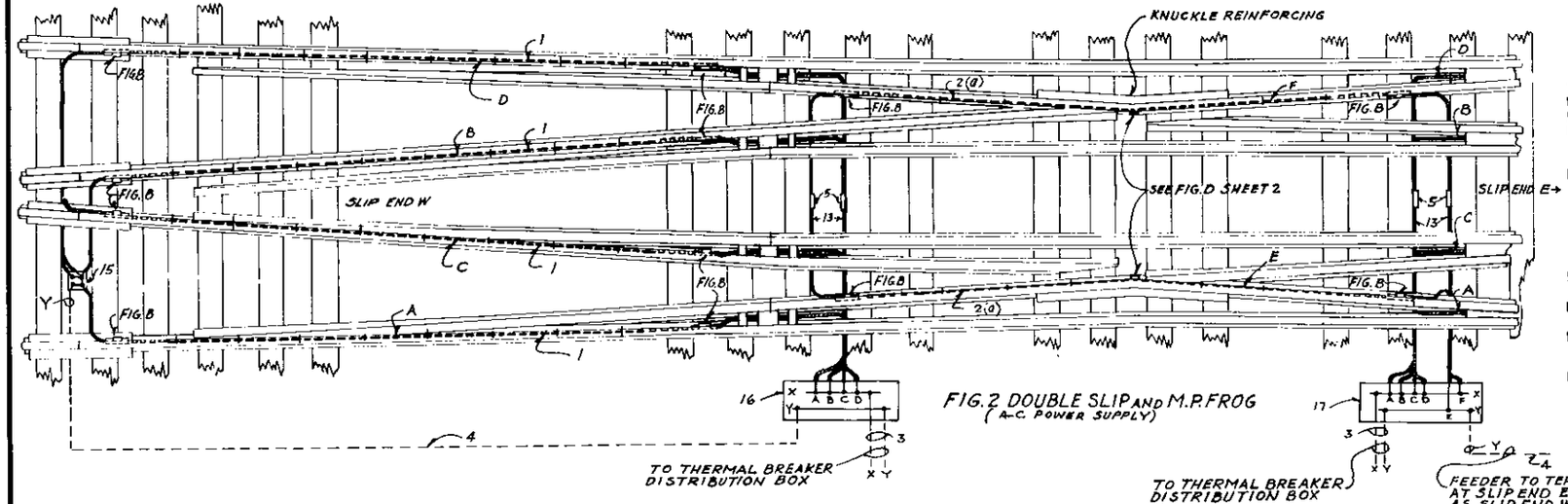
THE PENNSYLVANIA RAILROAD
STANDARD
ELECTRIC SWITCH HEATERS
ACTIVE ELEMENT MORE THAN 24 FEET LONG, A.C. OPERATION, AND D.C. OPERATION ANY LENGTH

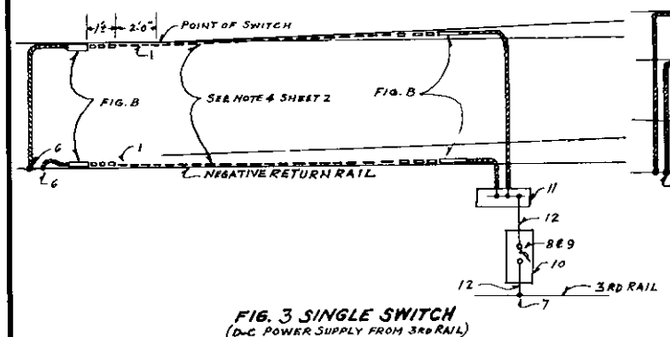
OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 19, 1950.

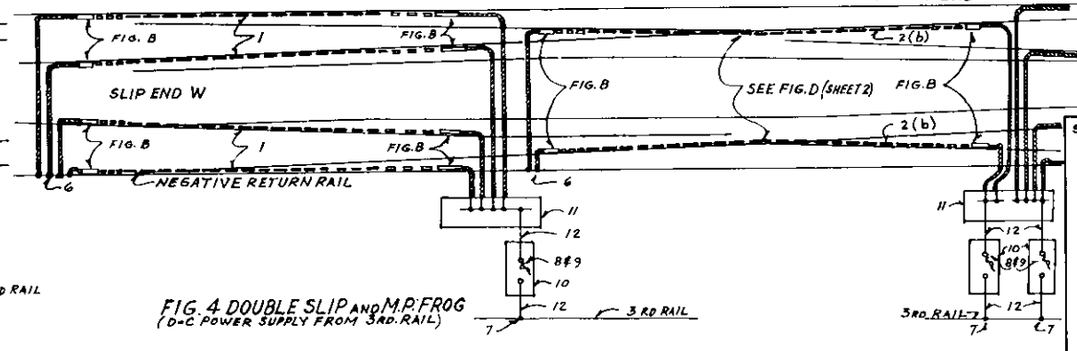
Approved
H. G. Salomon
Assistant Chief Engineer-Signals

Approved
J. H. Hewitt
Chief Engineer









NOTES, PARTS, & SYMBOLS

FOR DETAILS AND NOTES RELATING TO INSTALLATION, SEE SHEET NO. 2.

1 — TUBULAR HEATER: FOR ORDERING INFORMATION, SEE NOTE 1 ON SHEET 2 OF THIS DRAWING.

2(a) — TUBULAR HEATER: FOR ORDERING INFORMATION SEE NOTE 2 (a) ON SHEET 2 OF THIS DRAWING.

2(b) — TUBULAR HEATER: FOR ORDERING INFORMATION SEE NOTE 2 (b) ON SHEET 2 OF THIS DRAWING.

3 — 2A-SPECIAL. CABLE, TWO-CONDUCTOR NON-METALLIC, UNDERGROUND (SIZE TO BE DETERMINED IN FIELD) STRANDED, ANNEALED COPPER, INSULATION IN ACCORDANCE WITH SPECIFICATION C.E. 210 OR 112C-SECT. 601 FOR CIRCUITS OF 600 VOLTS OR LESS.

4 — 2A-SPECIAL. CABLE, SINGLE-CONDUCTOR, NON-METALLIC, UNDERGROUND, STRANDED, ANNEALLED COPPER, INSULATION IN ACCORDANCE WITH SPECIFICATION C.E. 210 OR 112C-SECT. 601 FOR CIRCUITS OF 600 VOLTS OR LESS. SIZE AS FOLLOWS: UP TO 30-FOOT SWITCHES USE #6 AWG FOR 460 VOLTS
" " " " " #1 " " 230 "
FOR 45-FOOT " " #4 " " 460 "
" " " " #2/0 " " 230 "

5 — BURNDY HYLINK YSGC-L OREQUAL. (TO APPLY, USE BURNDY HYTOOL MR4-C. OR MY29-3, OR EQUAL) WRAP RUBBER TAPE #ADHESIVE TAPE AROUND COMPLETED JOINT.

6 — 2A-590. CONNECTORS, TRACK CIRCUIT 24" LONG, STEEL STRAND WITH CENTER STRAND COPPER. AAR 516. SPEC. 151-50, DET. 17918, PL. S-179-M, SH. 1. (USE SOLDER-TYPE LUG ON HEATER CABLE LEAD). (FOR ALTERNATE CADWELD CABLE LEAD CONNECTION - SEE FIGURES F & G ON SHEET 2 OF THIS DRAWING).

7 — 25E-152. CLAMP CASTINGS M.I., 9/16" HOLE, 150-LB 3RD RAIL. ITEM A, L.I.R.R. DWG. C-7700-115. ALTERNATE CLAMP - 25E-148 CLAMPS, BRASS WITHOUT SCREWS 3RD-RAIL LIGHTING, MACHINED AND TAPPED FOR SET SCREWS. L.I.R.R. DWG 7770-16 (FOR ALTERNATE CADWELD CABLE CONNECTION - SEE FIGURES F & G ON SHEET 2 OF THIS DRAWING.)

8 — 25E-G763. SWITCH, HEATER, 600-V, 60 AMPS, FUSED UNDER BLADE, QUICK BREAK, REF. G52-2, DWG. 1054, SHIELD ELECTRIC CO.

9 — 25E-1274. FUSE, ENCLOSED, FERRULE CONTACT, NEC STANDARD, 60 AMPS, 600 VOLTS

10 — NON-METALLIC BOX, WITH HINGED LID, TO BE MADE BY FIELD FORCES.

11 — NON-METALLIC BOX TO BE MADE BY FIELD FORCES.

12 — 2A-SPECIAL. CABLE, SINGLE-CONDUCTOR, NON-METALLIC, UNDERGROUND, #6 AWG, 7-STRAND, ANNEALED COPPER, INSULATION IN ACCORDANCE WITH SPECIFICATION C.E. 210 OR 112C-SECT. 601 FOR 750-VOLT SERVICE.

13 — HEATERS ARE FURNISHED WITH TEN-FOOT LEADS UNLESS OTHERWISE SPECIFIED IN THE PURCHASE ORDER. WHEN NECESSARY TO SPLICE ADDITIONAL CABLE TO THE HEATER CABLE LEADS, THE ADDITIONAL CABLE SHALL BE:
FOR A-C SERVICE: — 2A-SPECIAL. CABLE, SINGLE-CONDUCTOR, NON-METALLIC, UNDERGROUND #6 AWG, 37-STRAND, ANNEALED COPPER, INSULATION IN ACCORDANCE WITH SPECIFICATION C.E. 210 OR 112C-SECT. 601 FOR CIRCUITS OF 600 VOLTS OR LESS.
FOR D-C SERVICE: USE CABLE SAME AS ITEM 12.

14 — 2A-SPECIAL. RACO TERMINAL BOX #463-108, OR EQUAL, WITH TWO WATER-PROOF BOX CONNECTORS TO FIT CABLE SIZE.

15 — 2A-SPECIAL. RACO TERMINAL BOX #463-107, OR EQUAL WITH FOUR WATER-PROOF BOX CONNECTORS TO FIT CABLE SIZE.

16 — 2A-SPECIAL. RACO TERMINAL BOX #428-74 OR EQUAL WITH FOUR WATER-PROOF BOX CONNECTORS ON BACK SIDE TO FIT CABLE SIZE. PROVIDE ONE SIX-POST #390 RACO UNIVERSAL TERMINAL, OR EQUAL.

17 — 2A-SPECIAL. RACO TERMINAL BOX #428-73, OR EQUAL WITH SIX WATER-PROOF BOX CONNECTORS (FOUR ON BACK SIDE AND TWO ON FRONT SIDE) TO FIT CABLE SIZE. PROVIDE TWO SIX-POST #390 RACO UNIVERSAL TERMINALS, OR EQUAL.

▭▭ INACTIVE PORTION OF TUBULAR HEATER
— — — ACTIVE " " " "
HEATER CABLE LEADS

REVISIONS
B. AUG. 12, 1954 RACO BOX #428-30 FORMERLY #428-10 S.C.R. ADDED FOR 2501. FEEDER TO SLIP END E FORMERLY SHOWN WITH TWO CABLES APPROVED: W.G. SALMONSON
C. JAN. 8, 1962 GENERAL REVISIONS; CHANGE SHEET NO. 2 TO 1 APPROVED: J.B. Austin

SHEET 1 OF 2 SHEETS

S-250-C

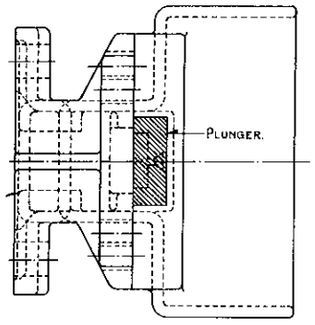
THE PENNSYLVANIA RAILROAD
STANDARD
ELECTRIC SWITCH HEATERS

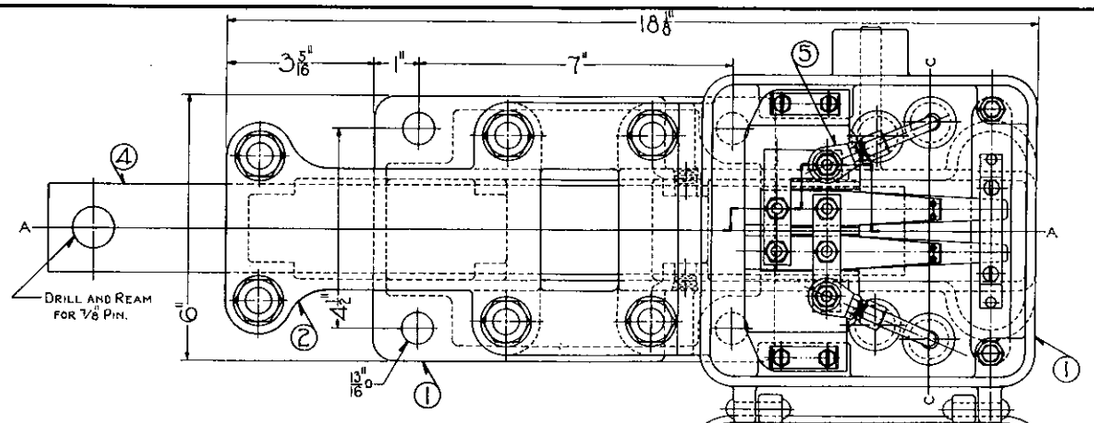
A-C AND D-C OPERATION ANY LENGTH

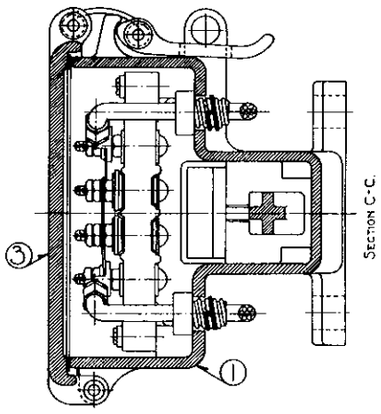
OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 19, 1950.

Approved
H. G. Salmonson
Assistant Chief Engineer-Signals

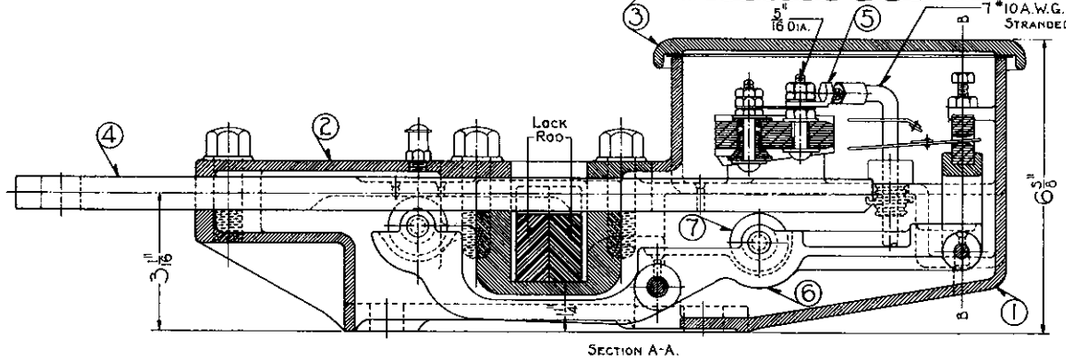
Approved
J. H. Winchell
Chief Engineer



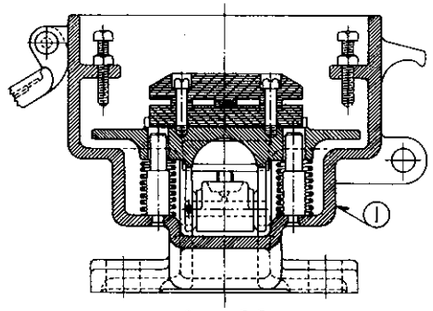




Order No	Name.	Item
2553	Case.	1
2554	Lock Cover.	2
2555	Circuit Controller Cover.	3
2556	Plunger.	4
2557	Dossert Connecting Lug.	5
2558	Operating Crank.	6
2559	Roller.	7



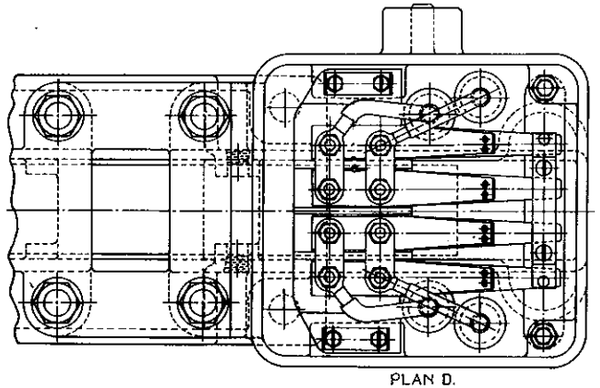
SECTION A-A.



SECTION B-B.

2551—PLUNGER LOCK COMPLETE AS SHOWN.
2552- " " " SEE NOTE. *

NOTE:-
PARTS NOT ITEMIZED SHOULD BE ORDERED FROM CATALOG OR MFG'S. DW'G. REF.
FOR BASE PLATE SEE PLAN S-256.
* ARRANGE CIRCUIT CONTROLLER AS SHOWN IN PLAN D.



PLAN D.
SHOWING CIRCUIT CONTROLLER ARRANGED FOR 4 CONTACTS.

0" 1" 3" 5"
SCALE

REVISIONS.

1 SHEET

S-255-A

PENNSYLVANIA SYSTEM

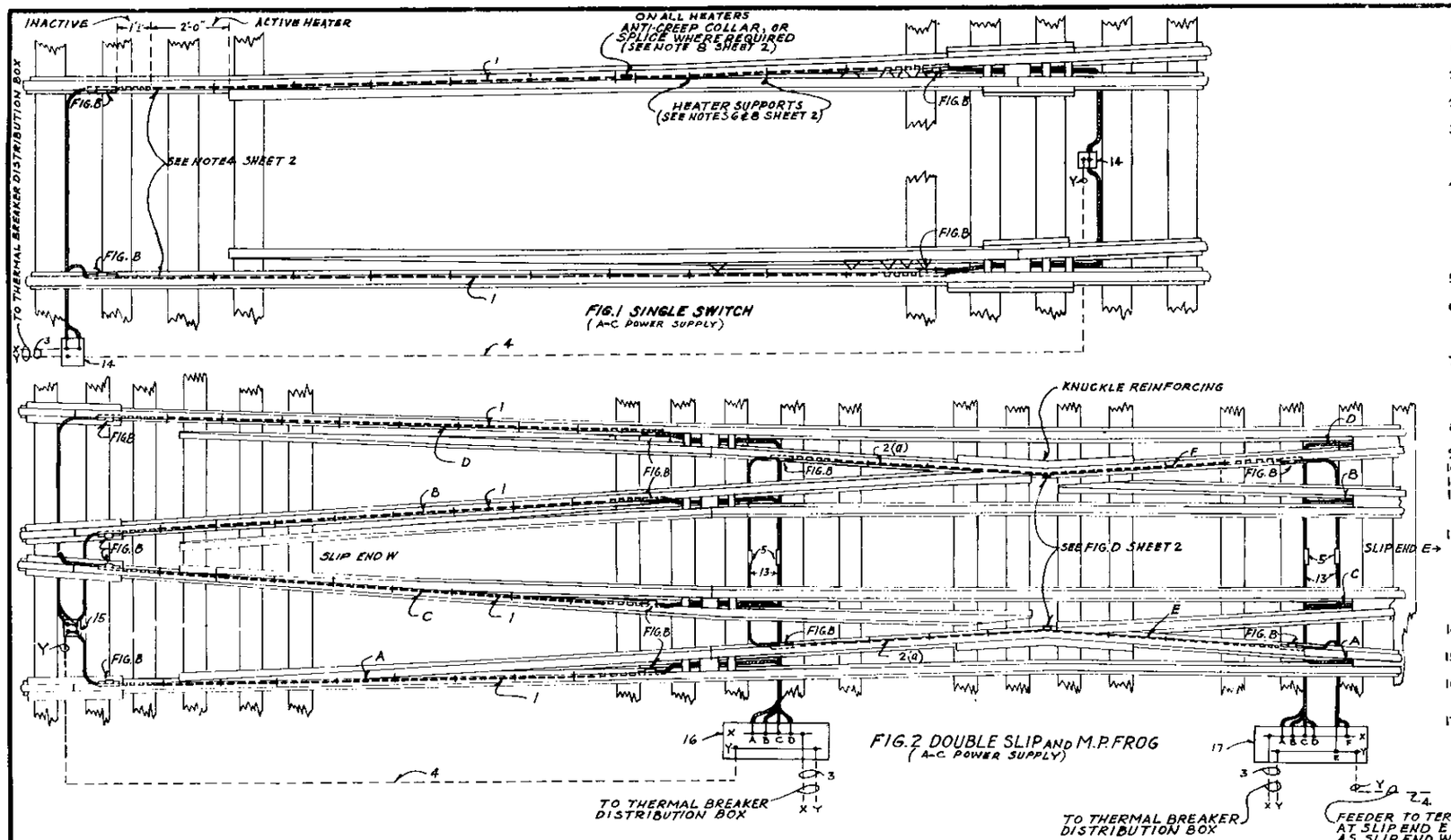
STANDARD
PLUNGER LOCK
AND CIRCUIT CONTROLLER

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., FEB. 1, 1922

Correct
Chief Signal Engineer

Approved
Chief Engineer

H.E.H.



NOTES, PARTS, & SYMBOLS

FOR DETAILS AND NOTES RELATING TO INSTALLATION, SEE SHEET NO. 2.

1 — TUBULAR HEATER: FOR ORDERING INFORMATION, SEE NOTE 1 ON SHEET 2 OF THIS DRAWING.

2(a) — TUBULAR HEATER: FOR ORDERING INFORMATION SEE NOTE 2(a) ON SHEET 2 OF THIS DRAWING.

2(b) — TUBULAR HEATER: FOR ORDERING INFORMATION SEE NOTE 2(b) ON SHEET 2 OF THIS DRAWING.

3 — 2A-SPECIAL. CABLE, TWO-CONDUCTOR NON-METALLIC, UNDERGROUND (SIZE TO BE DETERMINED IN FIELD) STRANDED, ANNEALED COPPER, INSULATION IN ACCORDANCE WITH SPECIFICATION C.E. 210 OR 112C - SECT. 601 FOR CIRCUITS OF 600 VOLTS OR LESS.

4 — 2A-SPECIAL. CABLE, SINGLE-CONDUCTOR, NON-METALLIC, UNDERGROUND, STRANDED, ANNEALED COPPER, INSULATION IN ACCORDANCE WITH SPECIFICATION C.E. 210 OR 112C-SECT. 601 FOR CIRCUITS OF 600 VOLTS OR LESS.
SIZE AS FOLLOWS: UP TO 30-FOOT SWITCHES USE #6 AWG FOR 460 VOLTS
" " " " " #1 " " 230 "
FOR 45-FOOT " " #4 " " 460 "
" " " " " 2/0 " " 230 "

5 — BURNDY HYLINK YSGC-L OR EQUAL. (TO APPLY, USE BURNDY HYTOOL MR4-C, OR MY29-3, OR EQUAL.) WRAP RUBBER TAPE & ADHESIVE TAPE AROUND COMPLETED JOINT.

6 — 2A-590 CONNECTORS, TRACK CIRCUIT 24" LONG, STEEL STRANDS WITH CENTER STRAND COPPER. AAR S18. SPEC. 151-50, DET. 17918, PL. S-179-M, SH. 1. (USE SOLDER-TYPE LUG ON HEATER CABLE LEAD). (FOR ALTERNATE CADWELD CABLE LEAD CONNECTION - SEE FIGURES F & G ON SHEET 2 OF THIS DRAWING).

7 — 25B-152. CLAMP CASTINGS M.T., 3/16" HOLE, 150-LB 3RD RAIL. ITEM A, L.I.R.R. DWG. C-7700-115. ALTERNATE CLAMP - 25E-148 CLAMPS, BRASS WITHOUT SCREWS 3RD-RAIL LIGHTING, MACHINED AND TAPPED FOR SET SCREWS. L.I.R.R. DWG. 7770-16 (FOR ALTERNATE CADWELD CABLE CONNECTION - SEE FIGURES F & G ON SHEET 2 OF THIS DRAWING.)

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FOR A-C SERVICE: — 2A-SPECIAL. CABLE, SINGLE-CONDUCTOR, NON-METALLIC, UNDERGROUND #6 AWG, 37-STRAND, ANNEALED COPPER, INSULATION IN ACCORDANCE WITH SPECIFICATION C.E. 210 OR 112C - SECT. 601 FOR CIRCUITS OF 600 VOLTS OR LESS.
FOR D-C SERVICE: USE CABLE SAME AS ITEM 12.

14 — 2A-SPECIAL. RACO TERMINAL BOX #403-108, OR EQUAL, WITH TWO WATER-PROOF BOX CONNECTORS TO FIT CABLE SIZE.

15 — 2A-SPECIAL. RACO TERMINAL BOX #403-107, OR EQUAL WITH FOUR WATER-PROOF BOX CONNECTORS TO FIT CABLE SIZE.

16 — 2A-SPECIAL. RACO TERMINAL BOX #428-74 OR EQUAL WITH FOUR WATER-PROOF BOX CONNECTORS ON BACK SIDE TO FIT CABLE SIZE. PROVIDE ONE SIX-POST #390 RACO UNIVERSAL TERMINAL, OR EQUAL.

17 — 2A-SPECIAL. RACO TERMINAL BOX #428-73, OR EQUAL WITH SIX WATER-PROOF BOX CONNECTORS (FOUR ON BACK SIDE AND TWO ON FRONT SIDE) TO FIT CABLE SIZE. PROVIDE TWO SIX-POST #390 RACO UNIVERSAL TERMINALS, OR EQUAL.

▪▪▪ INACTIVE PORTION OF TUBULAR HEATER
— — — ACTIVE " " " "
▬▬▬ HEATER CABLE LEADS

REVISIONS
B - AUG. 12, 1954 — RACO BOX #428-30 FORMERLY #428-10 S.C.R. ADDED PER 2501. FEEDER TO SLIP END E FORMERLY SHOWN WITH TWO CABLES APPROVED: W. G. SALMONSON
C - JAN. 8, 1962 GENERAL REVISIONS. CHANGE SHEET NO 2 TO 1 APPROVED: [signature]

SHEET 1 OF 2 SHEETS

S-250-C

THE PENNSYLVANIA RAILROAD
STANDARD
ELECTRIC SWITCH HEATERS

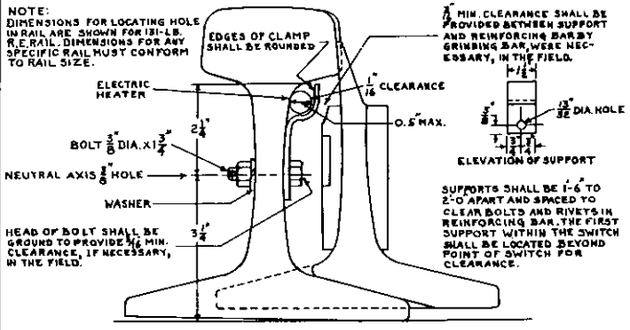
A-C AND D-C OPERATION ANY LENGTH

OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 19, 1950.

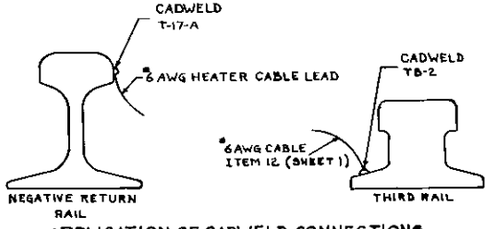
Approved
H. G. Salmonson
Assistant Chief Engineer-Signals

Approved
[signature]
Chief Engineer

NOTE:
DIMENSIONS FOR LOCATING HOLE IN RAIL ARE SHOWN FOR 131-LB. R.E.RAIL. DIMENSIONS FOR ANY SPECIFIC RAIL MUST CONFORM TO RAIL SIZE.

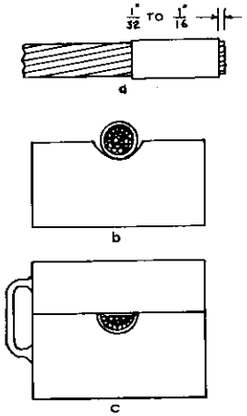


APPLICATION OF TUBULAR TYPE ELECTRIC HEATER
FIG. A



APPLICATION OF CADWELD CONNECTIONS
(SEE NOTES 6 & 7, SHEET 1 OF THIS DWG.)
FIG. F

BILL OF MATERIAL FOR FIG. F			
ITEM	PART NUMBER	NO. REQ.	DESCRIPTION
1	M-2000	1	T-17-A WELDER
2	M-248	1	MOLD ONLY
3		1	#25 CARTRIDGE
4	S-471	1	SLEEVE
5	S-428	1	HAMMER DIE
6	S-177	1	TB-2 WELDER
7	S-177-1	1	MOLD ONLY
8		1	#25 CARTRIDGE
9	S-471	1	SLEEVE
10	S-428	1	HAMMER DIE



DETAILS FOR FORMING CADWELD TERMINALS
FIG. G

SPECIAL INSTRUCTIONS - SEE FIG. G
1- CABLE AND SLEEVE MUST BE BRIGHT, CLEAN, AND DRY.
2- LET CABLE EXTEND 1/32" TO 1/16" BEYOND END OF SLEEVE (AS SHOWN IN a).
3- PLACE CABLE AND SLEEVE IN HAMMER DIE (AS SHOWN IN b).
4- FORM CABLE AND SLEEVE IN HAMMER DIE TO MAKE TERMINAL (AS SHOWN IN c).

NOTES

1- ORDERING INFORMATION: HEATER, ELECTRIC, TUBULAR TYPE, IN ACCORDANCE WITH LATEST EDITION OF AAR ELECTRICAL SECTION MANUAL, SECTION II, CHAPTER 2, PART 4, SPECIFICATION FOR TUBULAR TYPE ELECTRIC HEATERS FOR TRACK SWITCHES. ACTIVE LENGTH (SPECIFY ONE FOOT LESS THAN LENGTH OF SWITCH), 500 WATTS PER FOOT FOR ONE HALF OF HEATER AND 300 WATTS PER FOOT FOR OTHER HALF AT (SPECIFY 650, 460, OR 230) VOLTS, (SPECIFY WITH OR WITHOUT MOUNTING SUPPORTS, BOLTS, ETC.) FOR (SPECIFY SIZE RAIL). INCLUDE ALL TESTS IN ABOVE SPECIFICATION INCLUDING TESTS 10B.

2(a) - (HEATERS FOR MOVABLE POINT FROGS, A-C POWER SUPPLY) ORDERING INFORMATION: SAME AS 1 EXCEPT THE ACTIVE LENGTH OF HEATERS SHALL BE NO LONGER THAN TWICE THEIR CENTER SWITCH-POINT LENGTHS, PLUS THE DISTANCE BETWEEN THE TWO FACING CENTER SWITCH-POINTS MINUS SIX FEET. HEATERS SHALL BE RATED 500 WATTS PER FOOT FOR THEIR ENTIRE ACTIVE LENGTH AT ONE HALF RATED VOLTAGE (FOR SERIES CONNECTION).

2(b) - (HEATERS FOR MOVABLE POINT FROGS, D-C POWER SUPPLY) ORDERING INFORMATION: SAME AS 2(a) EXCEPT HEATERS SHALL BE RATED 500 WATTS PER FOOT FOR THEIR ENTIRE LENGTH AT 650 VOLTS (FOR PARALLEL CONNECTION).

3 - RATED VOLTAGE OF HEATERS FOR TRACK SWITCHES, A-C SUPPLY, SHALL BE 460 (PREFERRED) OR 230. RATED VOLTAGE OF HEATERS FOR TRACK SWITCHES, D-C SUPPLY, SHALL BE 650.

4 - FOR TRACK SWITCHES THE ACTIVE PART OF THE HEATER SHALL EXTEND APPROXIMATELY TWO FEET AHEAD OF THE POINT OF SWITCH. (THE FIRST 12 INCHES OF SHEATH IS INACTIVE). THE HIGHER WATTAGE (500 WATTS PER FOOT) END OF THE HEATER SHALL BE INSTALLED TOWARD THE POINT OF SWITCH. THE WORD POINT IS STAMPED ON THE HIGHER WATTAGE END OF HEATER. THE LOWER WATTAGE (300 WATTS PER FOOT) END OF THE HEATER SHALL EXTEND BACK TOWARD THE HEEL BLOCK ENDING SHORT OF THE HEEL BLOCK. THE CABLE LEAD SHALL BE TAKEN UNDER THE HEEL BLOCK THEN UNDER THE RAIL BASE TO THE TERMINAL BOX.

5 - THE HEATERS SHALL BE LOCATED AS HIGH AS PRACTICABLE ON THE INSIDE OF THE WEB OF THE STOCK RAIL (SEE FIG. A). THE HEATERS SHALL BE INSTALLED SO THAT THE INFORMATION STAMPED ON THE TERMINAL HOUSING OR ON THE HEATER SHEATH SHALL BE LOCATED APPROXIMATELY 45 DEGREES FROM THE VERTICAL AXIS OF THE RAIL POINTING UPWARD.

6 - HEATERS SHALL BE SECURED TO THE WEB OF THE RAIL BY MEANS OF HEATER SUPPORTS SPACED 18" TO 24" APART, TO CLEAR BOLTS AND RIVETS IN REINFORCING BAR, IT WILL BE NECESSARY IN SOME CASES TO GRIND THE SWITCH POINT AND REINFORCING BAR TO ALLOW A MINIMUM CLEARANCE OF 5/16 (SEE FIG. A). ONE HEATER SUPPORT SHALL BE LOCATED ON RAIL JUST AHEAD OF THE POINT OF SWITCH.

7 - SPECIAL SUPPORTS SHALL BE PROVIDED FOR ATTACHING TERMINAL HOUSING TO RAIL WHERE SEPARABLE HOUSINGS ARE USED (SEE FIG. B) ON SWITCH POINT WHERE NEAREST JOINT BAR DOES NOT PERMIT, THE HEATING ELEMENT SHALL EXTEND BEYOND THE SWITCH POINT THE MAXIMUM DISTANCE PERMITTED BY FIELD CONDITIONS, MOUNTING TERMINAL HOUSING AT THE FIRST JOINT BAR BOLT AS INDICATED IN FIG. C.

8 - ALL SUPPORTS SHALL BE SECURED BY MEANS OF 5/8 CORROSION RESISTANT BOLT, LOCKWASHER, AND SELF-LOCKING NUT (EVERDUR 1015 BRONZE OR EQUAL). BOLT HOLE SHALL BE 5/8 DRILLED IN THE WEB OF THE RAIL AT THE NEUTRAL AXIS (SEE FIG. A). IF REQUIRED THE HEAD OF THE SUPPORT BOLT SHALL BE GROUND TO PROVIDE 5/16 CLEARANCE BETWEEN BOLT HEAD AND REINFORCING BAR OF THE SWITCH POINT (SEE FIG. A). A HEATER SUPPORT SHALL BE PLACED AGAINST BOTH ENDS OF THE ANTI-CREEP COLLAR OR SPLICE, WHERE USED, TO PREVENT LONGITUDINAL MOVEMENT OF HEATERS DUE TO VIBRATION OR EXPANSION AND CONTRACTION. WHERE ANTI-CREEP COLLARS OR SPLICES ARE NOT USED AN ANTI-CREEP CLAMP SHALL BE USED AT THE MIDPOINT OF THE HEATER FIRM AGAINST THE HEATER.

9 - AT MOVABLE POINT FROGS IN AREA OF KNUCKLE REINFORCING, TO PERMIT INSTALLATION OF HEATER, PORTION OF CLIP WASHER FOR TRACK BOLT SHOULD BE REMOVED.

10 - CABLE LEADS BETWEEN HEATER AND TERMINAL BOXES SHALL BE SO LOCATED AS TO MINIMIZE POSSIBLE DAMAGE. LEADS SHALL BE ENCASED IN 5/8 RUBBER HOSE WHERE POSSIBLE.

11 - TERMINAL BOXES SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE ENDS OF THE HEATERS, PREFERABLY OUTSIDE OF TIES, WITH TOP OF BOX APPROXIMATELY AT THE LEVEL OF THE TOP OF TIE.

12 - IN JUNCTION AND TERMINAL BOXES, WHERE IT IS PRACTICABLE, CABLES SHALL BE TERMINATED BY APPLYING PROPER SIZE BURNDY HYLUG 5, OR EQUAL.

13 - EACH GROUP OF HEATERS SERVING A TRACK SWITCH SHALL BE PROVIDED WITH SUITABLE FAULT PROTECTION, PREFERABLY THERMAL BREAKERS. THE PROTECTIVE UNITS SO PROVIDED SHALL BE HOUSED IN A WEATHER-PROOF BOX LOCATED AS CLOSE AS POSSIBLE TO THE CENTER OF THE LOAD.

14 - FEEDER CABLES FROM POWER LOCATION AS INDICATED ON SHEET 1 OF THIS DRAWING ARE TYPICAL, THEY SHALL BE ARRANGED TO MEET THE CONDITIONS IN THE FIELD.

15 - IN A-C ELECTRIFIED TERRITORY POWER SUPPLY AND APPARATUS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS C.E. 500, PART X, PARAGRAPH 1002 AND C.E. 501, PART XI. IN NON-ELECTRIFIED TERRITORY APPARATUS SHALL BE APPROVED BY THE CHIEF ENGINEER.

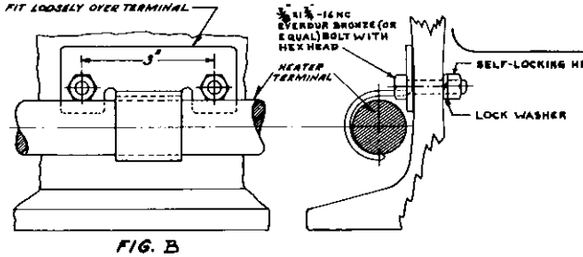


FIG. B

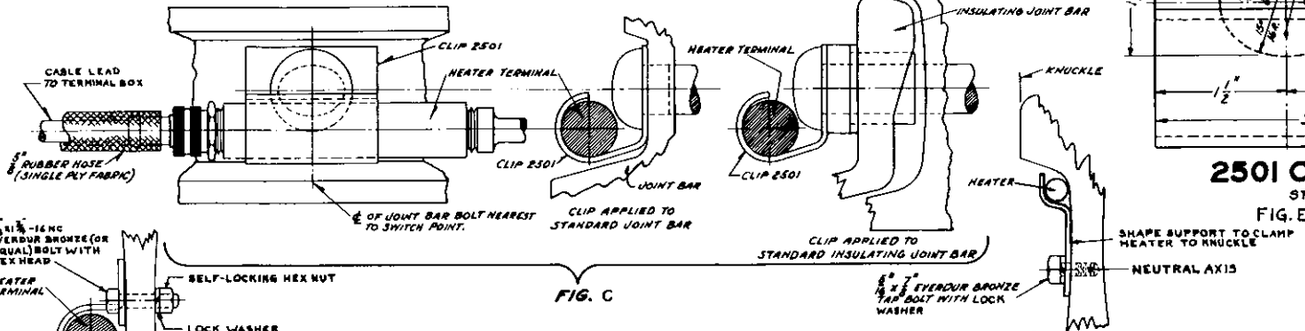
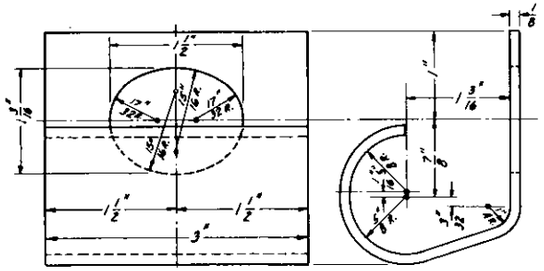


FIG. C

FIG. D



2501 CLIP GALV. STEEL
STORES CAT. REF. NO. 1C - 316

FIG. E

C- JAN. 8, 1962
FOR REVISION NOTES SEE SHEET 1
THIS SHEET WAS SHEET 1
APPROVED: H. A. Slatter

SHEET 2 OF 2 SHEETS

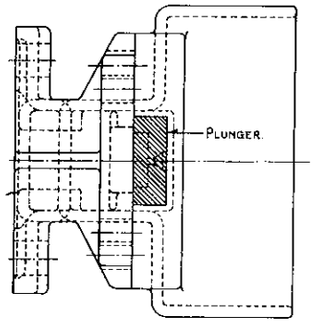
S-250-C

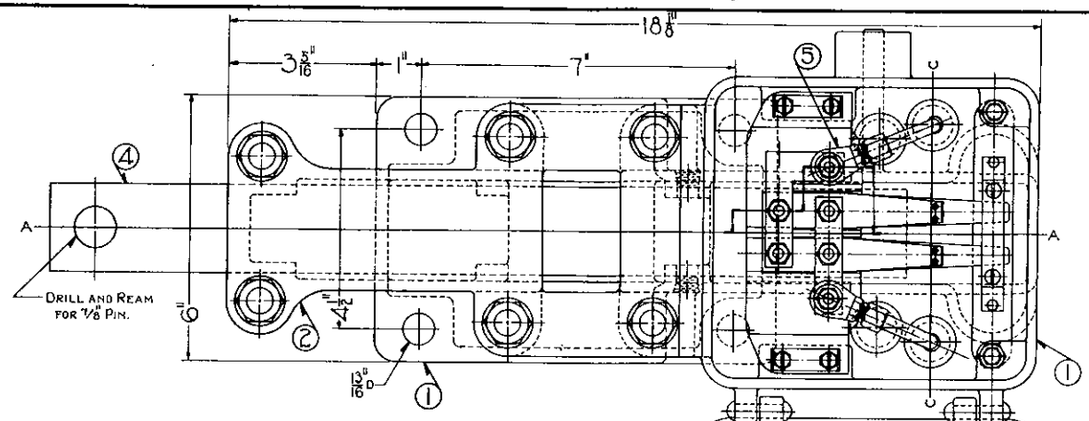
THE PENNSYLVANIA RAILROAD
STANDARD
ELECTRIC SWITCH HEATERS
DETAILS AND NOTES

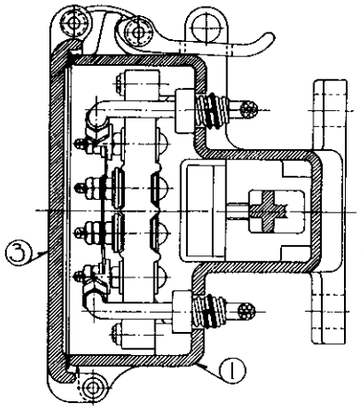
OFFICE OF CHIEF ENGINEER, PHILA., PA., DECEMBER 19, 1950.

Approved
W. S. Salmonson
Assistant Chief Engineer-Signals

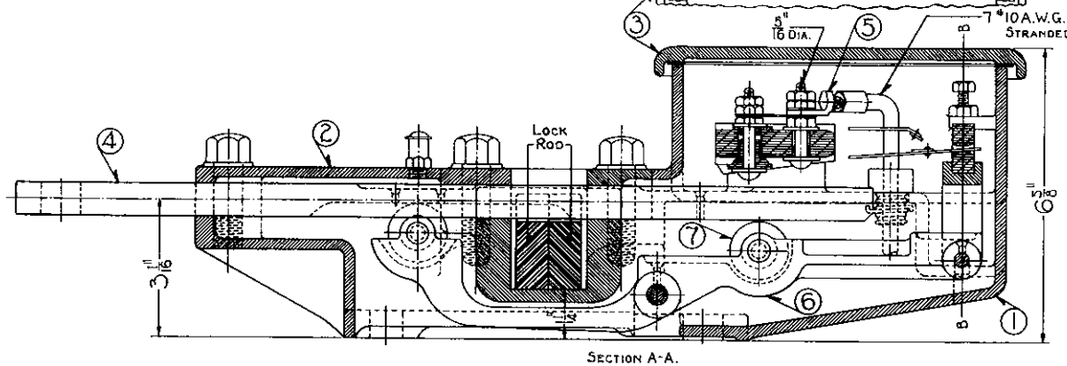
Approved
J. H. Merritt
Chief Engineer



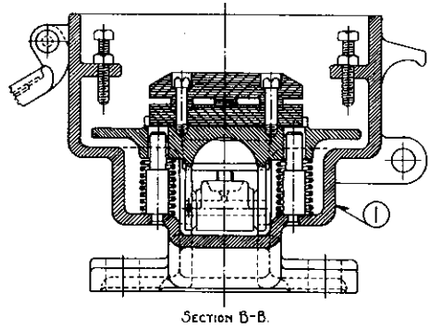




ORDER No	NAME.	ITEM
2553	CASE.	1
2554	LOCK COVER.	2
2555	CIRCUIT CONTROLLER COVER.	3
2556	PLUNGER.	4
2557	DOSSERT CONNECTING LUG.	5
2558	OPERATING CRANK.	6
2559	ROLLER.	7

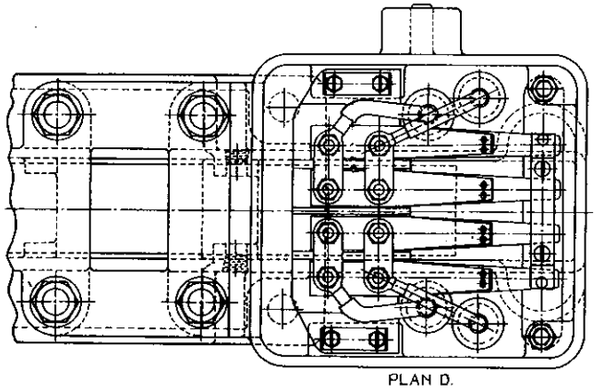


SECTION A-A.



2551—PLUNGER LOCK COMPLETE AS SHOWN.
2552- " " " SEE NOTE. *

NOTE:—
PARTS NOT ITEMIZED SHOULD BE ORDERED FROM CATALOG OR MFGR'S. DW'G. REF.
FOR BASE PLATE SEE PLAN S-256.
* ARRANGE CIRCUIT CONTROLLER AS SHOWN IN PLAN D.



PLAN D.
SHOWING CIRCUIT CONTROLLER ARRANGED FOR 4 CONTACTS.

REVISIONS.

0" 1" 3" 5"
SCALE

1 SHEET S-255-A

PENNSYLVANIA SYSTEM

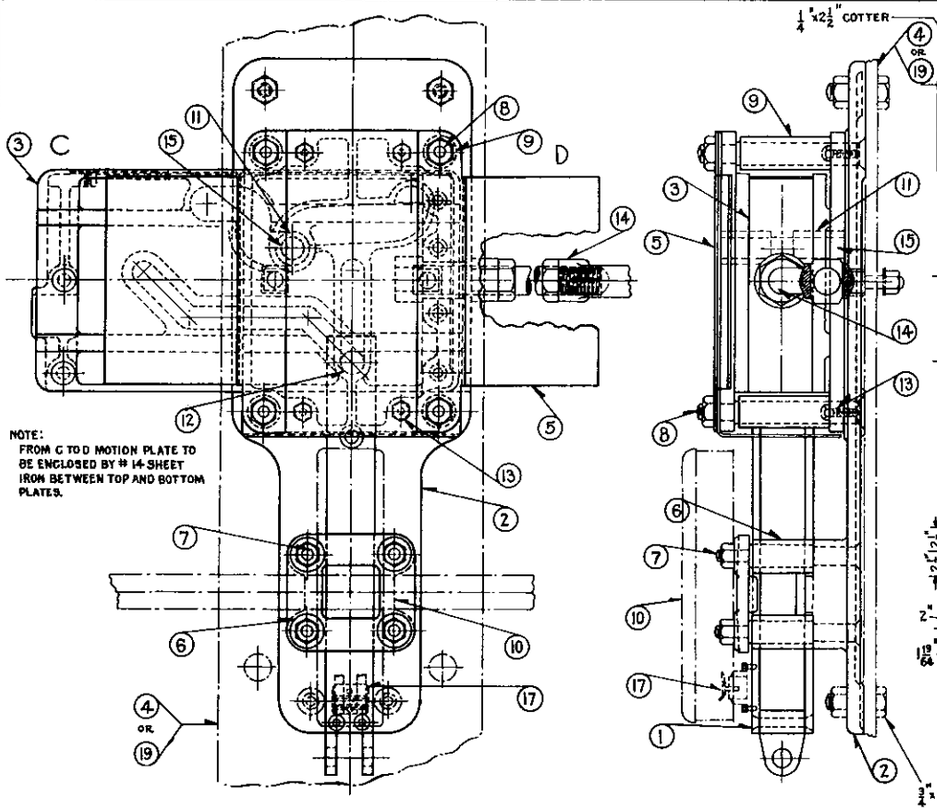
STANDARD
PLUNGER LOCK
AND CIRCUIT CONTROLLER

OFFICE OF CHIEF SIGNAL ENGINEER. PHILA., PA., FEB. 1, 1922

Correct
Chief Signal Engineer

Approved
Chief Engineer

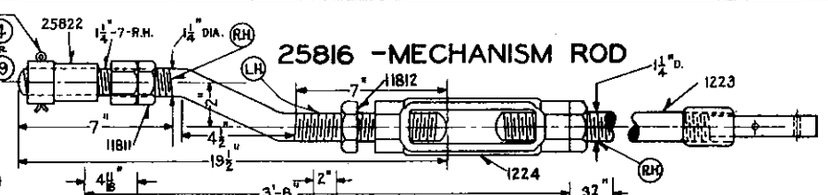
H.E.N.



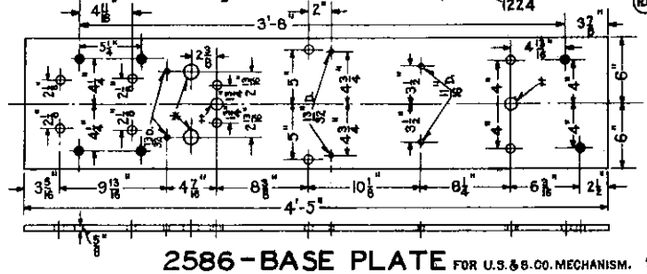
2581 - MECHANISM COMPLETE AS SHOWN WITH 25818

2582 - " " " " WITHOUT 25818

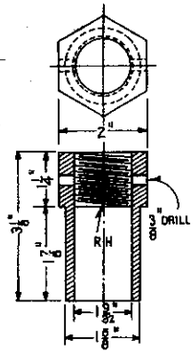
SPECIFY RIGHT OR LEFT HAND



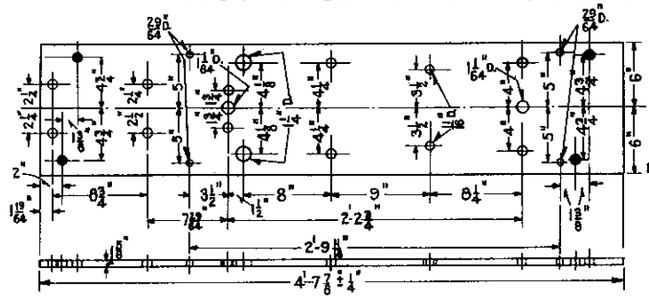
25816 - MECHANISM ROD



2586 - BASE PLATE FOR U.S.&S.CO. MECHANISM.



25822 - SLEEVE



25821 - BASE PLATE FOR G.R.S. CO. MECHANISM.

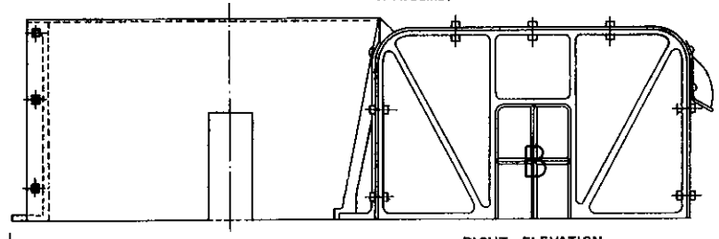
NOTE:
WHEN ORDERING REPAIR PARTS SPECIFY NAME OF MANUFACTURER OF THE SWITCH MECHANISM ON WHICH THE PARTS ARE TO BE USED.
CONTACT PLATE, ON CONTACT BLOCK 25819, SHALL BE MADE OF HARD CAST BRONZE.
ON 2586 { ✱ = 1¾" DIA. (PLUGGED WITH PUNCHINGS) / ‡ = REAMED HOLES, 1.000" TO 1.001" }
1/8" VARIATION ALLOWED EITHER WAY ON HOLES MARKED THUS; "●".
UNLESS OTHERWISE MARKED, HOLES IN 2585 AND 2582 ARE 13/16 D.
BREAK OPENINGS AT A OR B, DEPENDING UPON THE DIRECTION OF PIPE LINE.

ORDERING REFERENCE

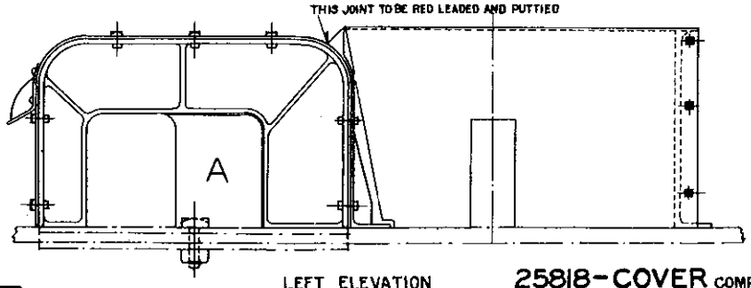
ORDER NO.	ITEM	NAME
2583	1	SLIDE BAR
2584	2	BASE
2585	3	MOTION PLATE
2586	4	BASE PLATE
2587	5	TOP PLATES
2588	6	ROLLER
2589	7	STUD WITH HEX. NUT
25810	8	STUD WITH HEX. NUT
25811	9	ROLLER
25812	10	INDICATION BOX COMPLETE
25813	11	ROLLER
25814	12	ROLLER
25815	13	CAP BOLT
25816	14	MECHANISM ROD
25817	15	PIN
25818	16	COVER COMPLETE AS SHOWN
25819	17	CONTACT BLOCK
25820	18	COVER SUPPORT
25821	19	BASE PLATE
25822	20	SLEEVE FOR MECHANISM ROD

REVISIONS

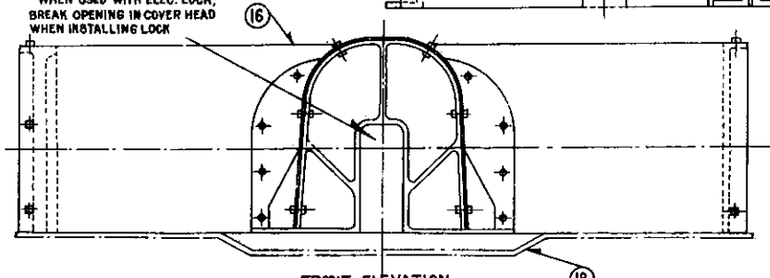
REDRAWN FROM APPROVED PLAN S-256-C, DATED 10-8-29. AND REVISED.



RIGHT ELEVATION



LEFT ELEVATION



FRONT ELEVATION

25818 - COVER COMPLETE AS SHOWN

SPECIFY RIGHT OR LEFT HAND

1 SHEET

S-258-D

THE PENNSYLVANIA RAILROAD

STANDARD

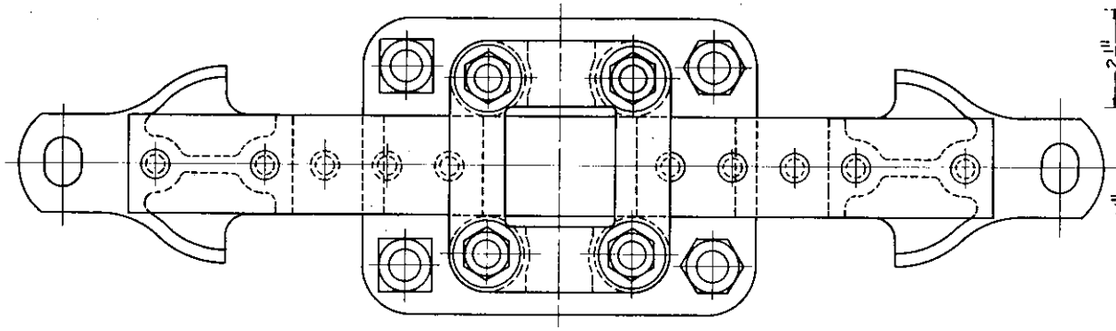
SWITCH MECHANISM

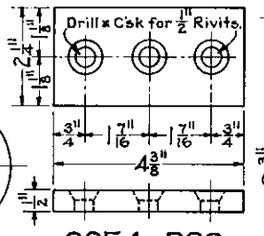
TYPE "G"

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., DEC. 27, 1929

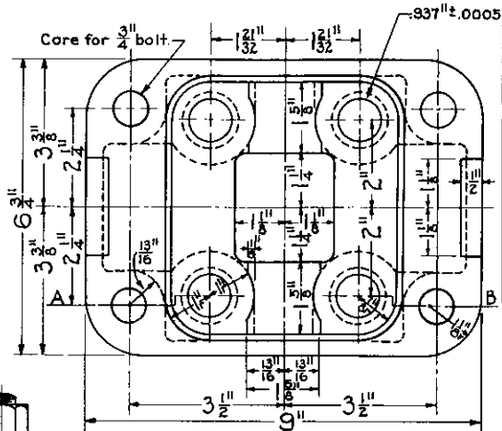
Approved A. H. Rudd Chief Signal Engineer

Approved J. Williamson Chief Engineer

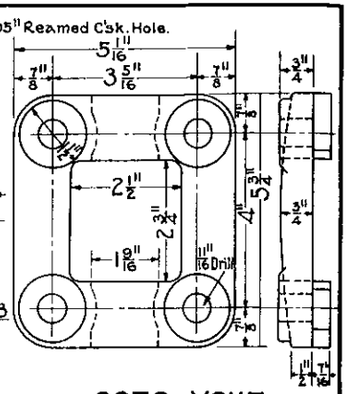




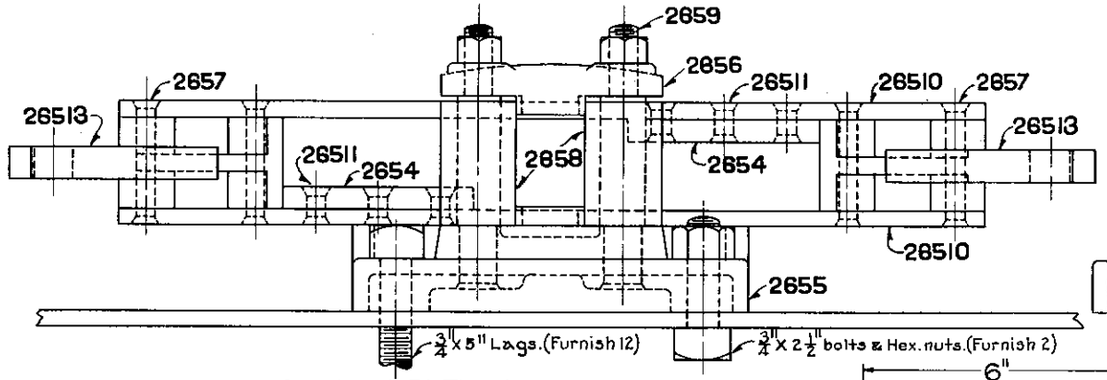
2654—DOG.
STEEL.



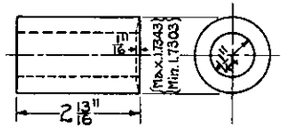
2655—BASE.
CAST IRON.



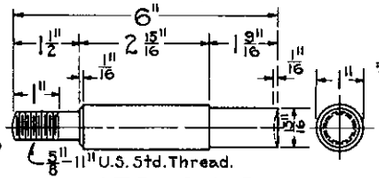
2656—YOKE.
CAST IRON.



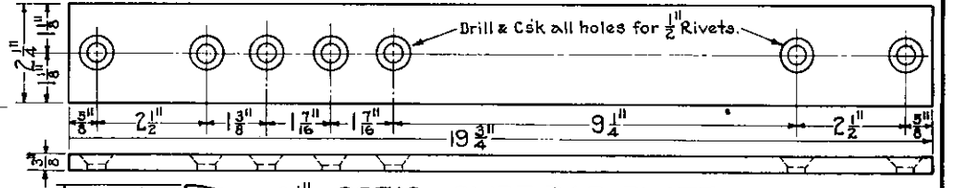
2651—DUPLEX SWITCH LOCK COMPLETE AS SHOWN WITH BASE PLATE, LAGS AND BOLTS.
2652—SLIDE BAR ONLY.
2653—BASE COMPLETE WITH 1-2655, 4-2658, 4-2659, 1-2656, 4-5/8 U.S.STD. HEX. NUTS.



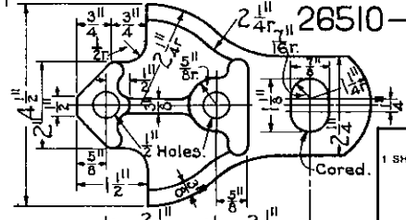
2658—ROLLER.
STEEL.

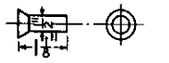


2659—STUD.
STEEL.

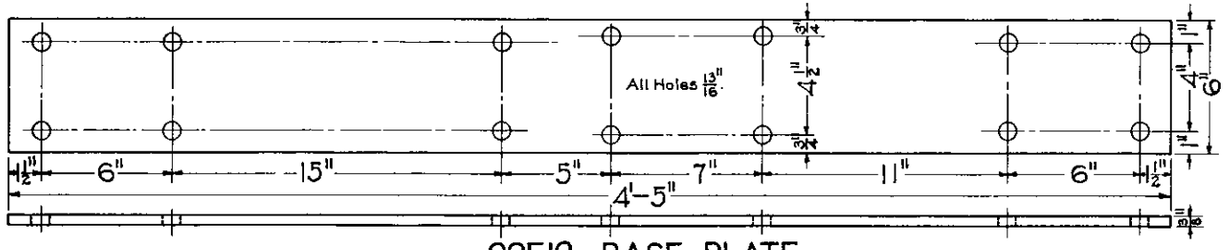


26510—SLIDE BAR PLATE.
STEEL.

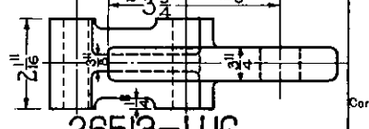




26511—RIVET.
WROT. IRON.



26512—BASE PLATE.
WROT. IRON.



26513—LUG.
MALLEABLE IRON.

1 SHEET

S-265-A

PENNSYLVANIA SYSTEM

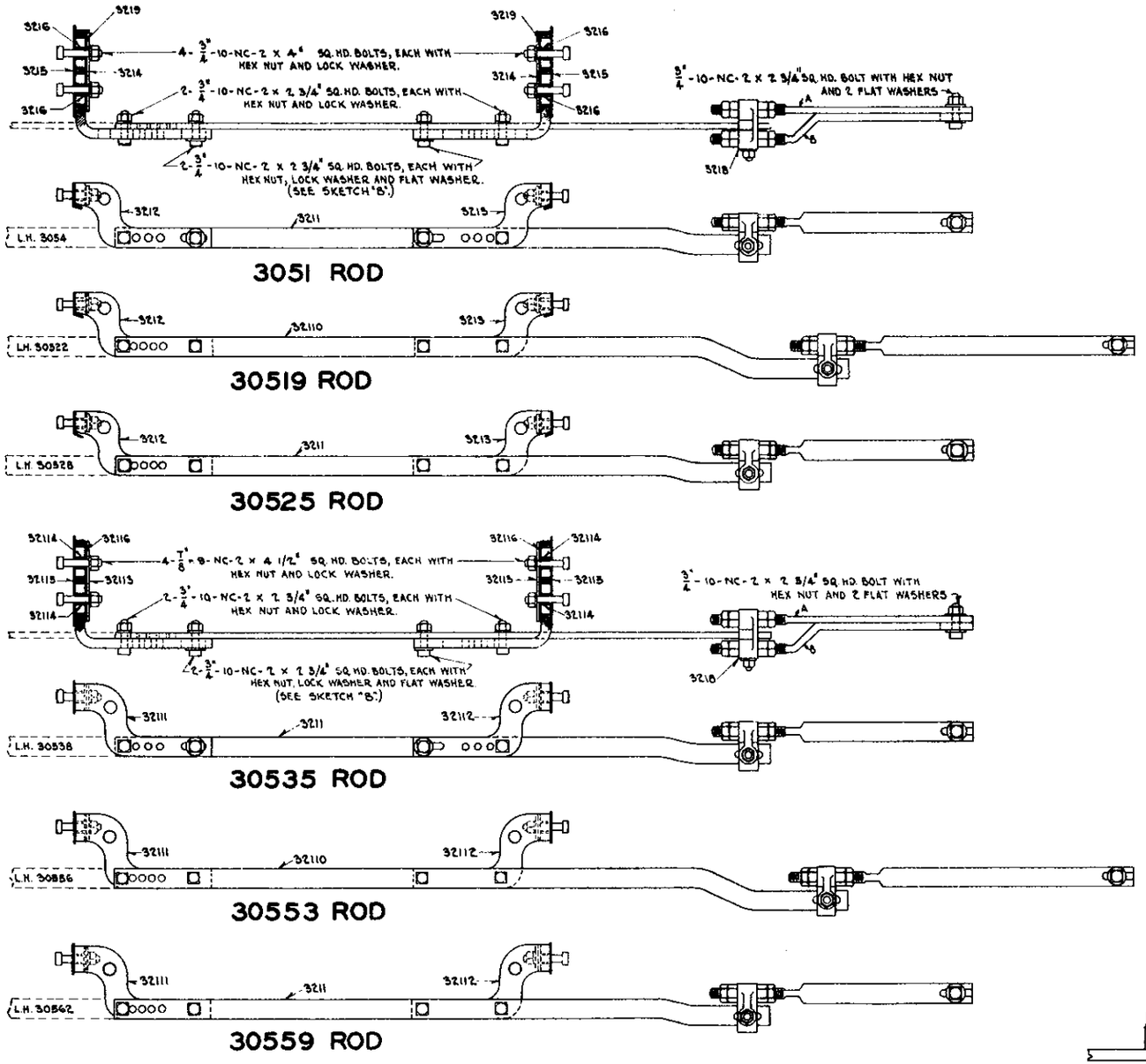
STANDARD
DUPLEX SWITCH LOCK

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., AUGUST 2, 1929

Correct
A. H. Rudd
Chief Signal Engineer

Approved
Chief Engineer

EXP
ACCT
C.O.

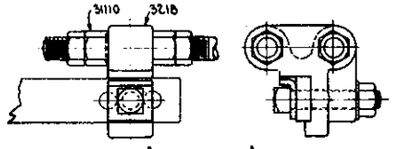


REFERENCE WHEN USED WITH 100# & 130# RAIL	REFERENCE WHEN USED WITH 131# & 152# RAIL	APPLICATION	FURNISH REF. 3051-30580.	FURNISH REF. 30535-30564.
3051	30535	R.H. TYPE "G" MECHANISM	AS SHOWN A-3111 B-3112.	AS SHOWN A-3111 B-3112.
3052	30536	R.H. " " "A", STYLE "M", "MO" OR PLUNGER LOCK.	3051 WITHOUT A AND B.	30535 WITHOUT A AND B.
3053	30537	R.H. " " " " " " " "	" " A, B AND 3218.	" " A, B AND 3218.
3054	30538	L.H. " " MECHANISM	" A-3111 B-3113	" A-3111 B-3113.
3055	30539	L.H. " "A", STYLE "M", "T-10" OR PLUNGER LOCK.	" WITHOUT A AND B.	" WITHOUT A AND B.
3056	30540	L.H. " " " " " " " "	" " A, B AND 3218.	" " A, B AND 3218.
3057	30541	PLUNGER LOCK R.H. LAYOUT LOCKING SWITCH NORMAL & REVERSE.	1-3052, 1-3118, 1-3117.	1-30536, 1-3115, 1-3117.
3058	30542	PLUNGER LOCK L.H. " " " " " "	1-3052, 1-3116, 1-3117.	1-30539, 1-3116, 1-3117.
3059	30543	PLUNGER LOCK R.H. " R.H. POINT LOCKED CLOSED.	1-3052, 1-3118, 1-3114.	1-30536, 1-3118, 1-3114.
30510	30544	PLUNGER LOCK R.H. " L.H. " " "	1-3052, 1-3115, 1-3118.	1-30536, 1-3118, 1-3116.
30511	30545	PLUNGER LOCK L.H. " " " " "	1-3053, 1-3116, 1-3114.	1-30539, 1-3116, 1-3114.
30512	30546	PLUNGER LOCK L.H. " R.H. " " "	1-3053, 1-3116, 1-3118.	1-30539, 1-3116, 1-3118.
30513	30547	R.H. TYPE "A" MECHANISM	3051 A-31120 B-31121.	30535 A-31120 B-31121.
30514	30548	L.H. " " "	" A-31120 B-31122.	" A-31120 B-31122.
30515	30549	R.H. STYLE "T10" "	" A-3111 B-3115.	" A-3111 B-3115.
30516	30550	L.H. " " "	" A-3111 B-3116.	" A-3111 B-3116.
30517	30551	R.H. " "M" "	" A-31125 B-31124.	" A-31125 B-31124.
30518	30552	L.H. " " "	" A-31126 B-31125.	" A-31126 B-31125.
30519	30553	R.H. " "MO" MECHANISM	AS SHOWN A-31125 B-31124.	AS SHOWN A-31125 B-31124.
30520	30554	R.H. " " "	30519 WITHOUT A AND B.	30553 WITHOUT A AND B.
30521	30555	R.H. " " "	" " A, B AND 3218.	" " A, B AND 3218.
30522	30556	L.H. " " "	" A-31126 B-31125.	" A-31126 B-31125.
30523	30557	L.H. " " "	" WITHOUT A AND B.	" WITHOUT A AND B.
30524	30558	L.H. " " "	" " A, B AND 3218.	" " A, B AND 3218.
30525	30559	R.H. TYPE "AS" MECHANISM	AS SHOWN A-31120 B-31121.	AS SHOWN A-31120 B-31121.
30526	30560	R.H. " " "	30525 WITHOUT A AND B.	30559 WITHOUT A AND B.
30527	30561	R.H. " " "	" " A, B AND 3218.	" " A, B AND 3218.
30528	30562	L.H. " " "	" A-31120 B-31122.	" A-31120 B-31122.
30529	30563	L.H. " " "	" WITHOUT A AND B.	" WITHOUT A AND B.
30530	30564	L.H. " " "	" " A, B AND 3218.	" " A, B AND 3218.

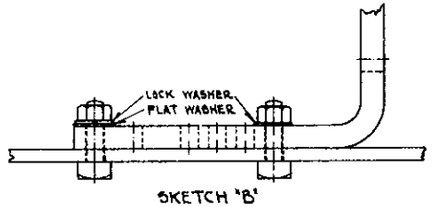
FOR MODEL 14 S. & L. MECHANISM WITH 6" THROW OF OPERATING ROD ORDER SAME AS FOR TYPE "G" MECHANISM.
" " " " 5" " " " " " " "A" " "

NOTE:-

1. IF RODS ARE APPLIED WHERE CENTER OF LOCK IS LESS THAN STANDARD DISTANCE FROM RAIL, BAR 3211 OR 32110 SHOULD BE DRILLED ACCORDINGLY FOR LUG 3218 AND END CUT OFF TO CLEAR BASE PLATE.
2. BAR 3211 APPLIED AS SHOWN IS FOR USE WITH "G", "A", "AB" OR "M" MECHANISMS, TURN SET UP FOR USE WITH PLUNGER LOCK OR "T-10" MECHANISM.
3. FOR BOLTS, NUTS, WASHERS, INSULATION, ETC REQUIRED WITH ALL RODS SEE 3051 AND 30535.
4. DIMENSIONS OF BOLT HEADS AND NUTS SHALL BE IN ACCORDANCE WITH A.S.A. ROUGH OR SEMI. FINISH SIZES.
5. 3/4"x 4" AND 7/8" x 4 1/2" BOLTS AND NUTS SHALL BE HEAT TREATED IN ACCORDANCE WITH AND SHALL MEET THE PHYSICAL REQUIREMENTS OF CURRENT ISSUE OF P.R.R. SPEC. C.S.D.
6. WHEN POINT DETECTOR IS USED ARRANGE LUG (3218) AND LOCK ROD NUTS PER SKETCH "A".



"SKETCH A"



SKETCH "B"

RELATIVE POSITION OF FOOT AND BAR FOR 30519, 30525, 30558 & 30558.

REVISIONS
REDRAWN FROM APPROVED PLAN S-305-P, DATED MAR. 30, 1925 AND 22/1/1930.

1 SHEET

S-305-G

THE PENNSYLVANIA RAILROAD

STANDARD

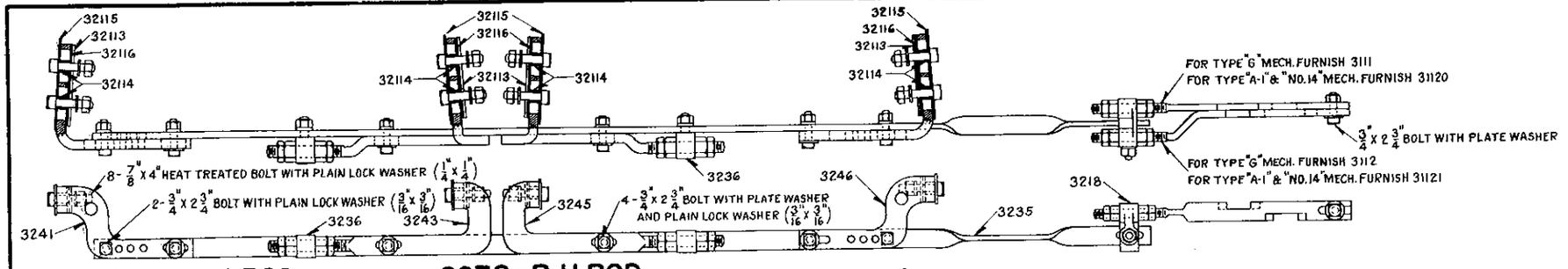
FRONT AND LOCK RODS

FOR SINGLE SWITCHES

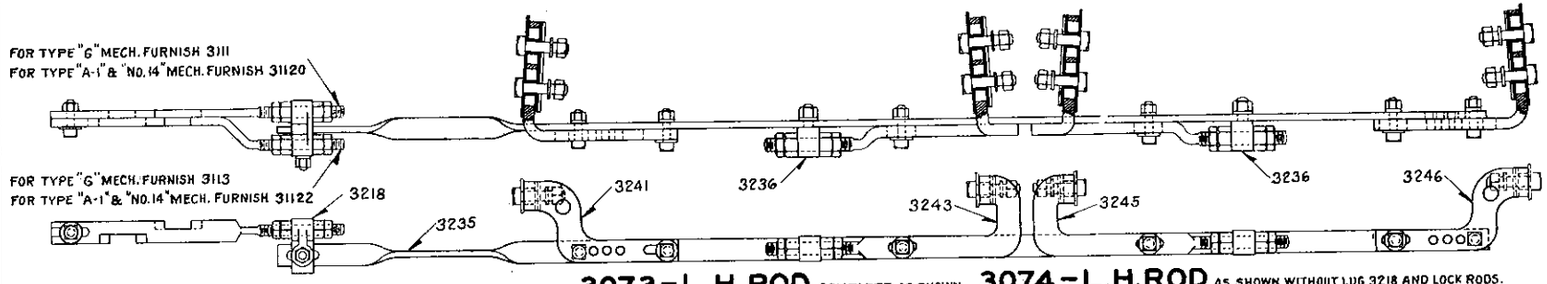
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., OCT. 11, 1926.

Approved: Chief Signal Engineer

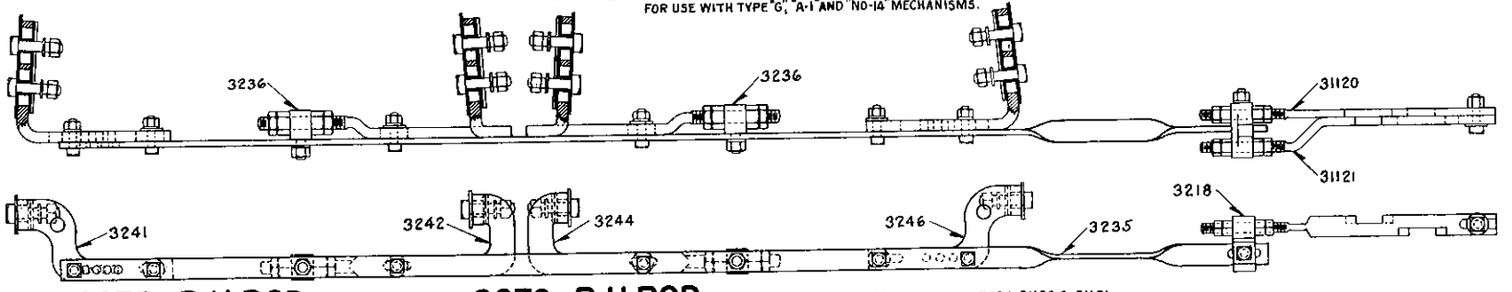
Approved: Chief Engineer



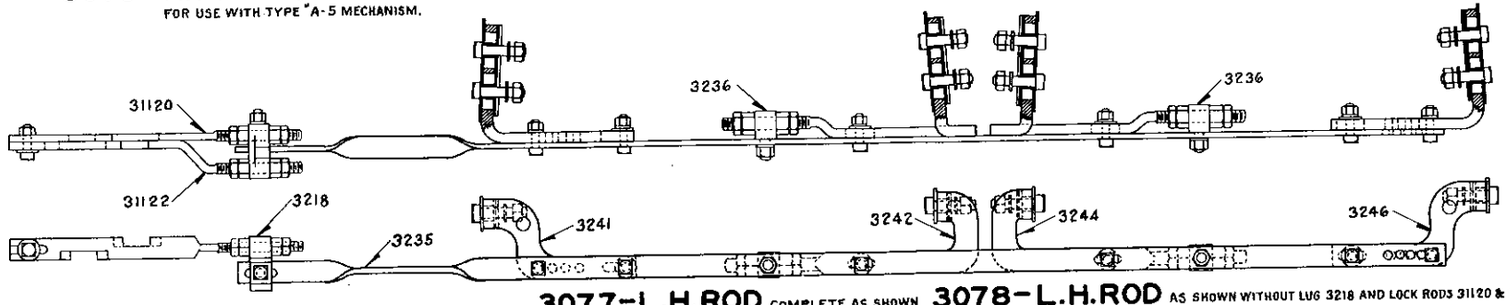
3071-R.H.ROD COMPLETE AS SHOWN. **3072-R.H.ROD** AS SHOWN WITHOUT LUG 3218 AND LOCK RODS.
FOR USE WITH TYPE "G," "A-1" AND "NO.14" MECHANISMS.



3073-L.H.ROD COMPLETE AS SHOWN **3074-L.H.ROD** AS SHOWN WITHOUT LUG 3218 AND LOCK RODS.
FOR USE WITH TYPE "G," "A-1" AND "NO-14" MECHANISMS.



3075-R.H.ROD COMPLETE AS SHOWN **3076-R.H.ROD** AS SHOWN WITHOUT LUG 3218 AND LOCK RODS 31120 & 31121.
FOR USE WITH TYPE "A-5 MECHANISM.



3077-L.H.ROD COMPLETE AS SHOWN **3078-L.H.ROD** AS SHOWN WITHOUT LUG 3218 AND LOCK RODS 31120 & 31122.
FOR USE WITH TYPE "A-5" MECHANISM.

NOTE:-

1. RODS SHOWN ARE FOR DOUBLE SLIP SWITCHES, FOR RODS FOR SINGLE SLIP SWITCHES ORDER AS FOR DOUBLE SLIP SWITCHES AND OMIT FEET NOT REQUIRED ON REQUISITION.
2. SPECIFY ON REQUISITION TYPE OF SWITCH MECHANISM.
3. FOR BOLTS, NUTS, WASHERS, INSULATION ETC. REQUIRED WITH ALL RODS SEE 3071.
4. BOLTS SHALL BE AMERICAN STANDARD REGULAR SQUARE HEAD WITH HEX. NUTS. THREAD TO BE NC-2.
5. HEAT TREATED BOLTS AND NUTS SHALL CONFORM TO AND SHALL BE MARKED (E) OR (CN) IN ACCORDANCE WITH CURRENT ISSUE OF P.R.R. SPECIFICATION NO. C.E.9.

REVISIONS

1 SHEET

S-307-A

THE PENNSYLVANIA RAILROAD

STANDARD

FRONT AND LOCK RODS

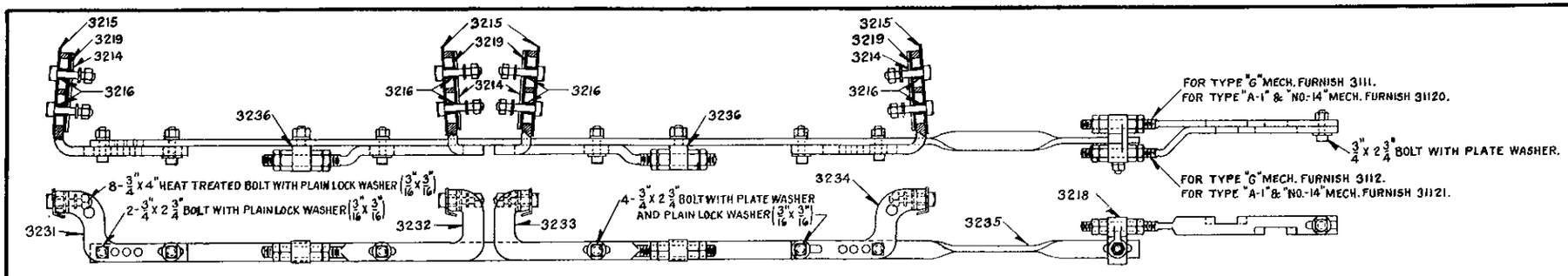
FOR SLIP SWITCHES 131 LB. R.E. AND 152 LB. P.S. RAIL.

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., AUGUST 12, 1935.

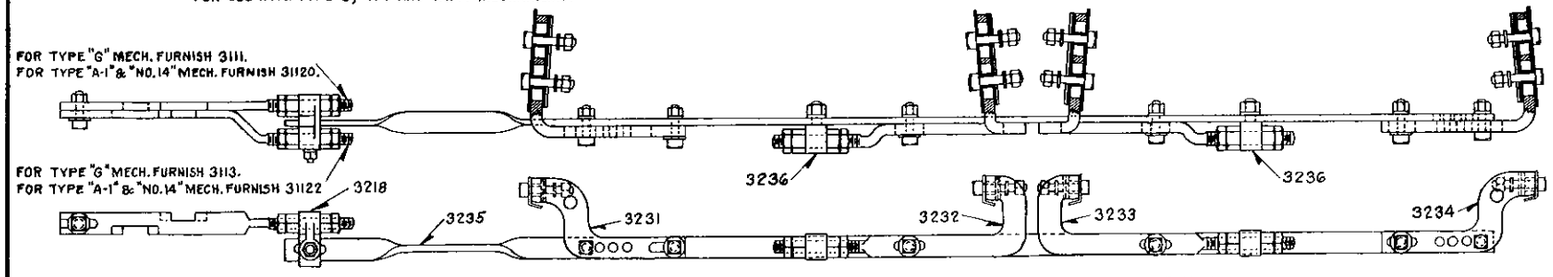
Approved A H Rudd
Chief Signal Engineer

Approved S W Huggins
Acting Chief Engineer

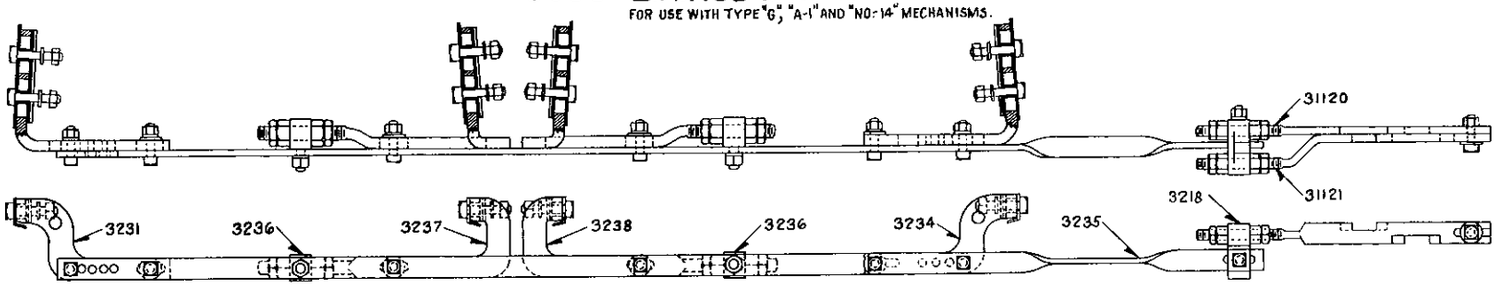
C.D.
C.D.
C.D.



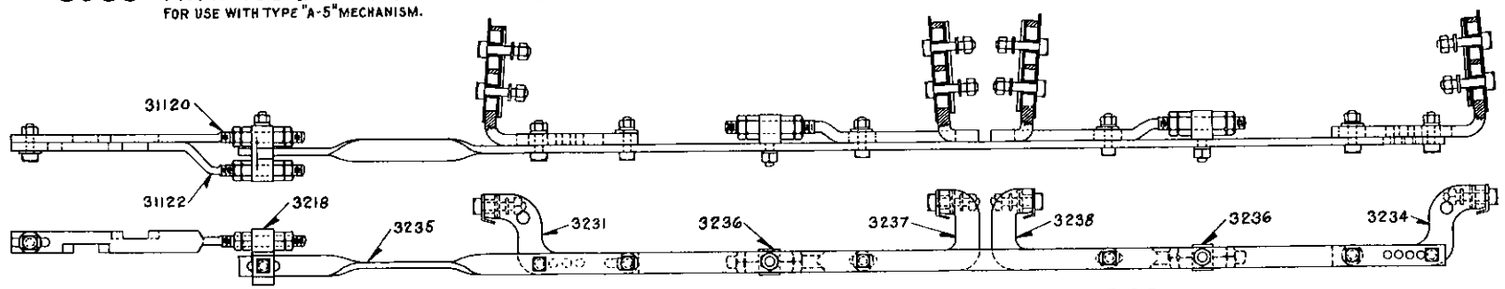
3081-R.H.ROD COMPLETE AS SHOWN. **3082-R.H.ROD** AS SHOWN WITHOUT LUG 3218 AND LOCK RODS.
FOR USE WITH TYPE "G", "A-1" AND "NO.-14" MECHANISMS.



3083-L.H.ROD COMPLETE AS SHOWN. **3084-L.H.ROD** AS SHOWN WITHOUT LUG 3218 AND LOCK RODS.
FOR USE WITH TYPE "G", "A-1" AND "NO.-14" MECHANISMS.



3085-R.H.ROD COMPLETE AS SHOWN. **3086-R.H.ROD** AS SHOWN WITHOUT LUG 3218 AND LOCK RODS 31120 & 31121.
FOR USE WITH TYPE "A-5" MECHANISM.



3087-L.H.ROD COMPLETE AS SHOWN. **3088-L.H.ROD** AS SHOWN WITHOUT LUG 3218 AND LOCK RODS 31120 & 31122.
FOR USE WITH TYPE "A-5" MECHANISM.

NOTE:-

1. RODS SHOWN ARE FOR DOUBLE SLIP SWITCHES, FOR RODS FOR SINGLE SLIP SWITCHES ORDER AS FOR DOUBLE SLIP SWITCHES AND OMIT FEET NOT REQUIRED ON REQUISITION.
2. SPECIFY ON REQUISITION TYPE OF SWITCH MECHANISM.
3. FOR BOLTS, NUTS, WASHERS, INSULATION ETC. REQUIRED WITH ALL RODS SEE 3081.
4. BOLTS SHALL BE AMERICAN STANDARD REGULAR SQUARE HEAD WITH HEX. NUTS. THREAD TO BE NC-2.
5. HEAT TREATED BOLTS AND NUTS SHALL CONFORM TO AND SHALL BE MARKED (C) OR (CN) IN ACCORDANCE WITH CURRENT ISSUE OF P.R.R. SPECIFICATION NO. C.E.9.

REVISIONS
REDRAWN FROM APPROVED PLAN S-308-A, DATED 7-11-1923 AND REVISED.

1 SHEET

S-308-B

THE PENNSYLVANIA RAILROAD

STANDARD

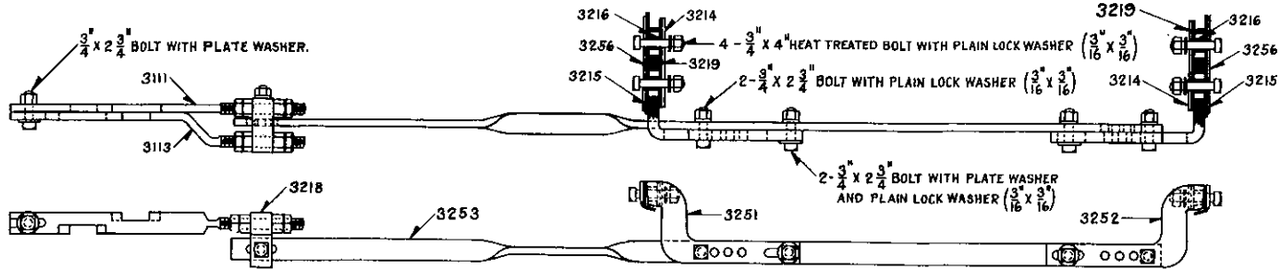
FRONT AND LOCK RODS

FOR SLIP SWITCHES 100 LB. P.S. AND 130 LB. P.S. RAIL.

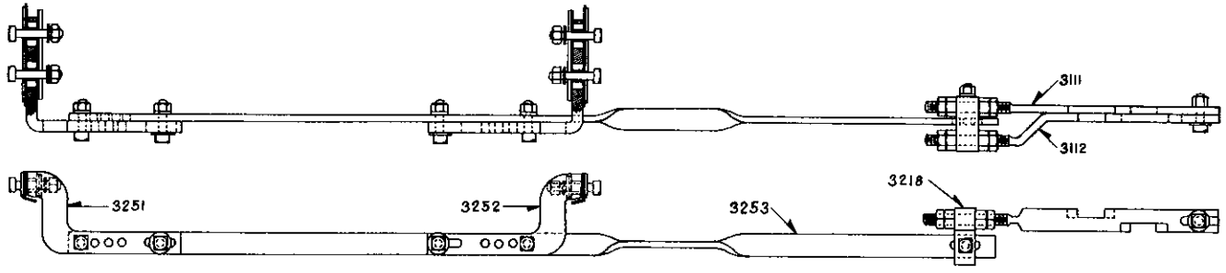
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., AUGUST 17, 1935.

Approved
Chief Signal Engineer

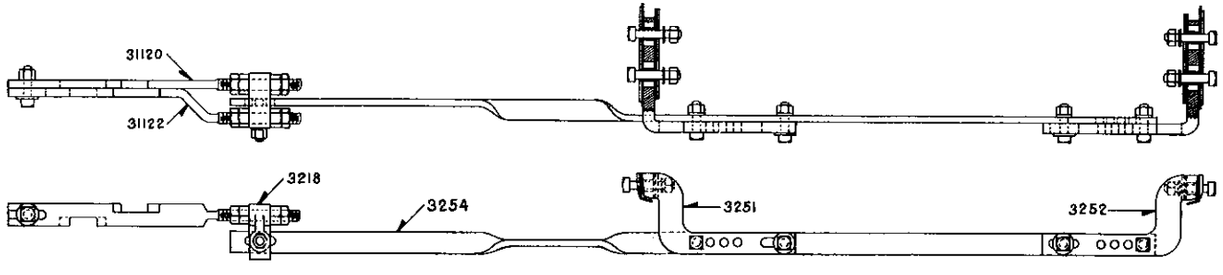
Approved
Acting Chief Engineer



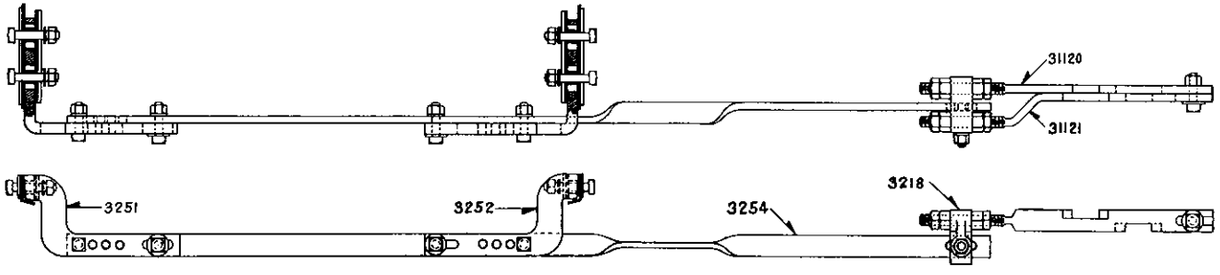
3091 - L.H. ROD COMPLETE.



3093 - R.H. ROD COMPLETE.



3095 - L.H. ROD COMPLETE.



3097 - R.H. ROD COMPLETE.

ORDERING REFERENCE

ORDER NO.	APPLICATION	FURNISH
3091	L.H. ROD FOR TYPE "G" MECHANISM.	AS SHOWN.
3092	" " " " " "	" " WITHOUT 3111, 3113 & 3218.
3093	R.H. " " " " "	" "
3094	" " " " " "	" " WITHOUT 3111, 3112 & 3218.
3095	L.H. " " " "A-5" "	" "
3096	" " " " " "	" " WITHOUT 31120, 31122 & 3218.
3097	R.H. " " " " "	" "
3098	" " " " " "	" " WITHOUT 31120, 31121 & 3218.

FOR TYPE "A-1" MECHANISM USE SAME RODS AS FOR TYPE "A-5" MECHANISM.
FOR NO. 14 MECHANISM, FRONT RODS SHALL BE SAME AS FOR TYPE "G" MECHANISM, LOCK RODS SHALL BE SAME AS FOR TYPE "A-5" MECHANISM.

NOTE:-

1. BOLTS SHALL BE AMERICAN STANDARD REGULAR SQUARE HEAD WITH HEX. NUTS. THREAD TO BE NC-2.
2. FOR BOLTS, NUTS, WASHERS, INSULATION ETC. REQUIRED WITH ALL RODS SEE 3091.
3. HEAT TREATED BOLTS AND NUTS SHALL CONFORM TO AND SHALL BE MARKED (C) OR (N) IN ACCORDANCE WITH CURRENT ISSUE OF P.R.R. SPECIFICATION NO. C.E.9.

REVISIONS
Redrawn from approved plan S-309-B, dated July 11, 1923, last revised April 3, 1924 and revised.

1 SHEET

S-309-C

THE PENNSYLVANIA RAILROAD

STANDARD

FRONT AND LOCK RODS

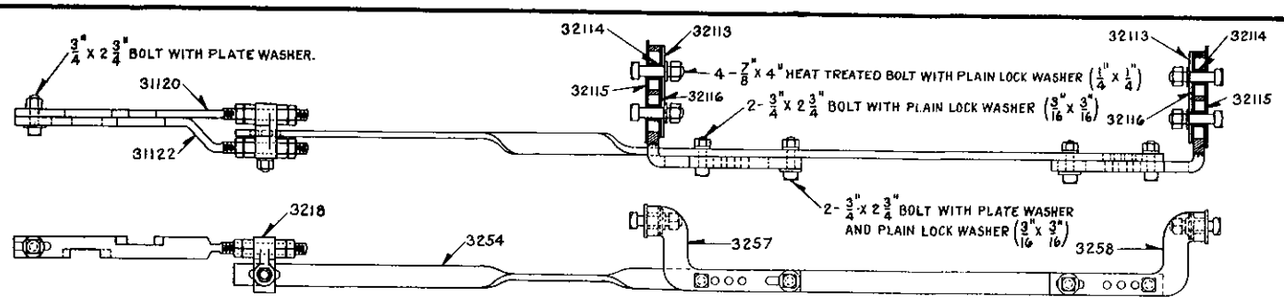
FOR MOVABLE POINT FROGS 100 LB. P.S AND 130 LB. P.S. RAIL.

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., MARCH 29, 1935.

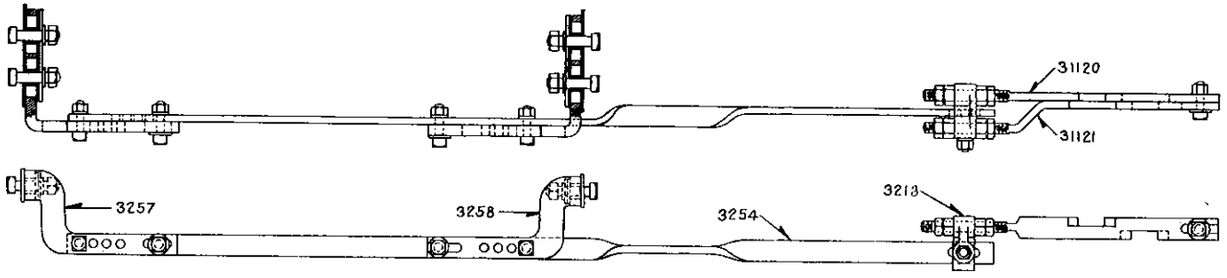
Approved A. H. Rudd
Chief Signal Engineer

Approved W. W. Wiggins
Acting Chief Engineer

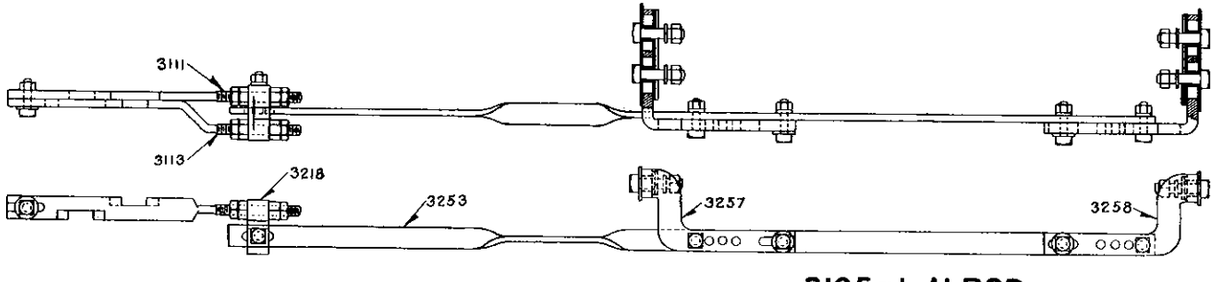
E.K.O.
C.D.
C.D.



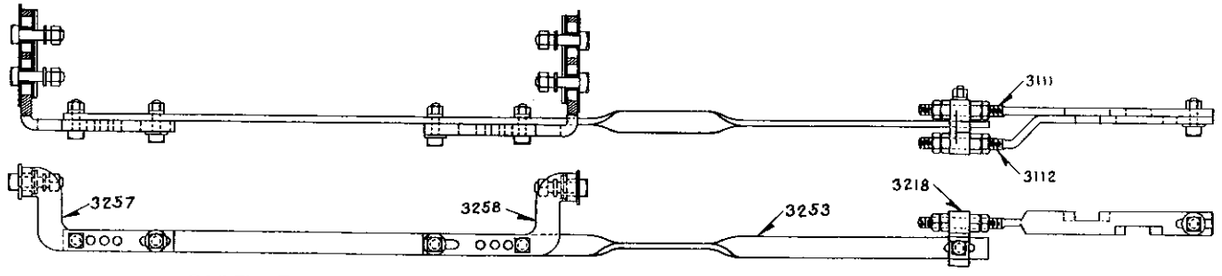
3101-L.H.ROD COMPLETE.



3103-R.H.ROD COMPLETE.



3105-L.H.ROD COMPLETE.



3107-R.H.ROD COMPLETE.

ORDERING REFERENCE

ORDER NO.	APPLICATION	FURNISH
3101	L.H. ROD FOR TYPE "A-5" MECHANISM.	AS SHOWN.
3102	" " " " " "	" " WITHOUT 31120, 31122 & 3218.
3103	R.H. " " " " "	" "
3104	" " " " " "	" " WITHOUT 31120, 31121 & 3218.
3105	L.H. " " " "G" "	" "
3106	" " " " " "	" " WITHOUT 3111, 3113 & 3218.
3107	R.H. " " " " "	" "
3108	" " " " " "	" " WITHOUT 3111, 3112 & 3218.

FOR TYPE "A-1" MECH. USE SAME FRONT AND LOCK RODS AS FOR TYPE "A-5" MECH.
FOR TYPE "NO.-14 MECH. USE SAME FRONT RODS AS FOR TYPE "G" MECH. AND SAME LOCK RODS AS FOR TYPE "A-5" MECH.

NOTE:-

1. BOLTS SHALL BE AMERICAN STANDARD REGULAR SQUARE HEAD WITH HEX. NUTS. THREAD TO BE NC-2.
2. FOR BOLTS, NUTS, WASHERS, INSULATION ETC. REQUIRED WITH ALL RODS SEE 3101.
3. HEAT TREATED BOLTS AND NUTS SHALL CONFORM TO AND SHALL BE MARKED (C) OR (CN) IN ACCORDANCE WITH CURRENT ISSUE OF P.R.R. SPECIFICATION NO. C.E. 9.

REVISIONS

1 SHEET

S-310-A

THE PENNSYLVANIA RAILROAD

STANDARD

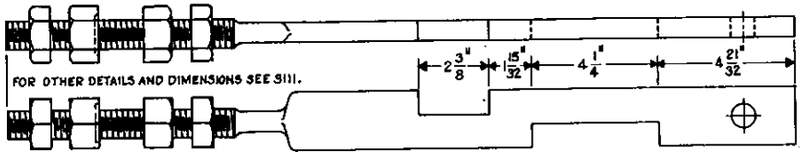
FRONT AND LOCK RODS

FOR MOVABLE POINT FROGS 131 LB. R.E. AND 152 LB. P.S. RAIL.

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., MAR. 30, 1935.

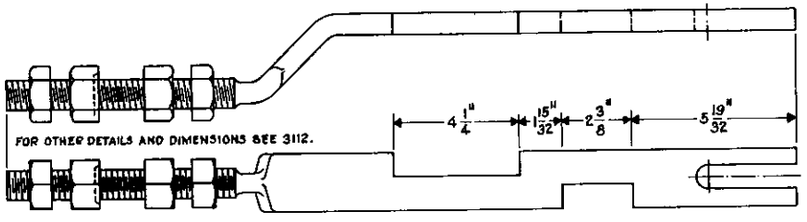
Approved
A.H. Rudd
Chief Signal Engineer

Approved
W.W. Wiggin
Acting Chief Engineer



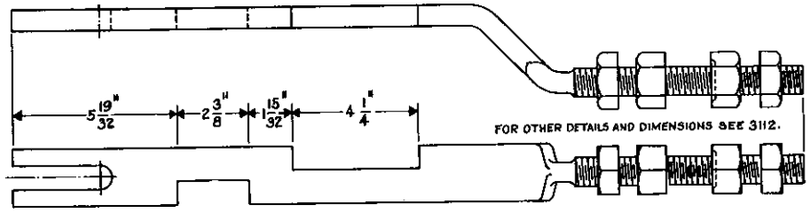
31120 LOCK ROD RIGHT OR LEFT HAND

STORES CAT. REF. NO. 2A-2125



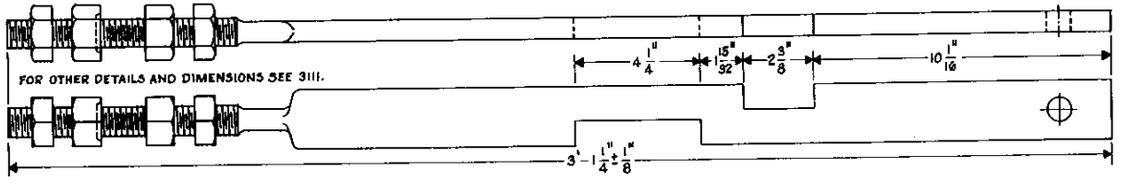
31121 LOCK ROD RIGHT HAND

STORES CAT. REF. NO. 2A-2126R



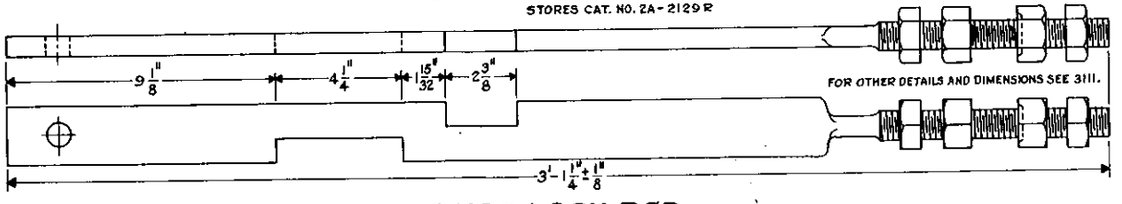
31122 LOCK ROD LEFT HAND

STORES CAT. REF. NO. 2A-2126L



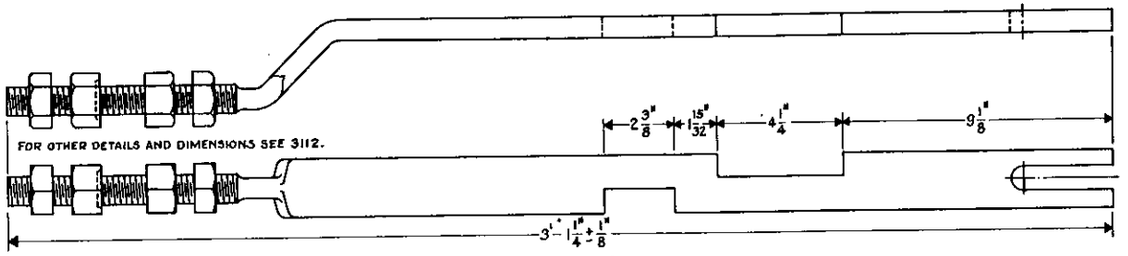
31123 LOCK ROD RIGHT HAND

STORES CAT. NO. 2A-2129R



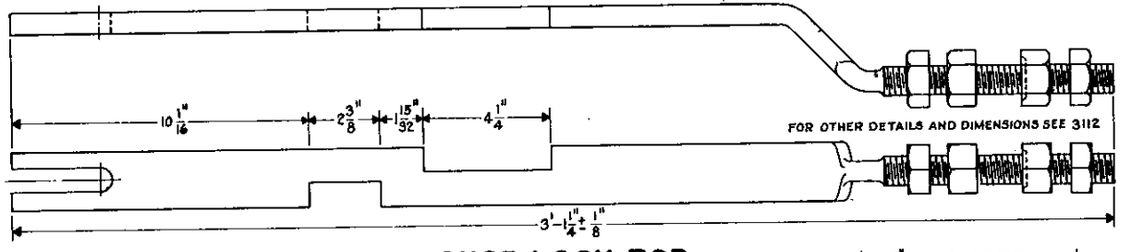
31126 LOCK ROD LEFT HAND

STORES CAT. REF. NO. 2A-2129L



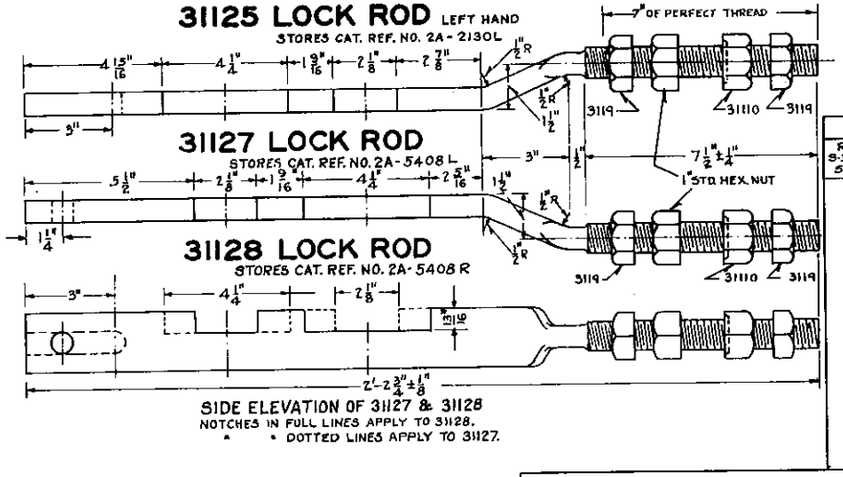
31124 LOCK ROD RIGHT HAND

STORES CAT. REF. NO. 2A-2130R



31125 LOCK ROD LEFT HAND

STORES CAT. REF. NO. 2A-2130L



31127 LOCK ROD

STORES CAT. REF. NO. 2A-5408L

31128 LOCK ROD

STORES CAT. REF. NO. 2A-5408R

SIDE ELEVATION OF 31127 & 31128

NOTCHES IN FULL LINES APPLY TO 31128.

* DOTTED LINES APPLY TO 31127.

REVISIONS
REDRAWN FROM APPROVED DRAWING S-311-F, DATED 7-5-27. LAST REV. 3-20-29. SEE SHEET NO. 1 FOR CHANGES.

NOTES:-

1. ALL RODS SHALL BE MADE OF FORGING STEEL CONTAINING 0.30 PER CENT TO 0.40 PER CENT CARBON, WITH A MAXIMUM OF 0.045 PER CENT PHOSPHOROUS. THEY SHALL BE HEATED TO A TEMPERATURE OF 1550° F., QUENCHED IN OIL, REHEATED TO 1200° F. AND ALLOWED TO COOL SLOWLY.
2. MANUFACTURER SHALL PAINT EACH LOCK ROD WITH ONE COAT OF A GOOD GRADE BLACK PAINT.

FOR DETAILS OF LOCK RODS 3111 TO 3118 INCLUSIVE, SEE SHT. 1 OF THIS DWG. TO DETERMINE CORRECT LOCK RODS FOR USE WITH EACH TYPE OPERATING MECHANISM, SEE SHEET 3 OF THIS DRAWING.

S-311-G

THE PENNSYLVANIA RAILROAD

STANDARD

LOCK RODS

OFFICE OF CHIEF ENGINEER, PHILA., PA., MAY 10, 1945.

Approved
Assistant Chief Engineer - T.C.&S.

Approved
Chief Engineer

LAYOUTS
FOR SINGLE SWITCHES
RIGHT HAND

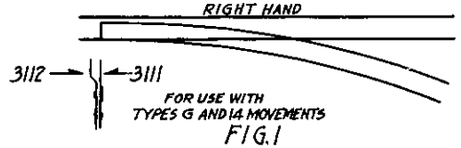


FIG. 1

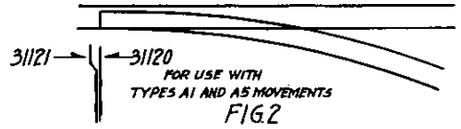


FIG. 2

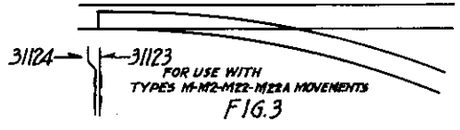


FIG. 3

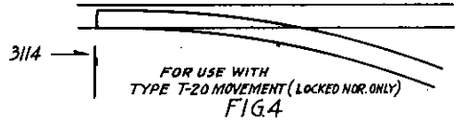


FIG. 4

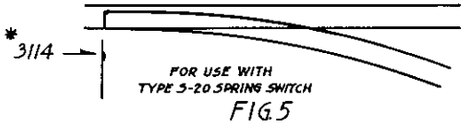


FIG. 5

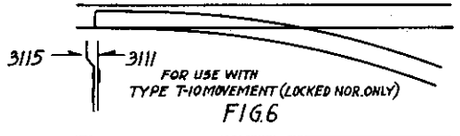


FIG. 6

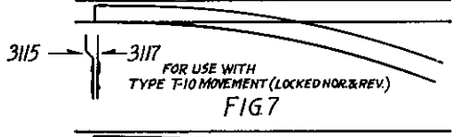


FIG. 7

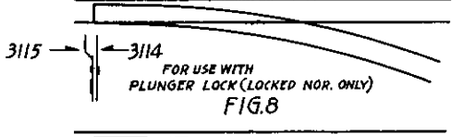


FIG. 8

FIG. 9

LAYOUTS
FOR SINGLE SWITCHES
LEFT HAND

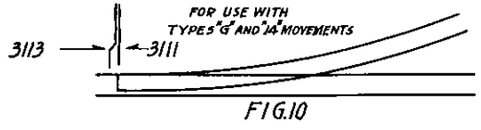


FIG. 10

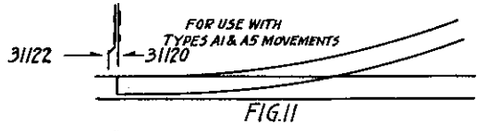


FIG. 11

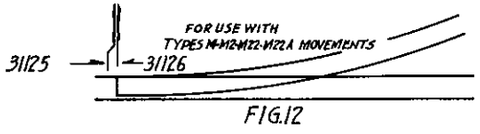


FIG. 12

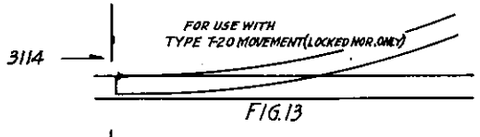


FIG. 13

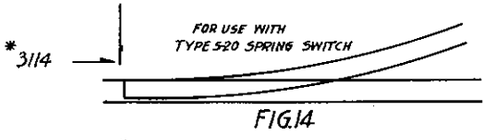


FIG. 14

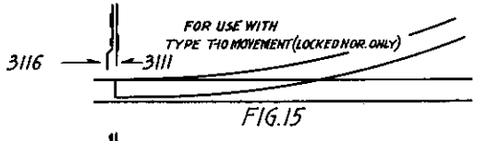


FIG. 15

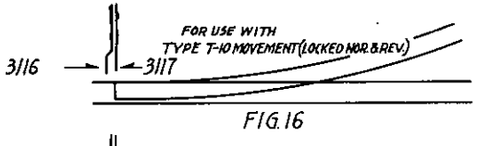


FIG. 16

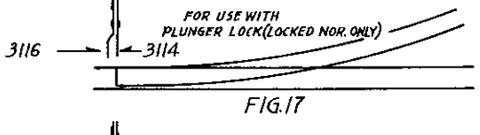


FIG. 17

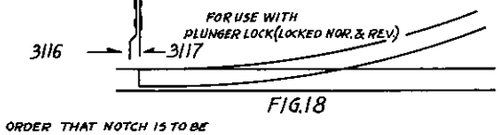


FIG. 18

* WHEN 3114 IS TO BE USED FOR SPRING SWITCH, SPECIFY ON ORDER THAT NOTCH IS TO BE WIDENED 1/16" ON FIELD SIDE, BOTH FACES OF NOTCH TO BE TORCH HARDENED.

LAYOUTS
FOR MOVABLE POINT FROGS

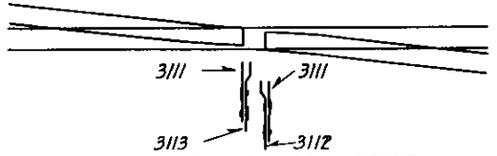


FIG. 19

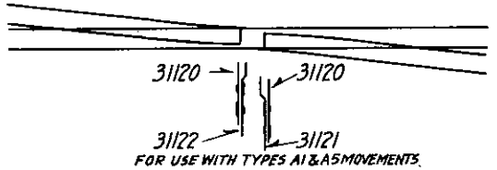


FIG. 20

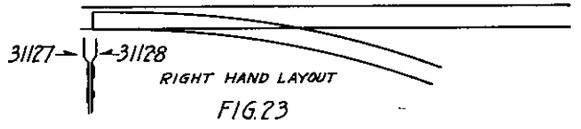


FIG. 23

LAYOUTS
FOR DOUBLE SLIP SWITCHES

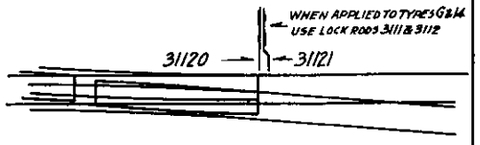


FIG. 21

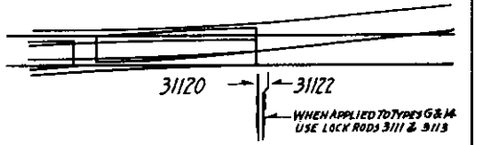


FIG. 22

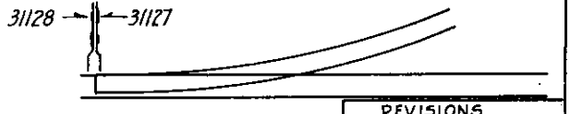


FIG. 24

WHEN A T-20 MOVEMENT IS EQUIPPED WITH SEPARATE LOCK BAR, LOCKING THE LOCK ROD WITH SWITCH IN BOTH NORMAL AND REVERSE POSITIONS, USE LOCK RODS AS SHOWN IN FIGS. 23 AND 24.

NOTES:
1. PLUNGER OR LOCKING DOG FOR LOCKING LOCK RODS FOR SWITCH MOVEMENTS, WILL ENTER LOCK RODS AS FOLLOWS:-
2. FOR A1 AND A5, FIRST INTO TOP SMALL NOTCH IN STRAIGHT LOCK ROD FOR BOTH LEFT HAND AND RIGHT HAND LAYOUTS WHEN SWITCH IS IN THE NORMAL POSITION.
3. FOR M-M2-M10-M22- FIRST INTO BOTTOM SMALL NOTCH IN BENT LOCK ROD FOR RIGHT HAND LAYOUT, AND INTO TOP SMALL NOTCH IN STRAIGHT LOCK ROD FOR LEFT HAND LAYOUT, BOTH WITH SWITCH IN THE NORMAL POSITION.
4. FOR MODEL 14, FIRST INTO TOP LARGE NOTCH IN STRAIGHT LOCK ROD FOR BOTH R.H. AND L.H. LAYOUTS WHEN SWITCH IS IN THE NORMAL POSITION.
5. FOR T-20 OR S-20 WITH SWITCH LOCKED NOR. ONLY, LOCK BAR ENTERS SMALL NOTCH IN LOCK ROD, WHICH IS LOCATED IN FAR LOCK ROD SPACE, FOR BOTH R.H. & L.H. LAYOUTS.
6. FOR T-20 WITH SWITCH LOCKED BOTH NOR. AND REV., SEE FIGS. 23 & 24. LOCK BAR ENTERS LARGE OR SMALL NOTCH FIRST, DEPENDING UPON CONDITIONS.
7. FOR T-10 WITH SWITCH LOCKED NORMAL ONLY, FIRST INTO TOP LARGE NOTCH IN STRAIGHT LOCK ROD FOR BOTH RIGHT HAND AND LEFT HAND LAYOUTS, WHEN IN THE NOR. POSITION.
8. FOR T-10 WITH SWITCH LOCKED BOTH NOR. AND REV., FIRST INTO TOP LARGE NOTCH IN STRAIGHT LOCK ROD, FOR BOTH RIGHT HAND AND LEFT HAND LAYOUTS, WHEN IN THE NOR. POSITION.
9. FOR TYPE G, FIRST INTO TOP SMALL NOTCH IN BENT LOCK ROD FOR BOTH RIGHT HAND AND LEFT HAND LAYOUTS WHEN SWITCH IS IN THE NORMAL POSITION.
10. FOR PLUNGER LOCK WITH SWITCH LOCKED NORMAL ONLY, FIRST INTO TOP SMALL NOTCH IN STRAIGHT LOCK ROD, WHEN IN THE NORMAL POSITION.
11. FOR PLUNGER LOCK WITH SWITCH LOCKED NORMAL AND REVERSE, FIRST INTO TOP LARGE NOTCH IN STRAIGHT LOCK ROD, FOR BOTH RIGHT HAND AND LEFT HAND LAYOUTS, WHEN SWITCH IS IN THE NORMAL POSITION.
12. OTHER COMBINATIONS OF LOCK RODS ARE SPECIAL. RODS SHOULD BE SELECTED FOR EACH INDIVIDUAL CASE.

THIS SHEET FOR INFORMATION ONLY. ORDER LOCK RODS FROM SHEETS 1 & 2 DRAWING S-311-G.
FOR DETAILS OF LOCK RODS 3111 TO 3118 INCL., SEE SHEET 1 OF DRAWING S-311-G.
FOR DETAILS OF LOCK RODS 31120 TO 31128 INCL., SEE SHEET 2 OF DRAWING S-311-G.

REVISIONS

THIS SHEET ADDED TO DWG. S-311-G FOR INFORMATION ONLY.

SHEET 3 OF 3.

S-311-G

THE PENNSYLVANIA RAILROAD

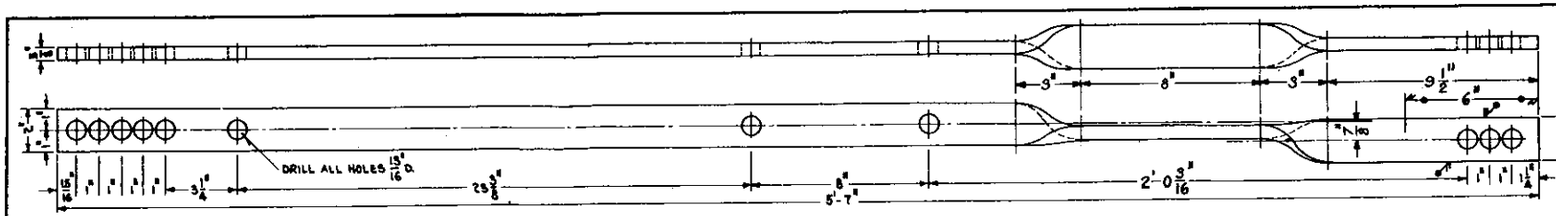
STANDARD

LOCK RODS

OFFICE OF CHIEF ENGINEER, PHILA., PA., MAY 10, 1945.

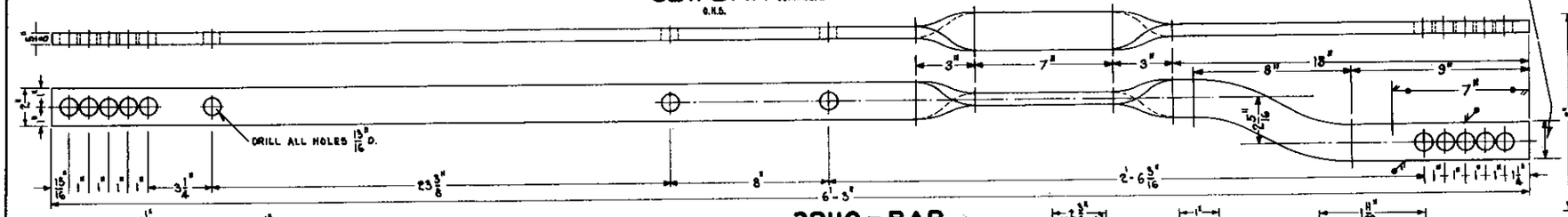
Approved
H. C. Griffith
Assistant Chief Engineer-T. C. & S.

Approved
J. H. Smith
Chief Engineer

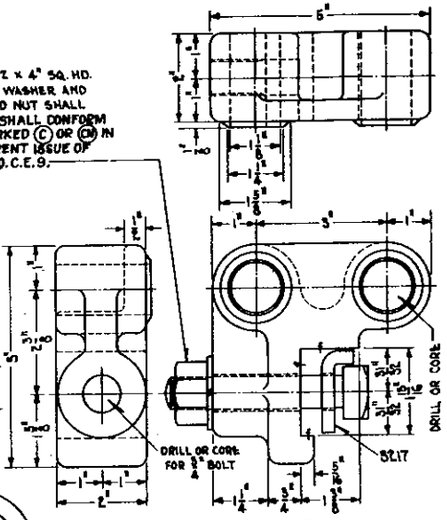


3211 BAR COMPLETE
O.H.S.

FURNISH:- 1- 3/4"-10-NC-2 x 4" SQ. HD. BOLT WITH HEX NUT, LOCK WASHER AND WASHER STK. BOLT AND NUT SHALL BE HEAT TREATED AND SHALL CONFORM TO AND SHALL BE MARKED (C) OR (CH) IN ACCORDANCE WITH CURRENT ISSUE OF P.R.R. SPECIFICATION NO. C.E.9.

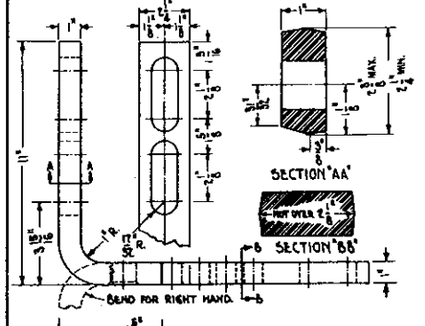


32110 - BAR COMPLETE
O.H.S.

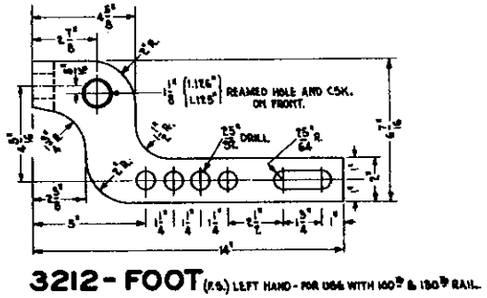


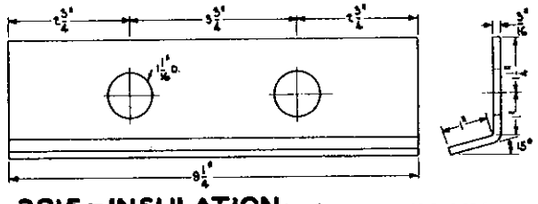
3218 - LUG COMPLETE
M.I.

NOTE:-
1. DIMENSIONS OF BOLT HEAD AND NUT SHALL BE IN ACCORDANCE WITH A.S.A. ROUGH OR SEMI. FINISH SIZES.
2. FIBRE, AND SPRING LOCK WASHER SHALL MEET THE REQUIREMENTS IN CURRENT ISSUE OF P.R.R. SPEC. C.E.50 AND C.E.7.

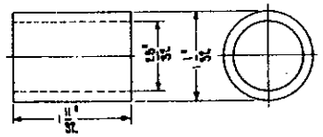


3212 - FOOT (P.S.) LEFT HAND - FOR USE WITH 100# & 130# RAIL.
3213 - " (P.S.) RIGHT HAND - . . . . . .

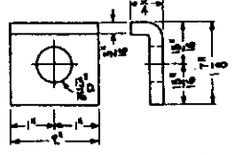




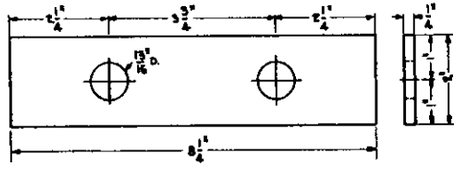
3215 - INSULATION (FIBRE) FOR USE WITH 3212 OR 3213.



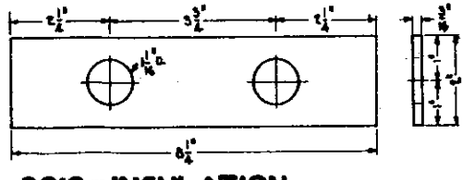
3216 - INSULATION (FIBRE) FOR USE WITH 3212 OR 3213.



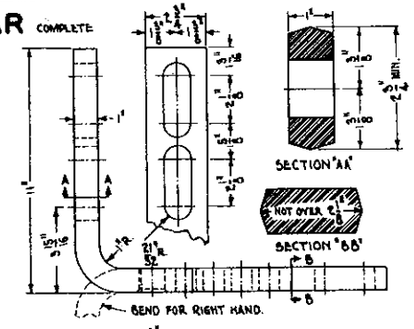
3217 - WASHER O.H.S.

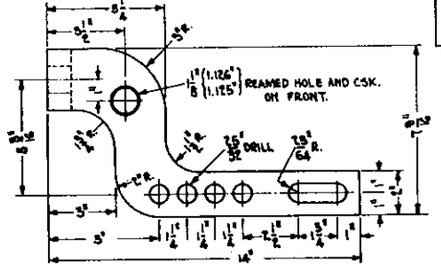


3214 - PLATE (O.H.S.) FOR USE WITH 3212 OR 3213.

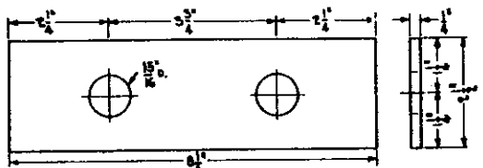


3219 - INSULATION (FIBRE) FOR USE WITH 3212 OR 3213.

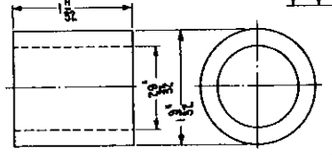




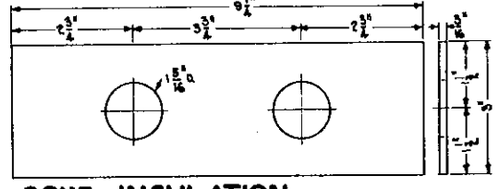
32111 - FOOT (P.S.) LEFT HAND - FOR USE WITH 131# & 132# RAIL.
32112 - " (P.S.) RIGHT HAND - . . . . . .



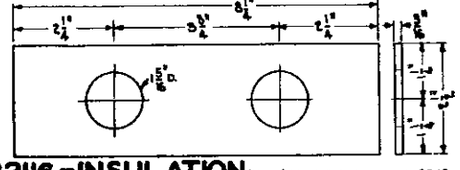
32113 - PLATE (O.H.S.) FOR USE WITH 32111 OR 32112.



32114 - INSULATION (FIBRE) FOR USE WITH 32111 OR 32112.



32115 - INSULATION (FIBRE) FOR USE WITH 32111 OR 32112.



32116 - INSULATION (FIBRE) FOR USE WITH 32111 OR 32112.

REVISIONS
REDRAWN FROM APPD. PLAN S-321-F. DATED MAR. 25, 1919 AND REVISED.
H MARCH 6, 1936. C.D.
APPROVED: A.H. Rudd

1 SHEET

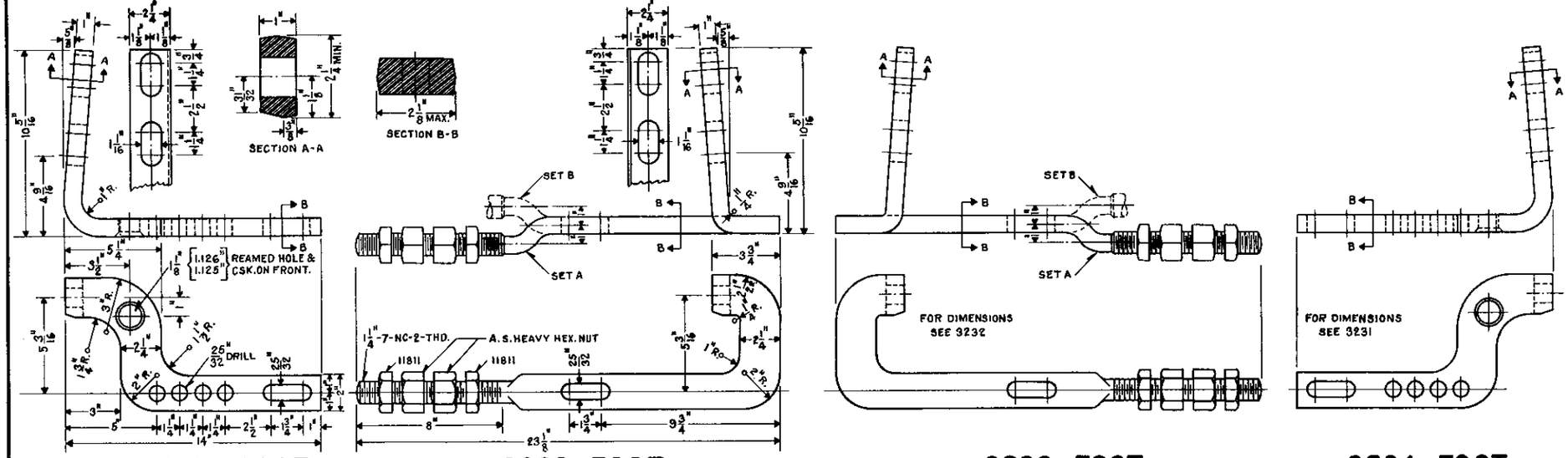
S-321-H

THE PENNSYLVANIA RAILROAD
STANDARD
FRONT ROD PARTS

OFFICE OF CHIEF ENGR., ENGINEER, PHILA., PA., OCT. 11, 1926.

Approved: A.H. Rudd, Chief Engr. Equipment

Approved: [signature], Asst. Engineer



3231-FOOT FORGED STEEL

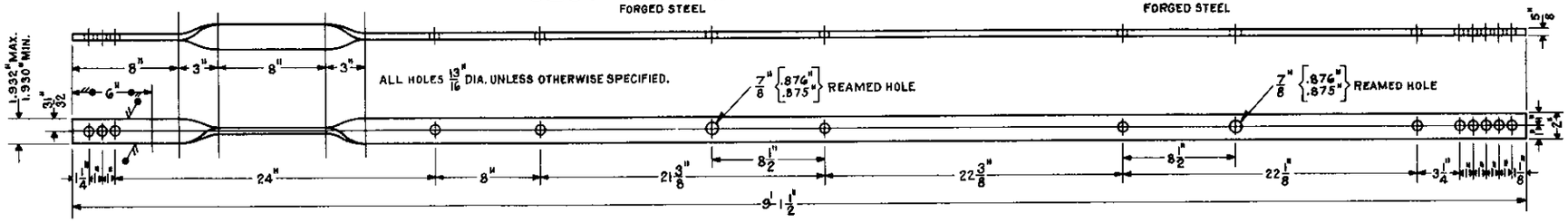
3232-FOOT SET A

3237-FOOT SET B FORGED STEEL

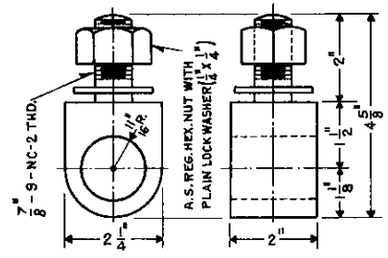
3233-FOOT SET A

3238-FOOT SET B FORGED STEEL

3234-FOOT FORGED STEEL



3235-BAR O.H. STEEL



3236-LUG O.H. STEEL HEAT TREATED

REVISIONS
REDRAWN FROM APPROVED PLAN S-323-G, DATED JULY 11, 1923, LAST REVISED SEPT. 18, 1925 AND REVISED.

1 SHEET

S-323-H

THE PENNSYLVANIA RAILROAD

STANDARD

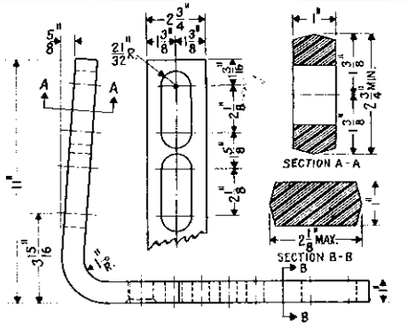
FRONT ROD PARTS

FOR SLIP SWITCHES 100 LB. P.S. AND 130 LB. P.S. RAIL.

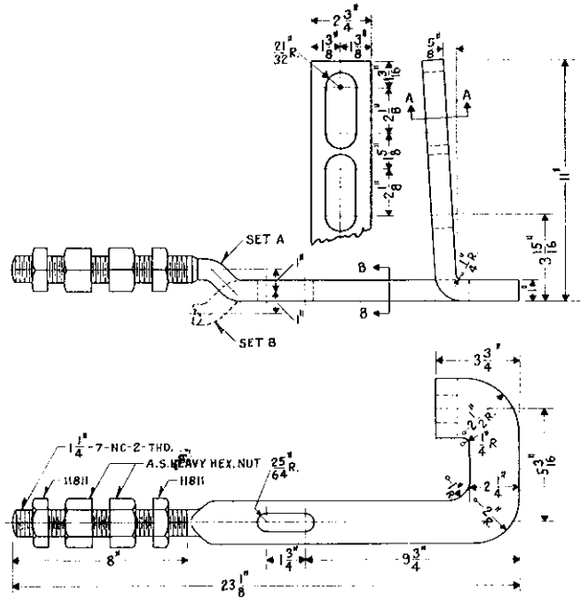
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., AUGUST 27, 1935.

Approved
Chief Signal Engineer

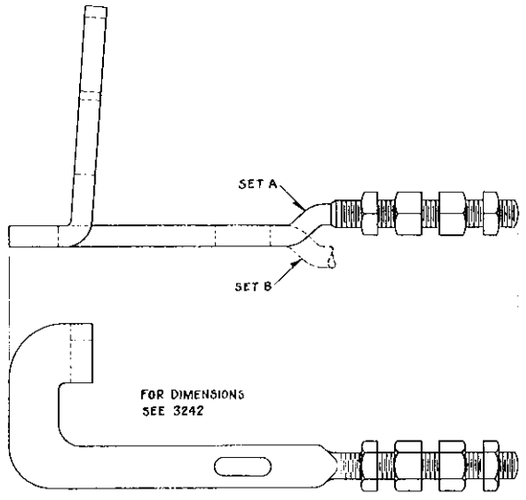
Approved
Acting Chief Engineer



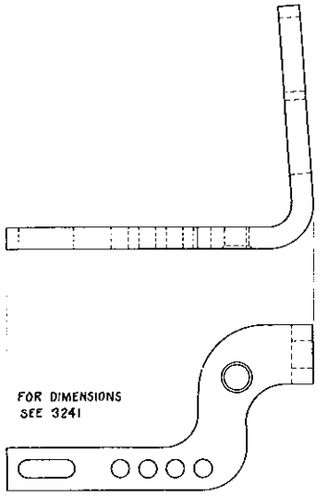
3241 FOOT
FORGED STEEL



3242 FOOT SET A
3243 FOOT SET B
FORGED STEEL



3244 FOOT SET A
3245 FOOT SET B
FORGED STEEL



3246 FOOT
FORGED STEEL

REVISIONS

1 SHEET

S-324-A

THE PENNSYLVANIA RAILROAD

STANDARD

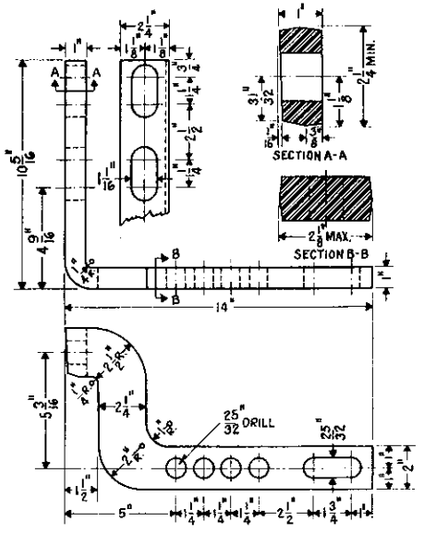
FRONT ROD PARTS

FOR SLIP SWITCHES 131 LB. R.E. AND 152 LB. P.S. RAIL.

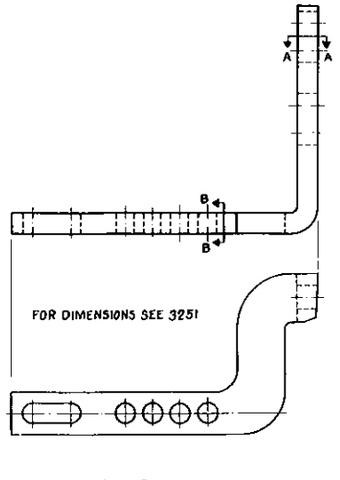
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., JULY 10, 1935.

Approved
Chief Signal Engineer

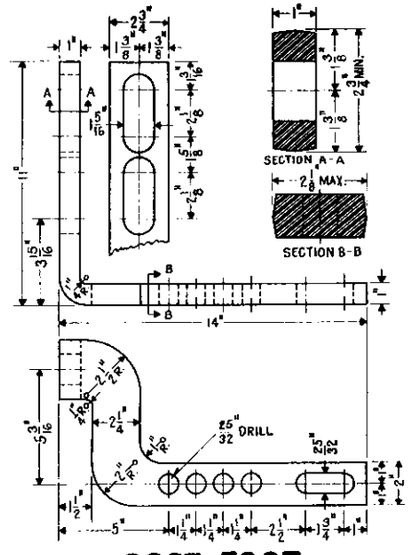
Approved
Acting Chief Engineer



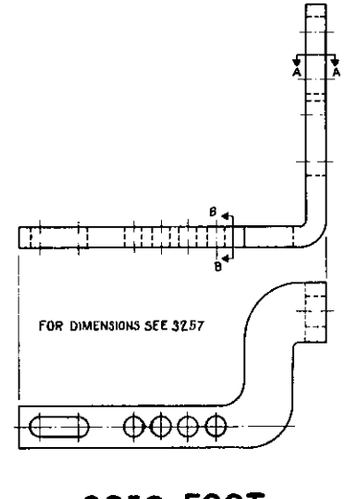
3251 FOOT FORGED STEEL
FOR #100 P.S. & #130 P.S. RAIL.



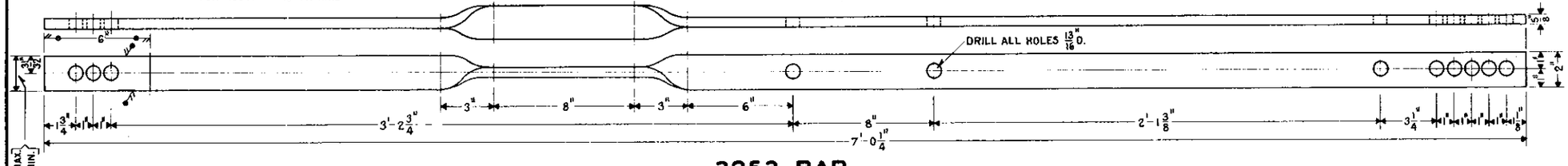
3252 FOOT FORGED STEEL
FOR #100 P.S. & #130 P.S. RAIL.



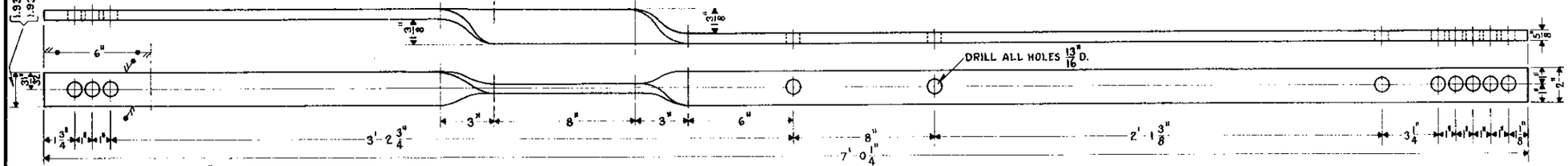
3257 FOOT FORGED STEEL
FOR #131 R.E. & #152 P.S. RAIL.



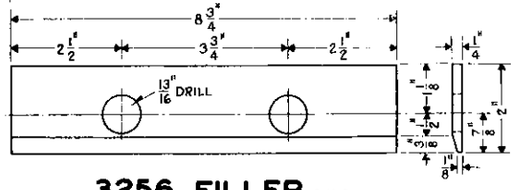
3258 FOOT FORGED STEEL
FOR #131 R.E. & #152 P.S. RAIL.



3253 BAR O.H.S.



3254 BAR O.H.S.



3256 FILLER O.H.S.

REVISIONS
Redrawn from approved plan S-325-B, dated July 11, 1923, last revised April 3, 1924 and revised.

1 SHEET

S-325-C

THE PENNSYLVANIA RAILROAD

STANDARD

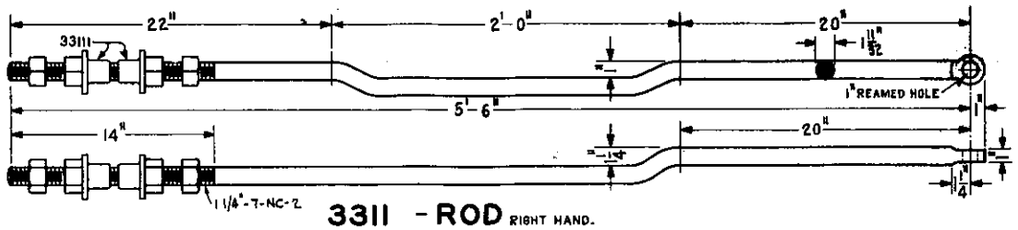
FRONT ROD PARTS

FOR MOVABLE POINT FROGS

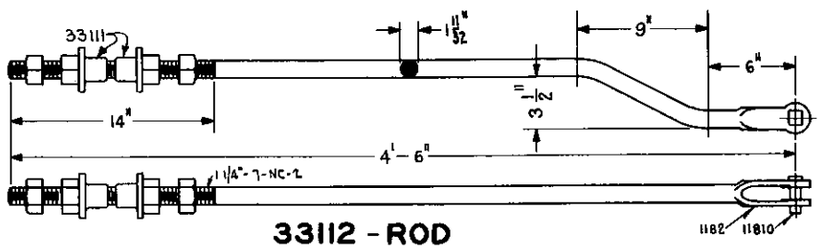
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., FEB. 20, 1935.

Approved
Chief Signal Engineer

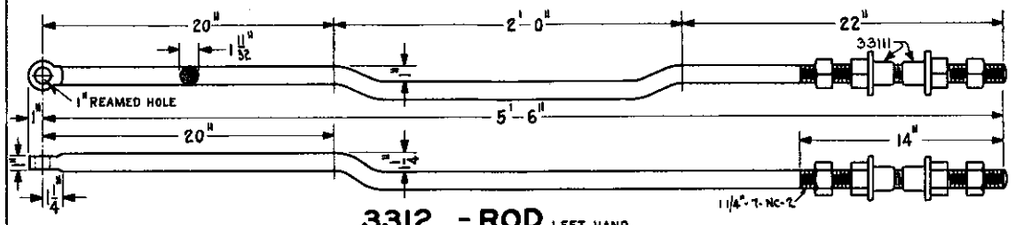
Approved
Acting Chief Engineer



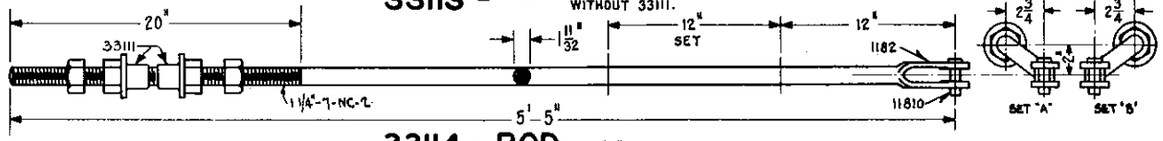
3311 - ROD RIGHT HAND.
33119 - " WITHOUT 33111.



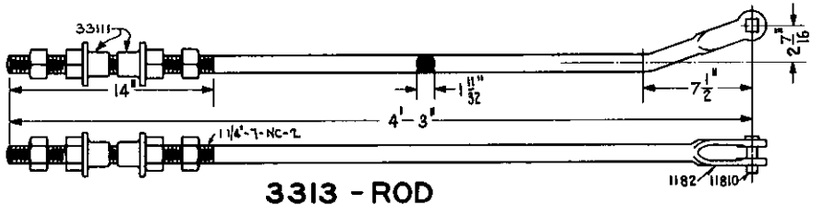
33112 - ROD
33113 - " WITHOUT 33111.



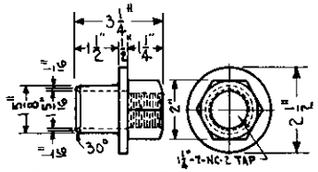
3312 - ROD LEFT HAND.
33120 - " WITHOUT 33111.



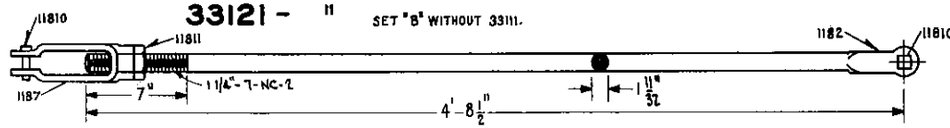
33114 - ROD SET "A".
33115 - " SET "A" WITHOUT 33111.
33116 - " SET "B"
33121 - " SET "B" WITHOUT 33111.



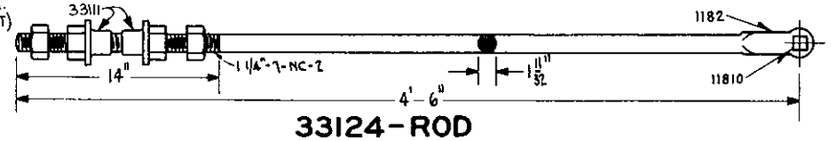
3313 - ROD
3314 - " WITHOUT 33111.



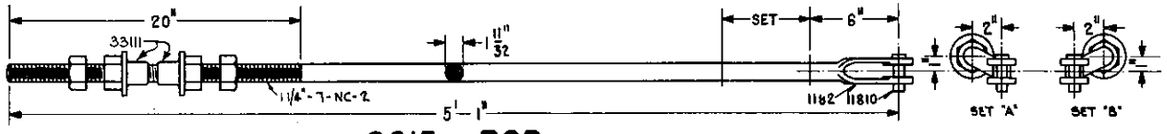
33111 - SLEEVE M.I.
(2 REQUIRED FOR EACH BASKET)



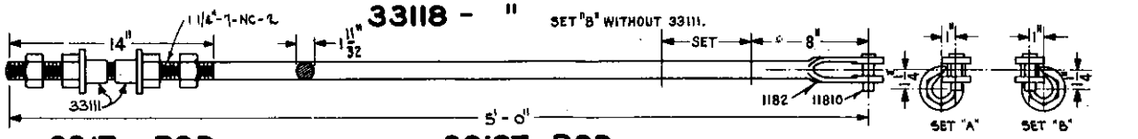
33122-ROD
33123 - " WITHOUT 1187 & 1-11810.



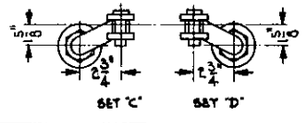
33124-ROD
33125 - " WITHOUT 33111.



3315 - ROD SET "A".
3316 - " SET "B".
3317 - " SET "A" WITHOUT 33111.
3318 - " SET "B" WITHOUT 33111.



3317 -ROD SET "A".
3318 -ROD SET "B".
3319 -ROD SET "A" WITHOUT 33111.
33110 -ROD SET "B" WITHOUT 33111.



33127-ROD SET "C".
33128-ROD SET "D".
33129-ROD SET "C" WITHOUT 33111.
33130-ROD SET "D" WITHOUT 33111.

NOTE:
1. OPERATING RODS HAVING A SET OF 1 INCH OR MORE SHALL BE HEAT TREATED TO GIVE A MINIMUM TENSILE STRENGTH OF 85,000 LBS. PER SQ. IN. AND STENCILED © FOR IDENTIFICATION. THE MARKING © TO BE PLACED ON ONE OF THE JAWS NEAR THE CENTER OF THE OUTSIDE FACE.
2. NUTS NOT OTHERWISE SPECIFIED SHALL BE 1 1/4"-7-NC-2 AMERICAN STANDARD HEAVY.
3. ALL RODS SHALL BE MADE OF OPEN HEARTH STEEL.
4. RODS 3311, 3312, 33119 & 33120 FOR USE WITH TYPE "S" SWITCH & LOCK MECHANISM.
5. RODS 3313 & 3314 FOR USE WITH E.P. DIRECT ACTING SWITCH MECHANISM.
6. RODS 3315, 3316, 33117 & 33118 FOR USE WITH STYLE "M" SWITCH & LOCK MECHANISM.
7. RODS 3317, 3318, 3319 & 33110 FOR USE WITH STYLE "A1" SWITCH & LOCK MECHANISM.
8. RODS 33112 & 33113 FOR USE WITH MODEL "5" SWITCH & LOCK MECHANISM.
9. RODS 33114 & 33115 FOR USE WITH STYLE "T-10" HAND OPERATED SWITCH MECHANISM.
10. RODS 33114, 33115, 33116 & 33121 FOR USE WITH STYLE "M2" SWITCH AND LOCK MOVEMENTS.
11. RODS 33122 & 33123 FOR USE WITH "HAYES" SLIDING DERAILS.
12. RODS 33124 & 33125 FOR USE WITH SPLIT SWITCH DERAILS.
13. RODS 33127, 33128, 33129 & 33130 FOR USE WITH STYLE "A5" SWITCH AND LOCK MECHANISM.

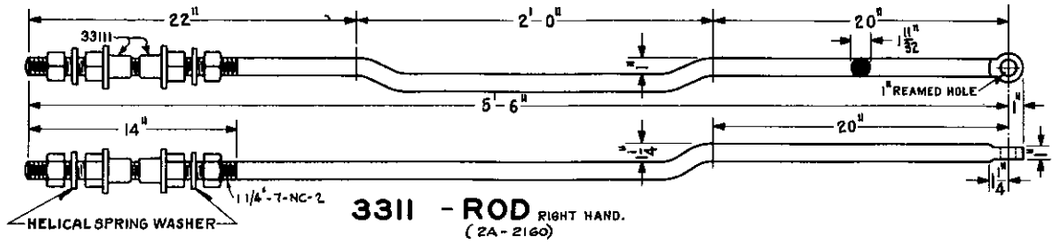
REVISIONS
REDRAWN FROM APPROVED PLAN S-331-C, DATED MAY 14, 1927 AND REVISED.
E MARCH 30, 1929. APPROVED: A.H. Rudd
F OCT. 11, 1932. APPROVED: A.H. Rudd
G JUNE 20, 1935. APPROVED: A.H. Rudd

1 SHEET S-331-G

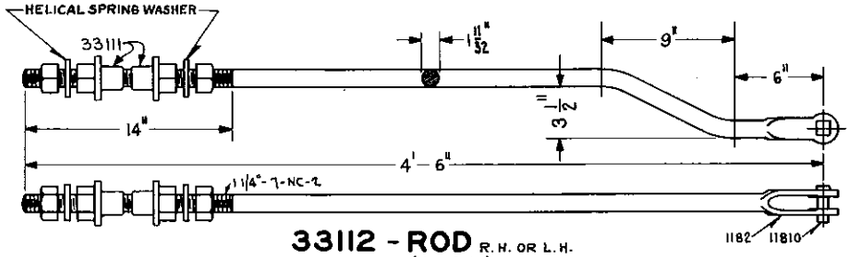
THE PENNSYLVANIA RAILROAD
STANDARD
OPERATING RODS
FOR SINGLE SWITCHES
OFFICE OF CHIEF SIGNAL ENGINEER PHILA., PA. FEB. 16, 1926

Approved A.H. Rudd Chief Signal Engineer

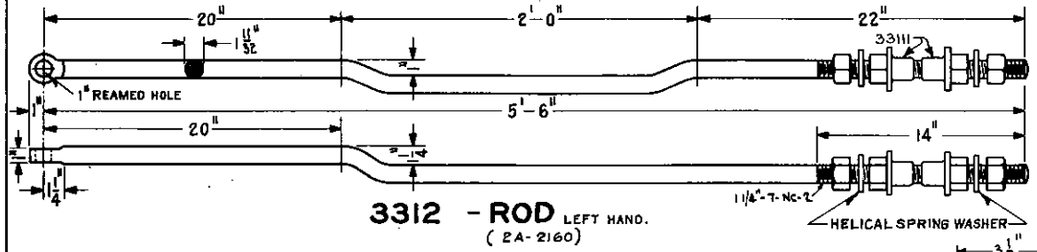
Approved [illegible] Chief Engineer



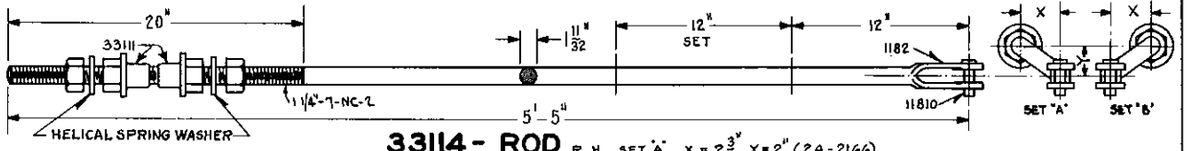
3311 - ROD RIGHT HAND.
(2A-2160)



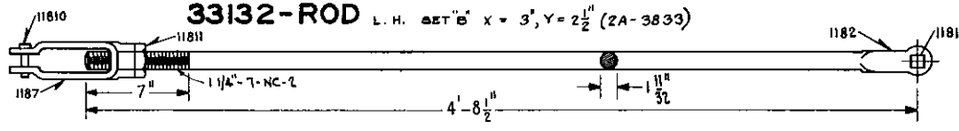
33112 - ROD R. H. OR L. H.
(2A-2165)



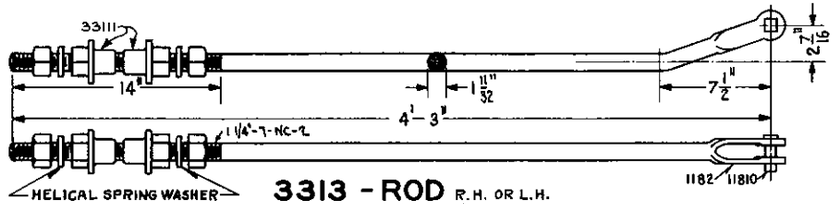
3312 - ROD LEFT HAND.
(2A-2160)



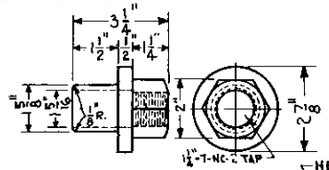
33114 - ROD R. H. SET "A" X = 2 3/4", Y = 2" (2A-2166)
33116 - ROD L. H. SET "B" X = 2 3/4", Y = 2" (2A-2172)
33131 - ROD R. H. SET "A" X = 3", Y = 2 1/2" (2A-3038)
33132 - ROD L. H. SET "B" X = 3", Y = 2 1/2" (2A-3833)



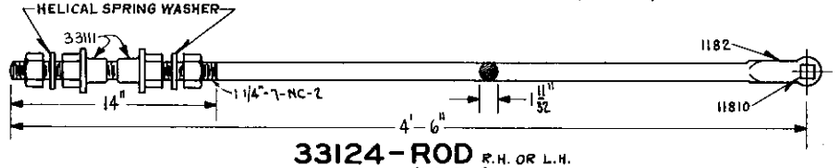
33122 - ROD R. H. OR L. H.
(2A-2173)



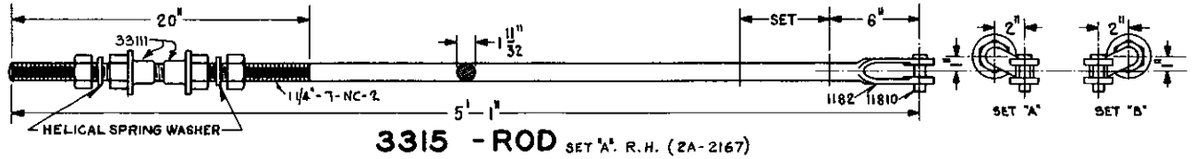
3313 - ROD R. H. OR L. H.
(2A-2161)



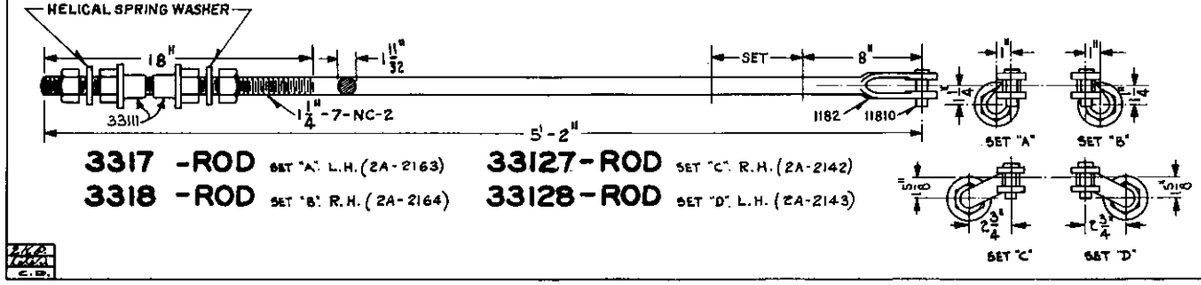
33111 - SLEEVE M.I.
(2A-2388)



33124 - ROD R. H. OR L. H.
(2A-2174)



3315 - ROD SET "A". R. H. (2A-2167)
3316 - " SET "B". L. H. (2A-2168)



3317 - ROD SET "A". L. H. (2A-2163)
3318 - ROD SET "B". R. H. (2A-2164)
33127 - ROD SET "C". R. H. (2A-2142)
33128 - ROD SET "D". L. H. (2A-2143)

NOTE:
1. OPERATING RODS HAVING A SET OF 1 INCH OR MORE SHALL BE HEAT TREATED TO GIVE A MINIMUM TENSILE STRENGTH OF 85,000 LBS. PER SQ. IN. AND STENCILED © FOR IDENTIFICATION. THE MARKING © TO BE PLACED ON ONE OF THE JAWS NEAR THE CENTER OF THE OUTSIDE FACE.
2. NUTS NOT OTHERWISE SPECIFIED SHALL BE 1 1/4-7-NC-2 AMERICAN STANDARD HEAVY.
3. ALL RODS SHALL BE MADE OF OPEN HEARTH STEEL.
4. RODS 3311 AND 3312 FOR USE WITH TYPE "B" SWITCH & LOCK MECHANISM.
5. ROD 3313 FOR USE WITH E.P. DIRECT ACTING SWITCH MECHANISM.
6. RODS 3315 AND 3316 FOR USE WITH STYLE "M" SWITCH & LOCK MECHANISM.
7. RODS 3317 AND 3318 FOR USE WITH STYLE "AI" SWITCH & LOCK MECHANISM.
8. ROD 33112 FOR USE WITH MODEL "5" SWITCH & LOCK MECHANISM.
9. ROD 33114 FOR USE WITH STYLE "T-10" HAND OPERATED SWITCH MECHANISM.
10. HELICAL SPRING WASHERS MUST CONFORM TO THE CURRENT ISSUE OF THE PENNA. R.R. CO'S. SPECIFICATION NO. C.E. 7.
11. RODS 33131 & 33132 FOR USE WITH STYLE "T-20" HAND OPERATED SWITCH MECHANISM.
12. RODS 33114 AND 33116 FOR USE WITH STYLE "M2" SWITCH AND LOCK MOVEMENTS.
13. ROD 33122 FOR USE WITH "HAYES" SLIDING DERAILS.
14. ROD 33124 FOR USE WITH SPLIT SWITCH DERAILS.
15. RODS 33127, 33128 FOR USE WITH STYLE "AS" SWITCH AND LOCK MECHANISM.
16. MANUFACTURER SHALL PAINT EACH ROD WITH ONE COAT OF A GOOD GRADE BLACK PAINT.

REVISIONS
REDRAWN FROM APPROVED PLAN S-331-C, DATED MAY 14, 1927 AND REVISED.
E MARCH 30, 1928. APPROVED:- A.H. Rudd
F OCT. 11, 1932. APPROVED:- A.H. Rudd
G JUNE 20, 1935. APPROVED:- A.H. Rudd
H DECEMBER 6, 1937. APPROVED:- N.C. Brandon
I SEPT. 5, 1946 RODS 3314, 3319, 33110, 33113, 33115, 33117, 33118, 33119, 33120, 33121, 33123, 33125, 33129 & 33130 REMOVED. 33111 REVISED (M.W. DWG. 69738-C IS OBSOLETE) NOTES 12, 13, 14, 15 WERE 11, 12, 13, 14. RODS 33131, 33132 ADDED. CAT. REF. NOS. ADDED. NOTES 11, 16 ADDED. APPROVED:-

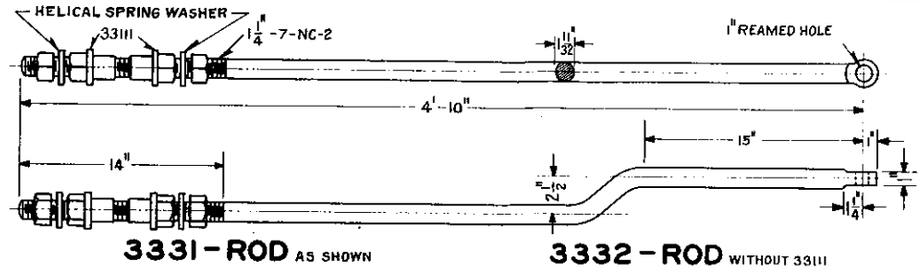
S-331-1

1 SHEET

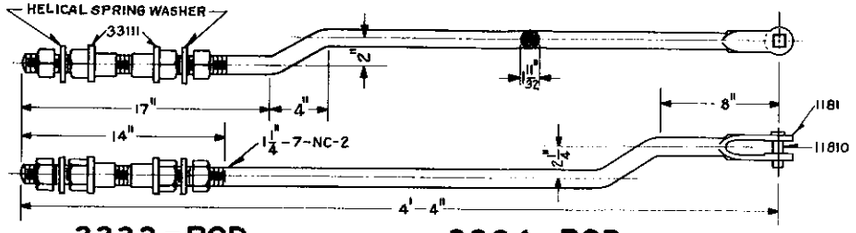
THE PENNSYLVANIA RAILROAD
STANDARD
OPERATING RODS
FOR SINGLE SWITCHES
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. FEB. 16, 1928

Approved A.H. Rudd
Chief Signal Engineer

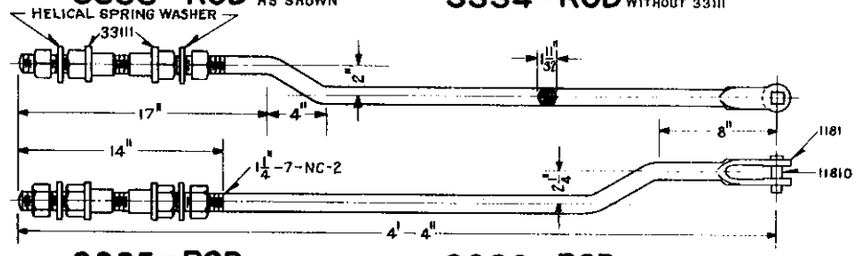
Approved W. W. Atterbury
Chief Engineer



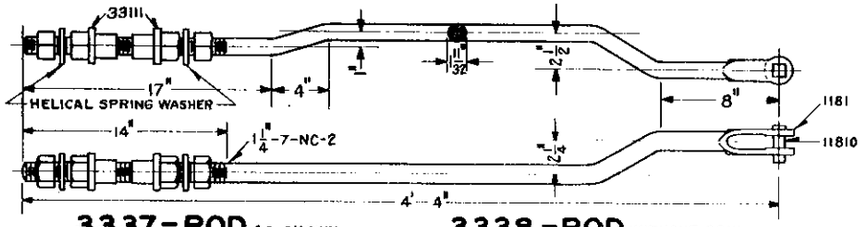
3331 – ROD AS SHOWN **3332 – ROD** WITHOUT 3311



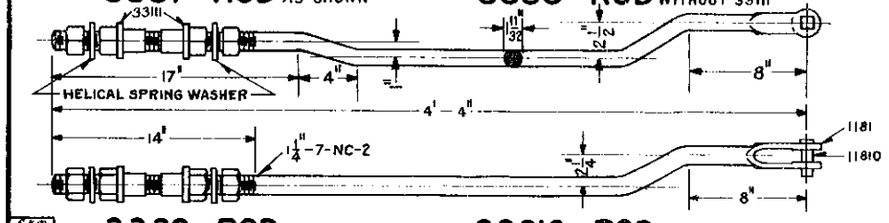
3333 – ROD AS SHOWN **3334 – ROD** WITHOUT 3311



3335 – ROD AS SHOWN **3336 – ROD** WITHOUT 3311



3337 – ROD AS SHOWN **3338 – ROD** WITHOUT 3311



3339 – ROD AS SHOWN **33310 – ROD** WITHOUT 3311

NOTE:-

1. OPERATING RODS HAVING A SET OF 1 INCH OR MORE SHALL BE HEAT TREATED TO GIVE A MINIMUM TENSILE STRENGTH OF 85,000 LBS. PER SQ. IN. AND STENCILED Ⓒ FOR INDENTIFICATION. THE MARKING Ⓒ TO BE PLACED ON ONE OF THE JAWS NEAR THE CENTER OF THE OUTSIDE FACE.
2. ALL RODS SHALL BE MADE OF OPEN HEARTH STEEL.
3. NUTS NOT OTHERWISE SPECIFIED SHALL BE 1¼"-7-NC-2 AMERICAN STANDARD HEAVY.
4. RODS 3331 & 3332 FOR USE WITH TYPE "G" MECH.
5. RODS 3333, 3334, 3335 & 3336 FOR USE WITH TYPE "A-1" MECH.
6. RODS 3337, 3338, 3339 & 33310 FOR USE WITH TYPE "A-5" MECH.
7. HELICAL SPRING WASHERS MUST CONFORM TO THE CURRENT ISSUE OF THE PENNA. R.R. COS. SPECIFICATION NO. C.E. 7.

REVISIONS
REDRAWN FROM APPROVED PLAN S-333-A, DATED MAY 12, 1924 AND REVISED.
C DEC. 6, 1937.
APPROVED: N. C. Newton

1 SHEET

S-333-C

THE PENNSYLVANIA RAILROAD

STANDARD

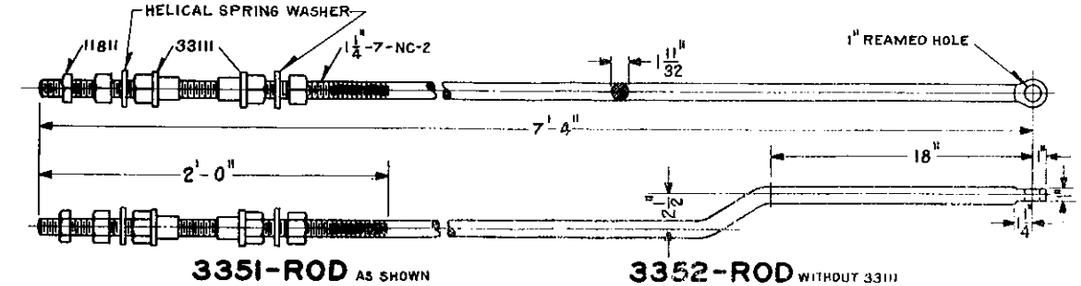
OPERATING RODS

FOR DOUBLE SLIP SWITCHES

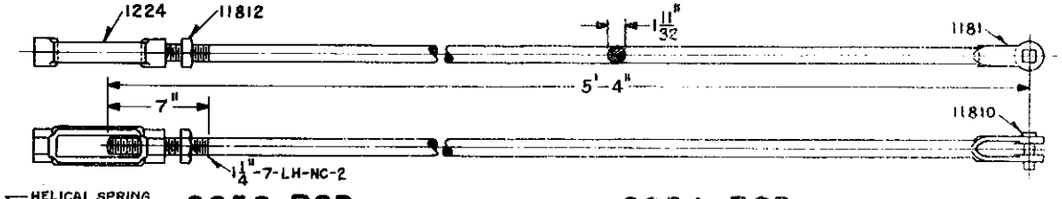
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., NOV. 12, 1936

Approved A.H. Rudd
Chief Signal Engineer

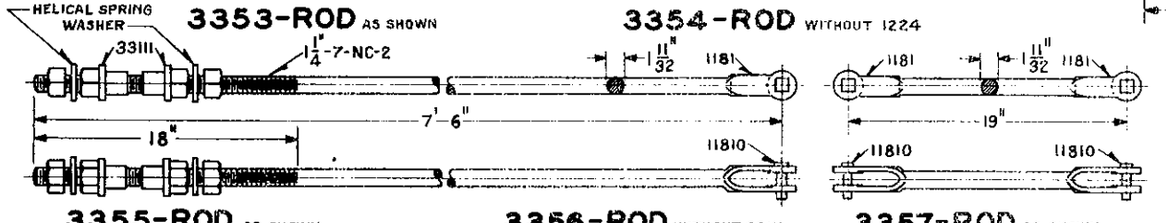
Approved W. W. Higgins
Chief Engineer



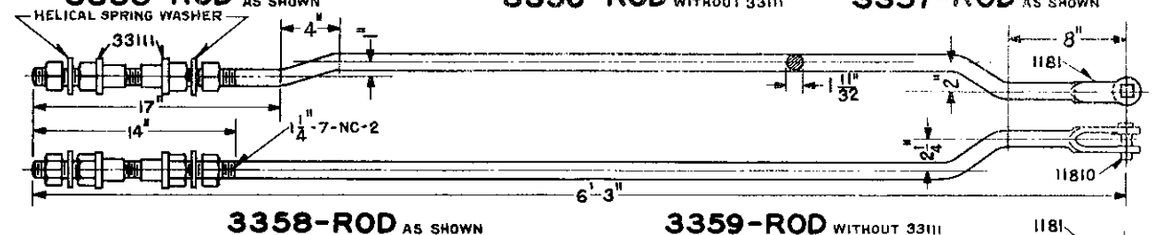
3351-ROD AS SHOWN



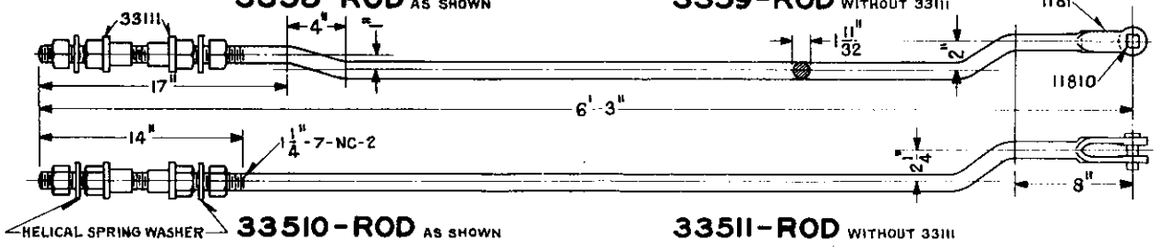
3353-ROD AS SHOWN



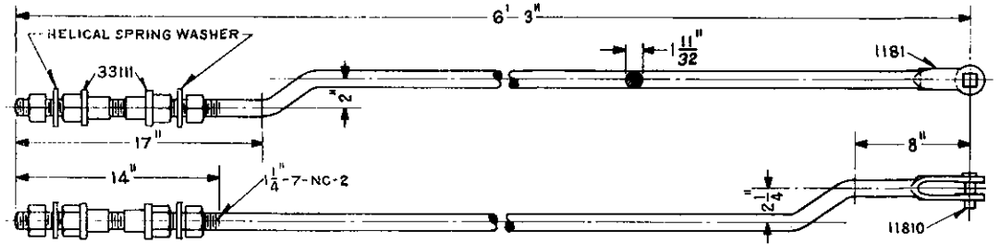
3355-ROD AS SHOWN



3358-ROD AS SHOWN

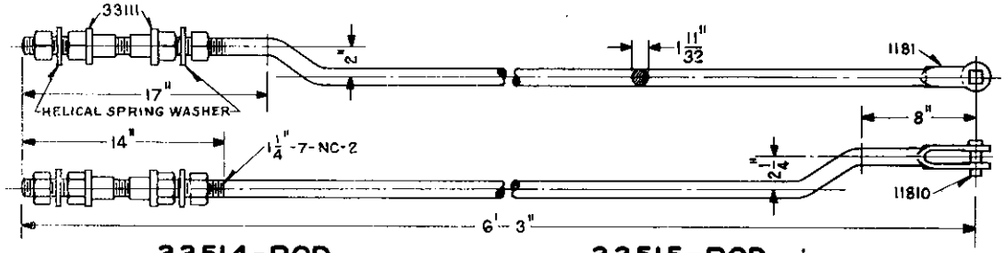


33510-ROD AS SHOWN



33512-ROD AS SHOWN

33513-ROD WITHOUT 33111



33514-ROD AS SHOWN

33515-ROD WITHOUT 33111

3354-ROD WITHOUT 1224

3356-ROD WITHOUT 33111

3357-ROD AS SHOWN

3359-ROD WITHOUT 33111

33511-ROD WITHOUT 33111

NOTE:-

1. OPERATING RODS HAVING A SET OF 1 INCH OR MORE SHALL BE HEAT TREATED TO GIVE A MINIMUM TENSILE STRENGTH OF 85,000 LBS. PER SQ. IN. AND STENCILED Ⓒ FOR INDENTIFICATION. THE MARKING Ⓒ TO BE PLACED ON ONE OF THE JAWS NEAR THE CENTER OF THE OUTSIDE FACE.
2. ALL RODS SHALL BE MADE OF OPEN HEARTH STEEL.
3. NUTS NOT OTHERWISE SPECIFIED SHALL BE 1¼"-7-NC-2 AMERICAN STANDARD HEAVY.
4. RODS 3351 TO 3357 INCL. FOR USE WITH TYPE "S" MECH.
5. RODS 3358 TO 33511 INCL. FOR USE WITH TYPE "A-1" MECH.
6. RODS 33512 TO 33515 INCL. FOR USE WITH TYPE "A-S" MECH.
7. HELICAL SPRING WASHERS MUST CONFORM TO THE CURRENT ISSUE OF THE PENNA.R.R.CO'S. SPECIFICATION NO. C.E.7.

REVISIONS
REDRAWN FROM APPROVED PLAN S-335-A DATED MAY 12, 1924 AND REVISED.
C DECEMBER 6, 1937.
APPROVED: W. C. Hendrickson

1 SHEET

S-335-C

THE PENNSYLVANIA RAILROAD

STANDARD

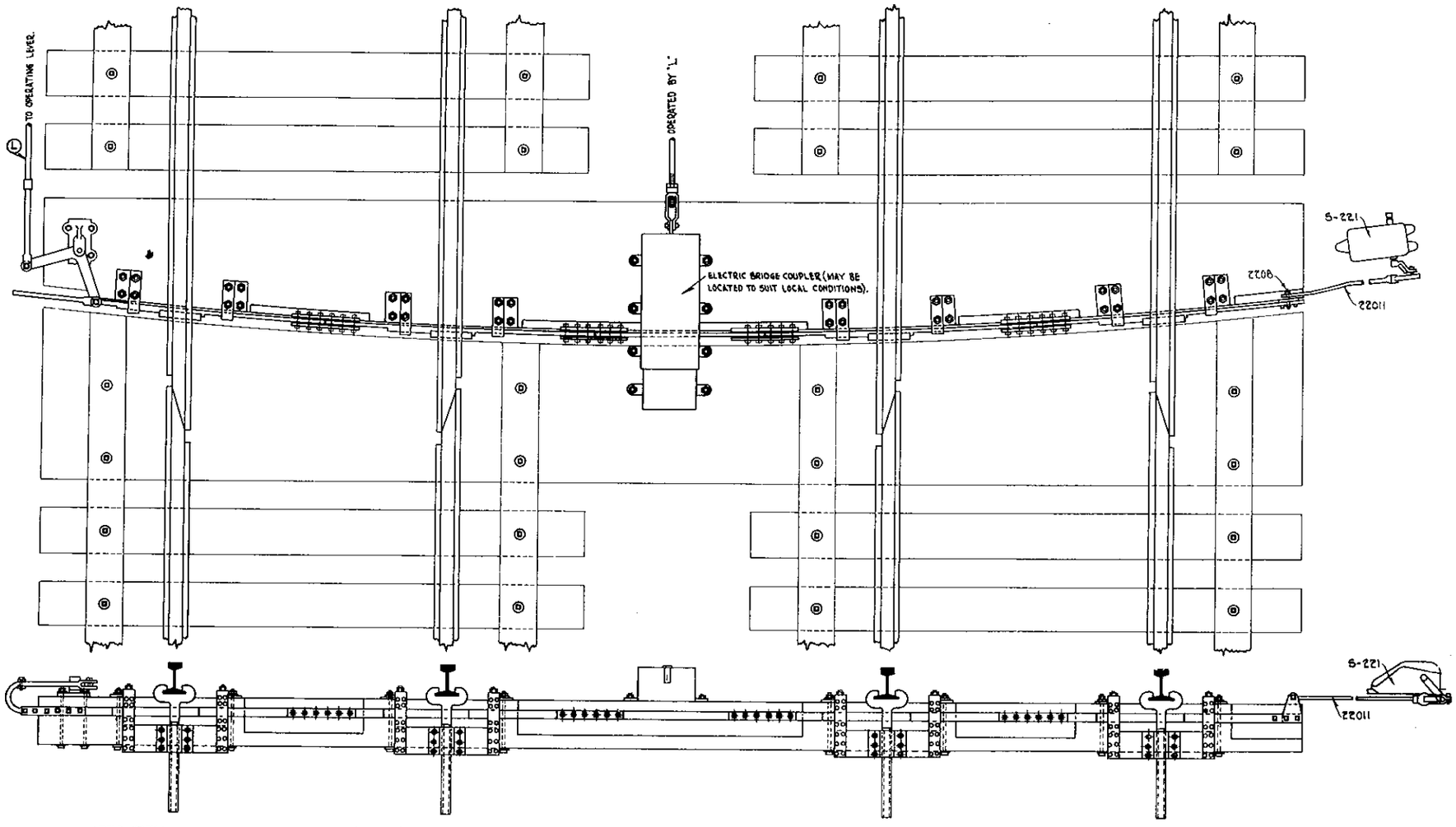
OPERATING RODS

FOR M.P. FROGS

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., NOV. 12, 1936.

Approved
A. H. Rudd
Chief Signal Engineer

Approved
W. W. Gibbons
Chief Engineer



-: FIELD WORK :-

1. A CIRCUIT CONTROLLER, PLAN S-221, SHALL BE CONNECTED TO AND OPERATED BY EACH DRAW WEDGE, DRAW LATCH, RAIL LIFT BEAM AND RAIL LOCK BAR. THE CIRCUIT CONTROLLER OPERATED BY RAIL LOCK BAR MUST BE CONNECTED AT FARTHEST POINT FROM OPERATING LEVER.

2. WHEN LOCKED, THE LOCKING BLOCK ON RAIL LOCK BAR, SHALL PASS 4" BEYOND FAR SIDE OF LOCKING TONGUE, WHEN UNLOCKED IT SHALL CLEAR LOCKING TONGUE 2".

3. CIRCUIT CONTROLLERS OPERATED BY DRAW WEDGES, DRAW LATCHES AND RAIL LOCK BARS SHALL BE ADJUSTED TO MAKE CONTACTS IN BOTH LOCKED AND UNLOCKED POSITIONS, CONTROLLERS OPERATED BY RAIL LIFT BEAM SHALL MAKE CONTACTS IN COMPLETE RAISED POSITION ONLY.

4. INSULATION SHALL BE PLACED IN PIPE LINES AND CONNECTIONS, IF NECESSARY, TO PREVENT THE GROUNDING OR SHUNTING OF TRACK CIRCUITS.

-: ENGINEERING REQUIREMENTS :-

1. (a) FOR SINGLE TRACK DRAW, USE ONE LEVER FOR LOCKING RAILS BOTH ENDS OF DRAW AND OPERATING ELECTRIC BRIDGE COUPLERS.

(b) FOR TWO TRACK DRAW, USE SEPARATE LEVER FOR LOCKING RAILS AND OPERATING ELECTRIC BRIDGE COUPLERS FOR EACH END.

2. (a) CIRCUITS THRU CIRCUIT CONTROLLERS SHALL BE SO ARRANGED THAT ALL RAILS MUST BE UNLOCKED (ELECTRIC BRIDGE COUPLERS BEING WITHDRAWN AT SAME TIME) BEFORE DRAW WEDGES AND DRAW LATCHES CAN BE WITHDRAWN AND RAIL LIFT BEAM CAN BE RAISED. DRAW WEDGES MUST BE ENTIRELY WITHDRAWN AND DRAW LATCHES AND RAIL LIFT BEAM RAISED PROPERLY BEFORE POWER CAN BE APPLIED TO SWING DRAW.

(b) IN RETURNING DRAW TO NORMAL POSITION CIRCUITS SHALL BE SO ARRANGED THAT DRAW MUST BE CENTERED WITH DRAW LATCH ENTIRELY DOWN BEFORE DRAW WEDGES CAN BE DRIVEN; DRAW WEDGES MUST BE DRIVEN PROPERLY AND RAIL LIFT BEAM DROPPED IN PLACE BEFORE LEVER OPERATING RAIL LOCKS AND ELECTRIC BRIDGE COUPLERS CAN BE OPERATED.

(c) TO MAKE THIS PROCEDURE IMPERATIVE, THE LOCK AND INDICATION CIRCUITS SHALL BE SO INTERCONNECTED WITH THE DRAW WEDGE AND SWING CONTROLS THAT ALL OPERATIONS OF SIGNAL AND DRAW MACHINERY MUST SUCCEED EACH OTHER IN THE PROPER PREDETERMINED ORDER.

3. THE CONTROLLING FONCTIONS OF OTHER TYPES OF DRAWBRIDGES SHALL CONFORM TO THESE SAME GENERAL PRINCIPLES.

REVISIONS

1 SHEET

S-371-A

THE PENNSYLVANIA RAILROAD

STANDARD

DRAWBRIDGE LOCKING FOR CENTER PIVOT DRAW

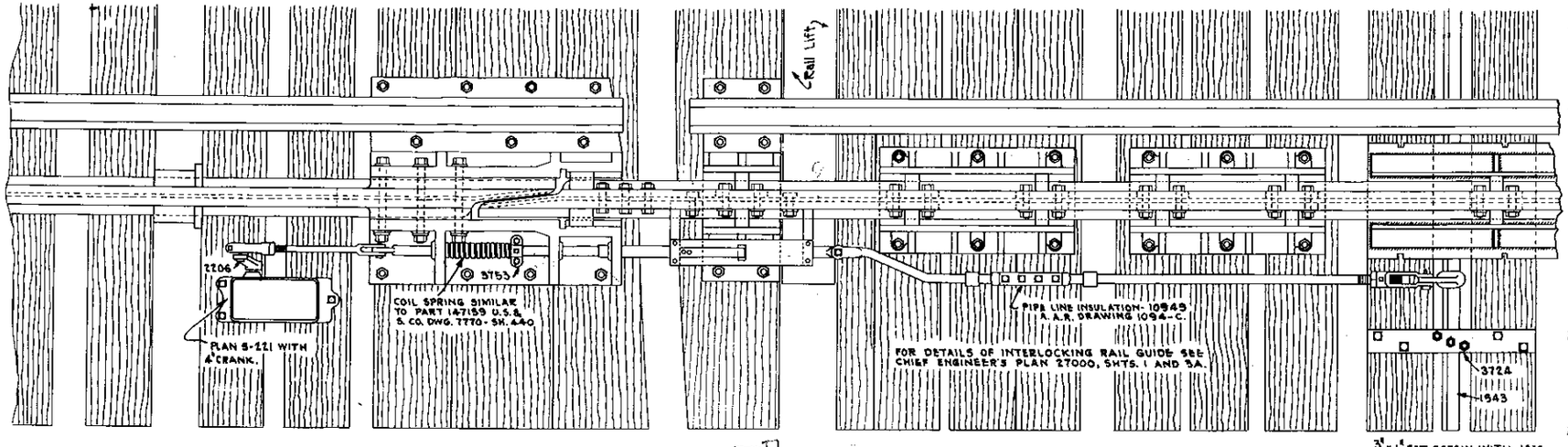
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. MAY 23, 1932

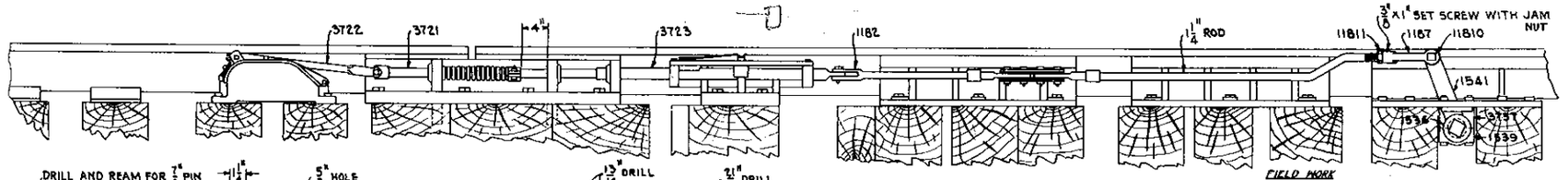
Approved

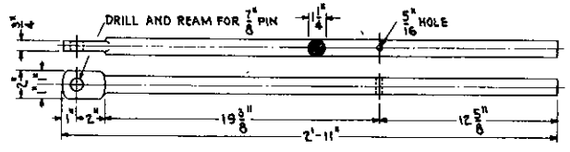
Chief Signal Engineer

Approved

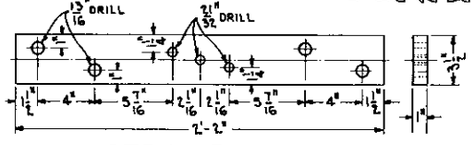
Chief Engineer



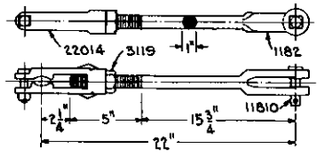




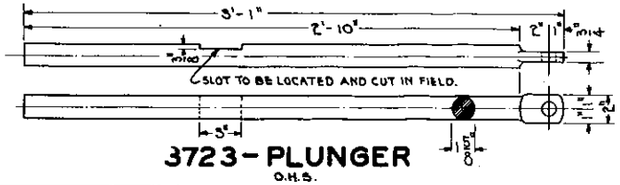
3721 – PLUNGER
O.H.S.



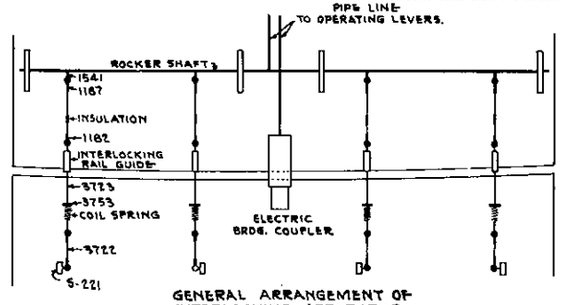
3724 – PLATE
O.H.S.



3722 – CONNECTOR



3723 – PLUNGER
O.H.S.



GENERAL ARRANGEMENT OF INTERLOCKING APPARATUS.

ENGINEERING REQUIREMENTS

1. (a) FOR EACH FOUR RAIL LOCKS, USE ONE LEVER, AND A SEPARATE LEVER FOR OPERATING THE ELECTRIC BRIDGE COUPLERS.
(b) PROVIDE MECHANICAL OR ELECTRICAL LOCKING SO THAT THE RAIL LOCKING LEVER MUST BE IN THE UNLOCKED POSITION BEFORE THE LEVER FOR OPERATING THE ELECTRIC BRIDGE COUPLER IS PUT NORMAL (COUPLER DISENGAGED).
2. (a) CIRCUITS SHALL BE SO ARRANGED THAT ALL RAILS MUST BE UNLOCKED, ELECTRIC BRIDGE COUPLERS WITHDRAWN BEFORE POWER CAN BE APPLIED TO WITHDRAW WEDGES AND RAISE LATCHES AND LIFT BEAMS. DRAW WEDGES MUST BE ENTIRELY WITHDRAWN AND DRAW LATCHES AND RAIL LIFT BEAMS RAISED PROPERLY BEFORE POWER BE APPLIED TO SWING DRAW.
(b) IN RETURNING DRAW TO CLOSED POSITION, CIRCUITS SHALL BE SO ARRANGED THAT DRAW MUST BE CENTERED WITH DRAW LATCH ENTIRELY DOWN BEFORE DRAW WEDGES CAN BE DRIVEN; DRAW WEDGES MUST BE DRIVEN PROPERLY AND RAIL LIFT BEAMS DROPPED IN PLACE BEFORE LEVERS OPERATING ELECTRIC BRIDGE COUPLERS AND RAIL LOCKS CAN BE THROWN.
(c) TO MAKE THE PROCEDURE OUTLINED EFFECTIVE, THE CIRCUITS SHALL BE SO INTERCONNECTED WITH THE DRAW WEDGE AND SWING CONTROLS THAT ALL OPERATIONS OF SIGNAL AND DRAW MACHINERY MUST SUCCEED EACH OTHER IN THE FOLLOWING PREDETERMINED ORDER:—

TO OPEN DRAW

(a) SIGNALS AND SMASHBOARD NORMAL.
(b) TROLLEY CARRIERS WHEN REQUIRED, OPEN.
(c) RAIL LOCKS WITHDRAWN.
(d) BRIDGE COUPLERS WITHDRAWN.
(e) WITHDRAW WEDGES, RAISE RAILS AND LATCHES.
(f) TURN BRIDGE.

TO CLOSE DRAW

THE ABOVE ORDER OF OPERATION SHALL BE REVERSED.

FIELD WORK

1. A CIRCUIT CONTROLLER, PLAN S-221, SHALL BE CONNECTED TO AND OPERATED BY EACH DRAW WEDGE, DRAW LATCH, RAIL LIFT BEAM AND RAIL LOCK PLUNGER FOLLOWER. CIRCUIT CONTROLLERS SHALL BE CONNECTED TO EACH TROLLEY CLOSING DEVICE WHEN REQUIRED. ELECTRIC OR MECHANICAL LOCKING SHALL BE PROVIDED TO LOCK THE BRIDGE AND RAIL OPERATING CLUTCHES IN PROPER SEQUENCE.
2. ELECTRICAL BRIDGE COUPLERS SHALL BE EQUIPPED WITH CONTACTS TO INDICATE WHEN THE COUPLER IS NORMAL (COUPLER DISENGAGED) AND REVERSE (COUPLER CLOSED).
3. WHEN LOCKED, THE RAIL LOCKING PLUNGER SHALL ENTER LOCKING HOLE FULL THICKNESS OF BRIDGE SEAT CASTING, LESS 1/4", WHEN UNLOCKED IT SHALL CLEAR THE LOCKING HOLE, NOT LESS THAN 3 INCHES.
4. CIRCUIT CONTROLLERS OPERATED BY DRAW WEDGES, DRAW LATCHES AND RAIL LOCKING PLUNGERS, SHALL BE ADJUSTED TO MAKE CONTACTS IN BOTH THE LOCKED AND UNLOCKED POSITIONS; CONTROLLERS OPERATED BY THE RAIL LIFT BEAM SHALL MAKE CONTACTS IN RAISED AND SEATED POSITIONS.
5. INSULATION SHALL BE PLACED IN PIPE LINES AND CONNECTIONS, IF NECESSARY, TO PREVENT THE GROUNDING OR SHUNTING OF TRACK CIRCUITS.
6. CIRCUIT CONTROLLERS CONNECTED TO WEDGES SHALL BE SO ADJUSTED THAT THE CIRCUITS WILL OPEN IF WEDGES ARE NOT FULLY DRIVEN, OR IF DRIVEN TOO FAR.

REVISIONS	
B AUGUST 16, 1937	R.L.S.

APPROVED: N.W. Stanton

FOR USE WITH 131 lb R.E. OR 152 lb P.S. RAILS.

1 SHEET

S-372-B

THE PENNSYLVANIA RAILROAD
STANDARD

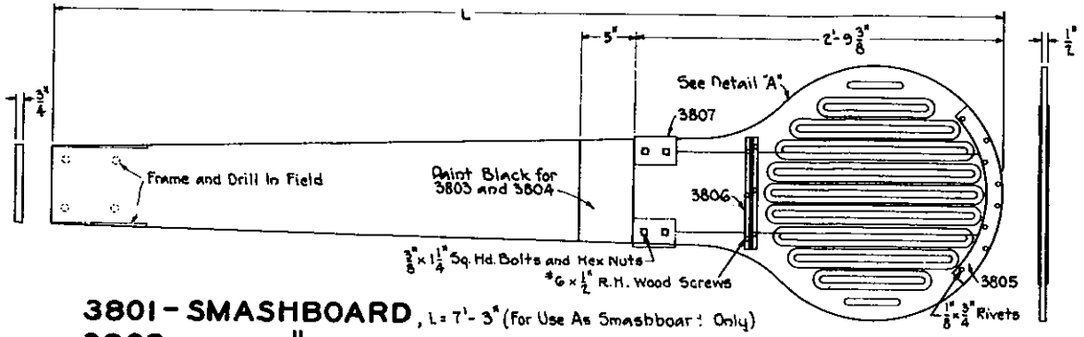
DRAWBRIDGE LOCKING

FOR CENTER PIVOT DRAW

Office of Chief Signal Engineer, Phila., Pa., May 14, 1935.

Approved: A.H. Rudd — Chief Signal Engineer

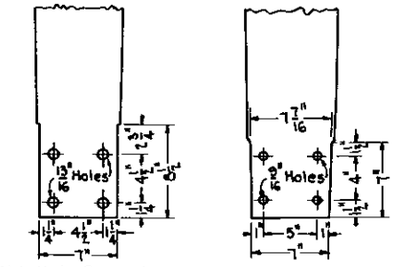
Approved: N.W. Stanton — Chief Engineer



3801 - SMASHBOARD, L = 7'- 3" (For Use As Smashboard Only)
3802 - " , L = As Specified (For Use As Smashboard Only)
3803 - " , L = 7'- 3" (For Use As Combined Signal and Smashboard)
3804 - " , L = As Specified (For Use As Combined Signal and Smashboard)

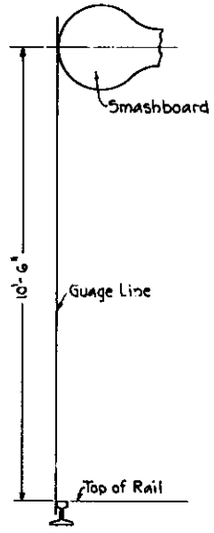
Paint 3801 and 3802 - Black all over.
Paint 3803 and 3804 - {Front, Medium Chrome Yellow with Black Stripe. Back and Edges, Black.

When installed as 3803 or 3804, the usual semaphore lamp must be provided showing Green when board is Clear, Red for all other positions.

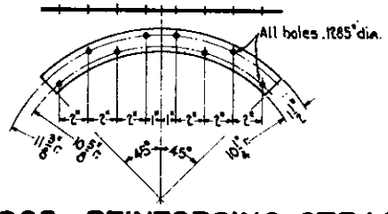


Old Style Semaphore A.A.R. Sig. Sec. Semaphore

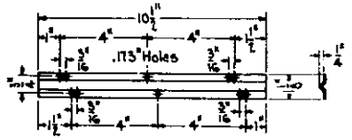
FRAMING AND DRILLING OF BOARDS



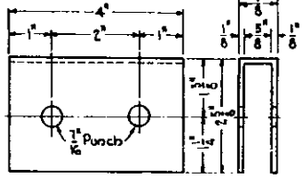
TYPICAL INSTALLATION



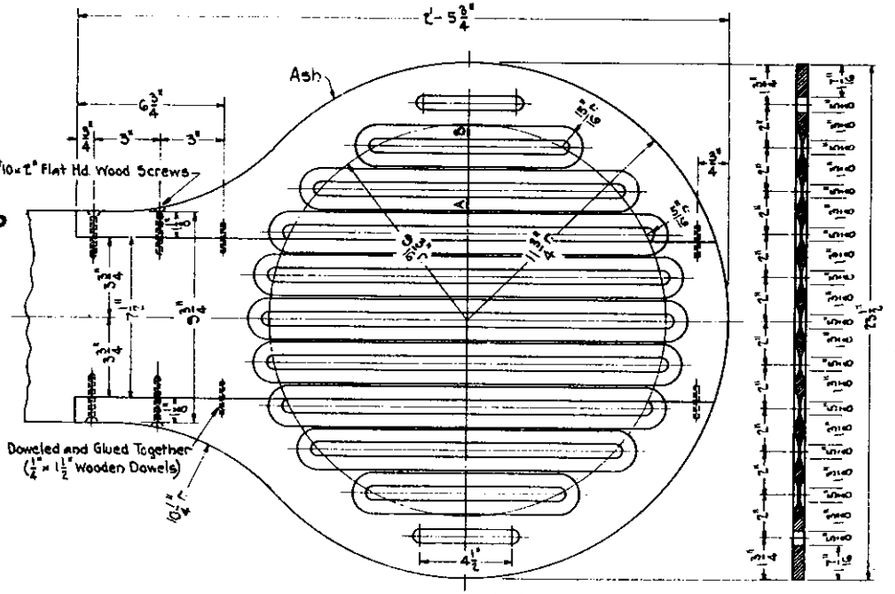
3805 - REINFORCING STRAP
(#14 Galv. Iron)



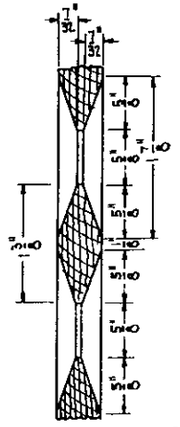
3806 - REINFORCING STRAP
(#16 Annealed Steel)



3807 - CLAMP (Sheet Steel)



DETAIL "A"



SECTION "AB" (Enlarged)

Revisions

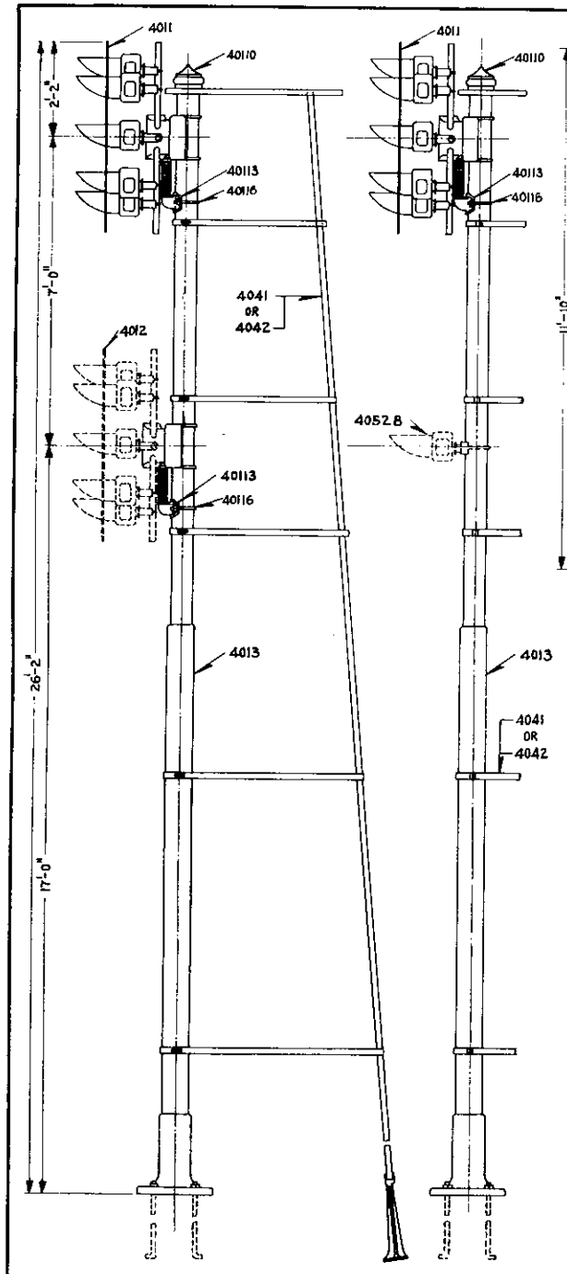
1 Sheet S-380-A

THE PENNSYLVANIA RAILROAD
STANDARD

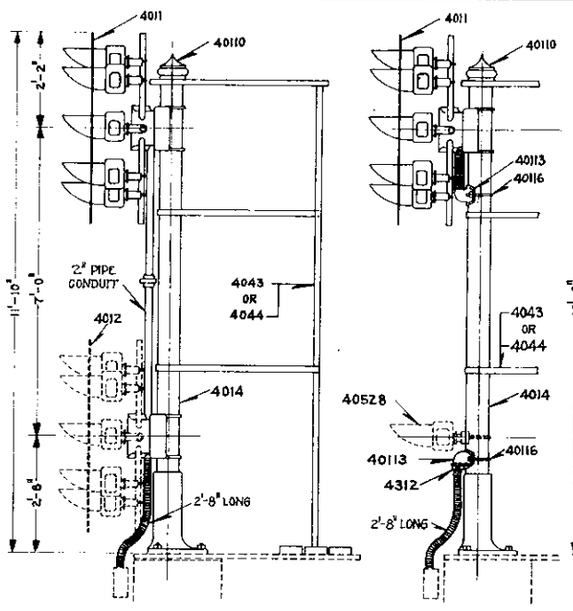
SMASHBOARDS

Office of Chief Signal Engineer, Phila., Pa., July 25, 1936.

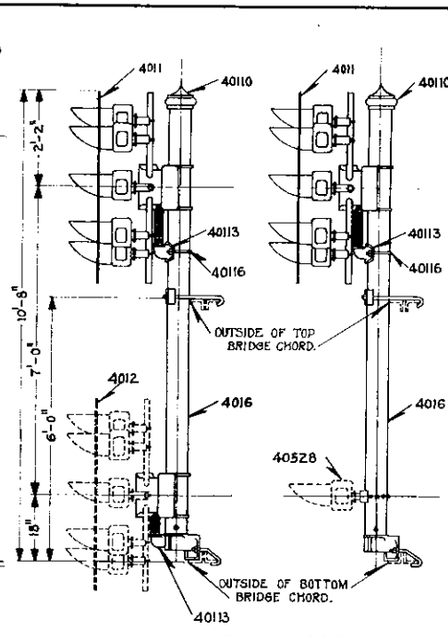
Approved: A. H. Rudd, Chief Signal Engineer
Approved: W. S. Higgins, Acting Chief Engineer



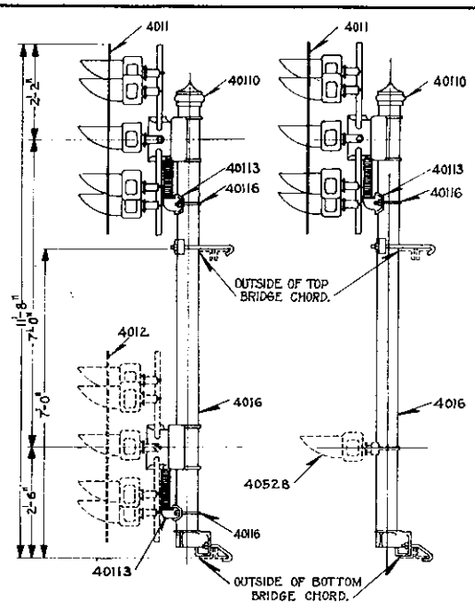
4001 – SIGNAL



4002 – SIGNAL
(FOR STANDARD CANTILEVER)

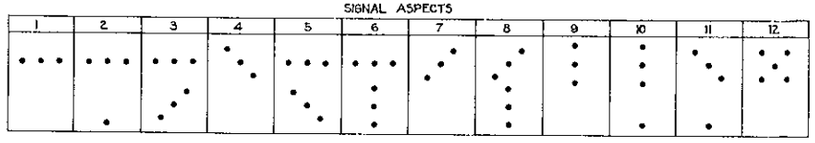


4004 – SIGNAL
(FOR 2, 3 OR 4 TRACK BRIDGE)



4005 – SIGNAL
(FOR 5 OR 6 TRACK BRIDGE)

SIGNAL ASPECTS



NOTES:-

1. WHERE ASPECT NO. 5 IS USED ON SIGNAL 4001, LOCATED BETWEEN TRACKS, THE TRACKS SHALL BE NOT LESS THAN 19'-0" CENTERS.
2. CIRCULAR BACKGROUND SHALL BE FURNISHED FOR TOP ARM OF ALL SIGNALS, EXCEPT AS PROVIDED IN NOTE 5.
3. BACKGROUND 4012 SHALL BE FURNISHED FOR BOTTOM ARM, ONLY WHERE ASPECT NO. 6 OR NO. 8 IS TO BE DISPLAYED.
4. ALL OPENINGS IN BACKGROUND SHALL BE CUT; THOSE NOT USED SHALL BE COVERED WITH SHEET IRON DISCS.
5. USE 4002 WHERE PRACTICABLE, WITHOUT BACKGROUND, FOR TAKE SIDING INDICATOR – ASPECT NO. 12.
6. SIGNALS SHALL BE COMPLETE WITH HUB, NECESSARY RADIAL PIPING, JUNCTION BOX, BACKGROUND, LAMP UNITS AS ORDERED, BOLTS, ETC., FOR INSTALLATION, EXCEPT FOUNDATION BOLTS AND STEEL CHANNELS.
7. FOR BRIDGES SPANNING MORE THAN 6 TRACKS, CROSS SECTION OF BRIDGE SHOULD ACCOMPANY ORDER.
8. FOR ARRANGEMENT OF TERMINALS SEE STANDARD PLAN S-858.
9. WHEN ORDERING SIGNALS SPECIFY FIGURE NUMBER, TOGETHER WITH ASPECTS DESIRED.
10. WHERE NO DETAIL REFERENCE IS SHOWN, THE MANUFACTURER'S STANDARD APPARATUS SHALL BE FURNISHED.
11. DRILL MAST FOR WIRES, ONLY AS REQUIRED FOR ASPECTS ORDERED.
12. WHERE DEPTH OF BRIDGE CHORD IS OTHER THAN THAT SHOWN ON 4004 OR 4005, THE ACTUAL DEPTH SHOULD BE SPECIFIED ON ORDER.

REVISIONS
REDRAWN FROM APPROVED PLAN S-400-D, DATED 2-17-27 AND REVISED.

1 SHEET

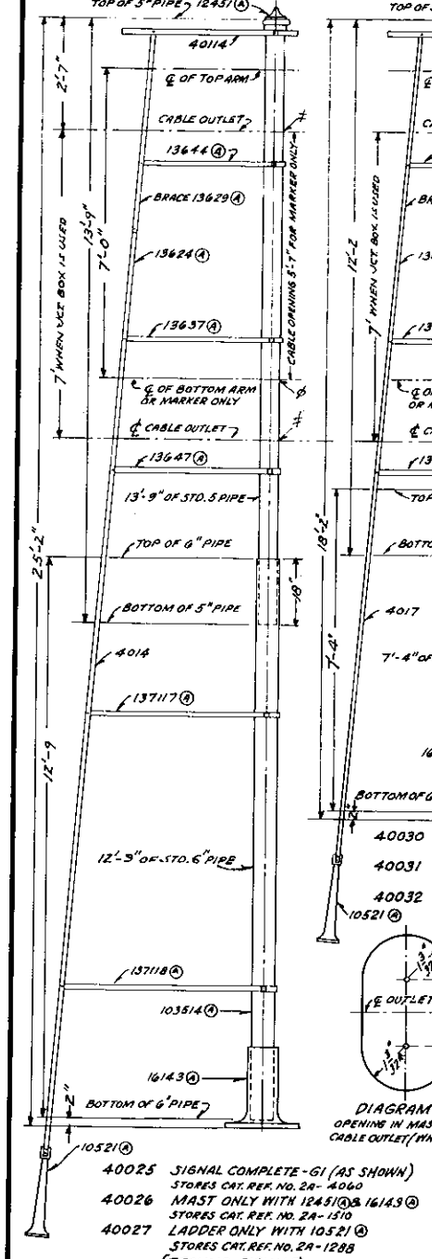
S-400-E

THE PENNSYLVANIA RAILROAD
STANDARD
SIGNALS
POSITION LIGHT

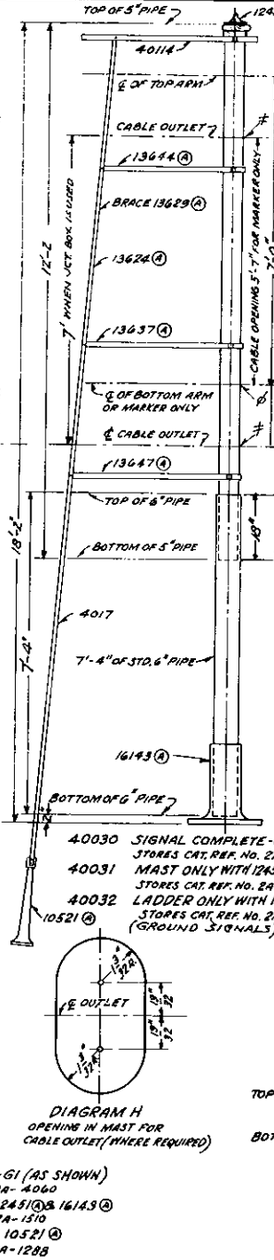
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. NOV. 10, 1927

Approved
Chief Signal Engineer

Approved
Chief Engineer

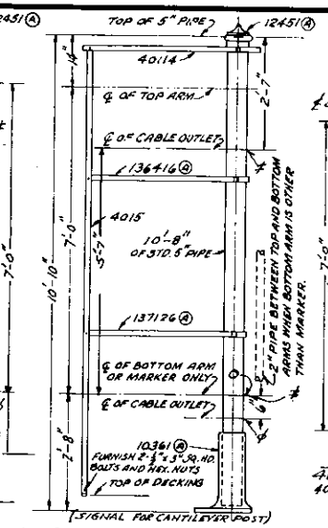


40025 SIGNAL COMPLETE-G1 (AS SHOWN)
STORES CAT. REF. NO. 2A- 4060
40026 MAST ONLY WITH 12451 (A) & 16143 (A)
STORES CAT. REF. NO. 2A- 1510
40027 LADDER ONLY WITH 10521 (A)
STORES CAT. REF. NO. 2A-1288
(GROUND SIGNALS)



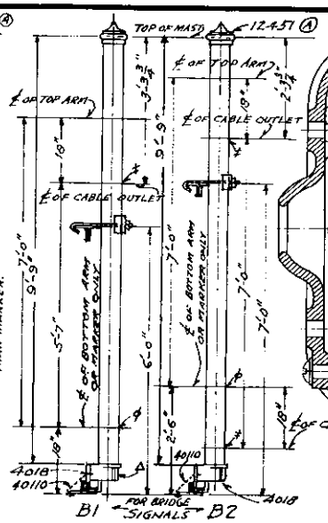
40030 SIGNAL COMPLETE-G2 (AS SHOWN)
STORES CAT. REF. NO. 2A- 4061
40031 MAST ONLY WITH 12451 (A) & 16143 (A)
STORES CAT. REF. NO. 2A- 1512
40032 LADDER ONLY WITH 10521 (A)
STORES CAT. REF. NO. 2A-1292
(GROUND SIGNALS)

DIAGRAM H
OPENING IN MAST FOR CABLE OUTLET (WHERE REQUIRED)



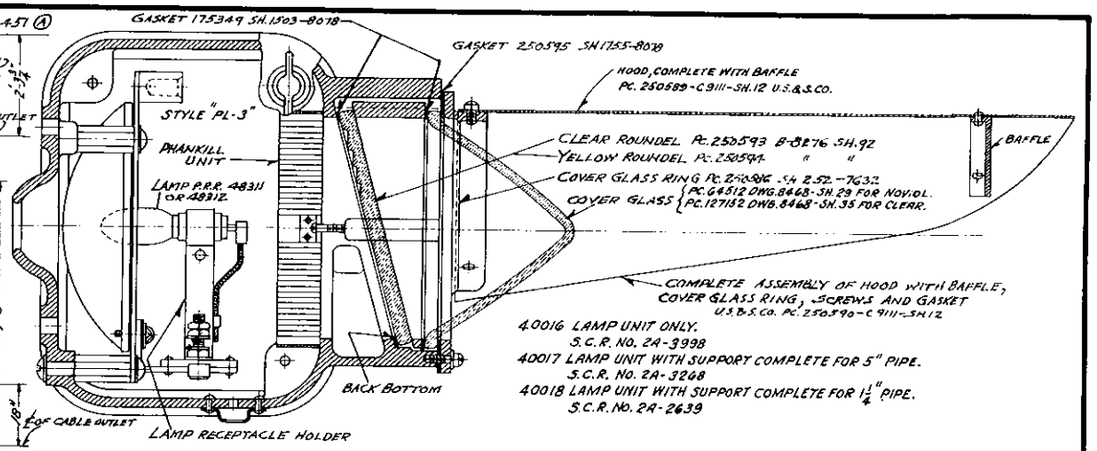
(SIGNAL FOR CANTILEVER POST)

40035 SIGNAL COMPLETE - C1 (AS SHOWN)
STORES CAT. REF. NO. 2A - 4062
40036 MAST ONLY WITH 12451 (A) & 10361 (A)
STORES CAT. REF. NO. 2A - 1511
40037 LADDER ONLY
STORES CAT. REF. NO. 2A-1290

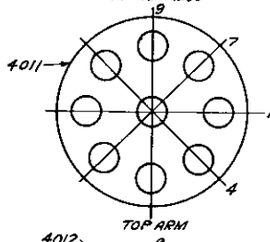


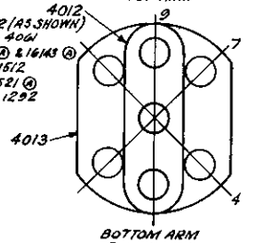
40040 SIGNAL COMPLETE - B1 (AS SHOWN)
FOR 1-2-3-4 TRACK TRUSS BRIDGE
STORES CAT. REF. NO. 2A - 4063
40041 MAST ONLY WITH 4018 & 12451 (A)
STORES CAT. REF. NO. 2A-4063

40045 SIGNAL COMPLETE-B2 (AS SHOWN)
FOR 5-6 TRACK TRUSS BRIDGE
STORES CAT. REF. NO. 2A - 4064
40046 MAST ONLY WITH 4018 & 12451 (A)
STORES CAT. REF. NO. 2A - 4060



40016 LAMP UNIT ONLY.
S.C.R. NO. 2A-3998
40017 LAMP UNIT WITH SUPPORT COMPLETE FOR 5" PIPE.
S.C.R. NO. 2A-3268
40018 LAMP UNIT WITH SUPPORT COMPLETE FOR 1¼" PIPE.
S.C.R. NO. 2A-2639





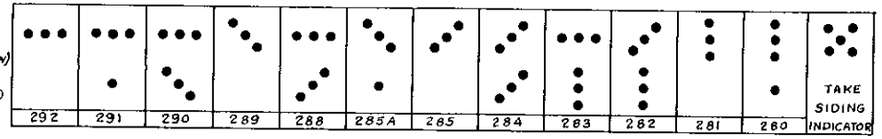
TOP ARM :-
BACKGROUND 4011 SHALL BE APPLIED FOR ANY ASPECT, OR COMBINATION OF ASPECTS.
BOTTOM ARM :-
BACKGROUND 4012 SHALL BE APPLIED FOR ASPECT 9, AND FOR ASPECT 7 IF NOT IN COMBINATION WITH ASPECT 7 OF TOP ARM.
BACKGROUND 4013 SHALL BE APPLIED WHERE ASPECT 7 IS IN COMBINATION WITH ASPECT 7 OF TOP ARM. DUE TO LOCAL CONDITIONS, BACKGROUND 4013 MAY BE APPLIED TO BOTTOM ARM HAVING ANY ASPECTS.

TABLE-O

ORDERING REFERENCES FOR SIGNAL ARMS COMPLETE — LESS MAST AND LADDER — SEE DIAGRAM D

ORDER NUMBER	ASPECT 3 TOP ARM	ASPECT 3 BOTTOM ARM	S.C.R. 2A —
4001	1		4352
4002	4		
4003	7		
4004	9		4350
4005	1-4		
4006	1-7		4368
4007	1-9		4355
4008	1-4-7		
4009	1-4-9		4374
40010	1-7-9		4356
40011	1-4-7-9		4358
40012	4-7		4353
40013	4-9		
40014	4-7-9		4357
40015	7-9		4354
SEE NOTE 9 A		4	4364
B		7	4328
C		9	4359
D		4-7	4363
E		4-9	4361
F		4-7-9	4362
G		7-9	4360
H	MARKER 40017		3268

ASPECTS



292	291	290	289	288	285A	285	284	283	282	281	280	TAKE SIDING INDICATOR

NOTES:

1. SIGNALS INDICATED IN DIAGRAM D, WITH ASPECTS SPECIFIED IN TABLE O, SHALL BE COMPLETE WITH HUB, NECESSARY RADIAL ARMS, TERMINAL BOX, FLEXIBLE CONDUIT, CABLE OUTLET, WIRING BETWEEN TERMINAL BOX AND LIGHT UNITS, BACKGROUND AS INDICATED, BOLTS, NUTS ETC. COMPLETE FOR ATTACHING TO 5" MAST, UNLESS OTHERWISE SPECIFIED. USE ORDER NUMBER FOR TOP ARM AND LETTER FOR BOTTOM ARM.
2. SIGNALS G1-G2-C1-B1 OR B2 SHALL BE COMPLETE WITH MAST, HUB, RADIAL PIPING, TERMINAL BOX ETC. AS SPECIFIED IN NOTE 1 (EXCEPT FOR MARKER UNIT ONLY), BACKGROUND, LADDER COMPLETE, LAMP UNITS AS ORDERED FROM TABLE O, BOLTS, NUTS, ETC. READY FOR INSTALLATION. (No LADDER FURNISHED WITH B1 OR B2).
3. ALL OPENINGS IN BACKGROUNDS SHALL BE CUT, THOSE NOT USED SHALL BE COVERED WITH COPPER BEARING SHEET STEEL DISCS.
4. TAKE SIDING INDICATOR SHALL NOT BE PROVIDED WITH BACKGROUND.
5. SIGNALS FOR BRIDGES SPANNING MORE THAN SIX TRACKS AND WHERE DEPTH OF CHORDS IS OTHER THAN 6 FT. OR 7 FT. ARE SPECIAL; CROSS-SECTION OF BRIDGE CHORDS SHALL ACCOMPANY ORDER.
6. FOR ARRANGEMENT OF TERMINALS IN JUNCTION BOX, SEE PRR. DRAWING S-888.
7. WHERE NO DETAIL REFERENCE IS SHOWN, THE MANUFACTURER'S STANDARD APPARATUS SHALL BE FURNISHED.
8. WHEN REQUIRED, DRILL 5" MAST FOR WIRE AND CABLE OUTLETS AS INDICATED IN DIAGRAM H.
9. WHEN ORDERING TOP OR BOTTOM ARM ONLY, REQUISITION SHOULD SPECIFY WHICH IS DESIRED USING TABLE O FOR ASPECTS, AND STATE FOR APPLICATION TO 1¼" PIPE OR TO 5" PIPE.
10. WHERE SIGNAL G1 OR G2 IS LOCATED BETWEEN TRACKS, THE CENTER LINES OF THE TRACKS MUST BE SPACED AT LEAST 25 FT. CENTER TO CENTER.
11. IF SPECIAL COMBINATIONS ARE DESIRED FOR ROUNDEL AND COVER GLASS, SPECIFY ON ORDER.
12. ALL METAL PARTS, EXCEPT FRONT OF BACKGROUNDS AND LAMP UNITS, SHALL BE PAINTED IN ACCORDANCE WITH A.A.R. 316. SEC. SPECIFICATION 120-50, M.R. 110.
13. FACE OF BACKGROUNDS AND LAMP UNITS SHALL BE PAINTED WITH A FINISH COAT OF DUCO 249-408 S.C.R. 47-2020 OR RUSTOLEUM R-412 S.C.R. 47-3208.

SYMBOLS

⌀ - OPENINGS REQUIRED FOR MARKER ONLY.
⌀ - " ALWAYS REQUIRED FOR TOP ARM, AND FOR BOTTOM ARM WHEN IT IS OTHER THAN MARKER ONLY.
△ - FLEXIBLE DUCT BETWEEN CABLE OUTLET AND BOTTOM ARM. (FURNISHED BY RAILROAD)
(A) - INDICATES A.A.R. SIGNAL SECTION DRAWING.

REVISIONS

REDRAWN FROM APPROVED DRAWING S-400-E, DATED NOV. 10, 1927 AND REVISED 4-00-30, 40031, 40032, TABLE O, DIAGRAMS D & H, UNITS 40016, 40017 & 40018 AND REFS. TO A.A.R. PARTS ADDED. NOTES REVISED.

1 SHEET

S-400-F

THE PENNSYLVANIA RAILROAD

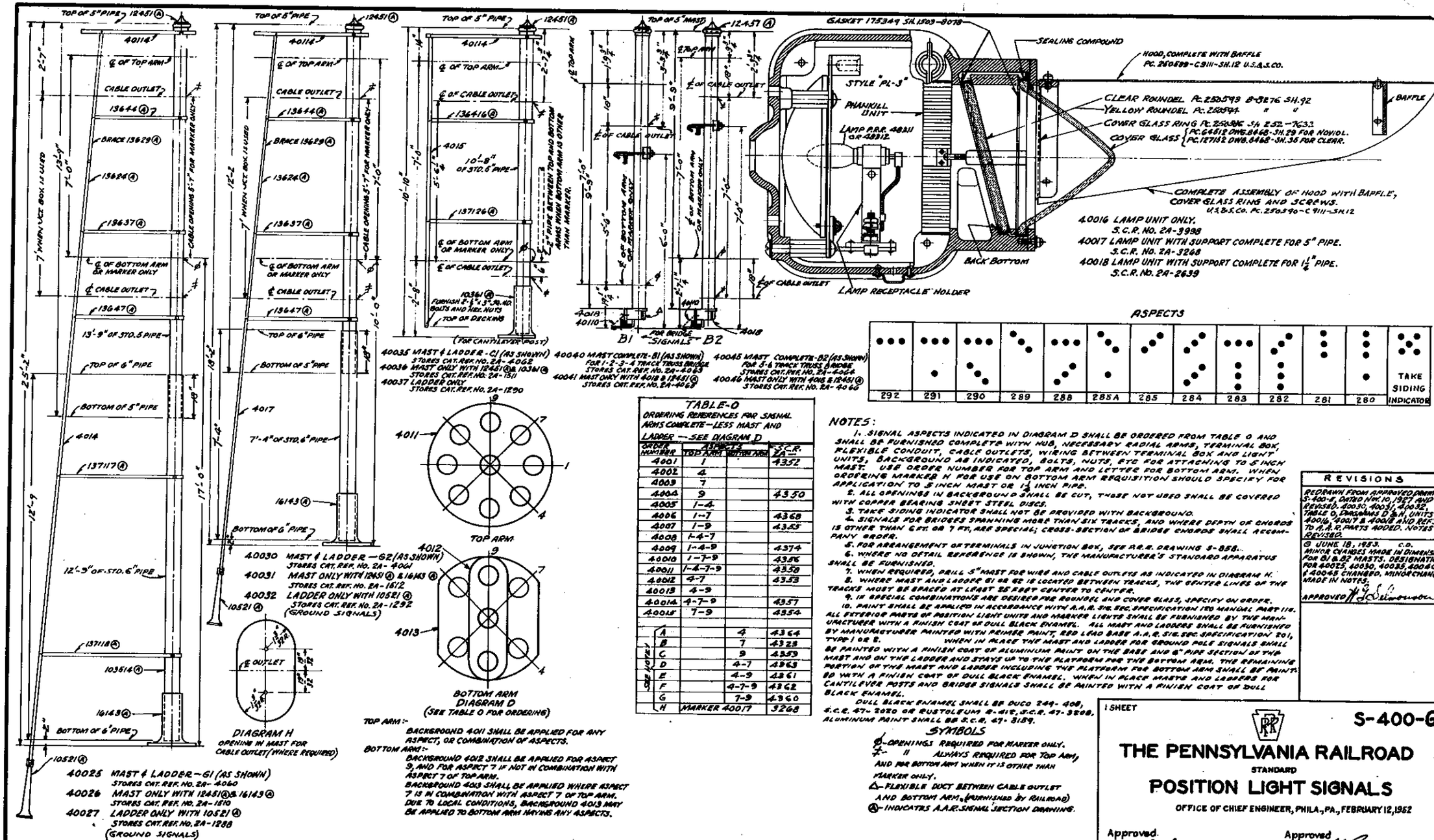
STANDARD

POSITION LIGHT SIGNALS

OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 12, 1952

Approved
W. G. Salmonson
Assistant Chief Engineer-Signals

Approved
J. W. Smith
Chief Engineer



ASPECTS

292	291	290	289	288	285A	285	284	283	282	281	280	TAKE SIDING INDICATOR

TABLE-O

ORDERING REFERENCES FOR SIGNAL ARMS COMPLETE — LESS MAST AND LADDER — SEE DIAGRAM D

	ORDER NUMBER	ASPECTS TOP ARM	ASPECTS BOTTOM ARM	S.C.R. 2A —
	4001	1		4352
	4002	4		
	4003	7		
	4004	9		4350
	4005	1-4		
	4006	1-7		4368
	4007	1-9		4355
	4008	1-4-7		
	4009	1-4-9		4374
	4010	1-7-9		4356
	4011	1-4-7-9		4358
	4012	4-7		4353
	4013	4-9		
	4014	4-7-9		4357
	4015	7-9		4354
SEE NOTE 7	A		4	4364
	B		7	4328
	C		9	4359
	D		4-7	4363
	E		4-9	4361
	F		4-7-9	4362
	G		7-9	4360
	H	MARKER 4001 7		3268

TOP ARM:- BACKGROUND 4011 SHALL BE APPLIED FOR ANY ASPECT, OR COMBINATION OF ASPECTS.

BOTTOM ARM:- BACKGROUND 4012 SHALL BE APPLIED FOR ASPECT 9, AND FOR ASPECT 7 IF NOT IN COMBINATION WITH ASPECT 7 OF TOP ARM. BACKGROUND 4013 SHALL BE APPLIED WHERE ASPECT 7 IS IN COMBINATION WITH ASPECT 7 OF TOP ARM. DUE TO LOCAL CONDITIONS, BACKGROUND 4019 MAY BE APPLIED TO BOTTOM ARM HAVING ANY ASPECTS.

NOTES:

1. SIGNAL ASPECTS INDICATED IN DIAGRAM D SHALL BE ORDERED FROM TABLE O AND SHALL BE FURNISHED COMPLETE WITH HUB, NECESSARY RADIAL ARMS, TERMINAL BOX, FLEXIBLE CONDUIT, CABLE OUTLETS, WIRING BETWEEN TERMINAL BOX AND LIGHT UNITS, BACKGROUND AS INDICATED, BOLTS, NUTS, ETC FOR ATTACHING TO 5 INCH MAST. USE ORDER NUMBER FOR TOP ARM AND LETTER FOR BOTTOM ARM. WHEN ORDERING MARKER H FOR USE ON BOTTOM ARM REQUISITION SHOULD SPECIFY FOR APPLICATION TO 5 INCH MAST OR 1¼ INCH PIPE.
2. ALL OPENINGS IN BACKGROUND SHALL BE CUT, THOSE NOT USED SHALL BE COVERED WITH COPPER BEARING SHEET STEEL DISCS.
3. TAKE SIGNAL INDICATOR SHALL NOT BE PROVIDED WITH BACKGROUND.
4. SIGNALS FOR BRIDGES SPANNING MORE THAN SIX TRACKS, AND WHERE DEPTH OF CHORDS IS OTHER THAN 6 FT. OR 7 FT., ARE SPECIAL; CROSS-SECTION OF BRIDGE CHORDS SHALL ACCOMPANY ORDER.
5. FOR ARRANGEMENT OF TERMINALS IN JUNCTION BOX, SEE A.R.A. DRAWING S-858.
6. WHERE NO DETAIL REFERENCE IS SHOWN, THE MANUFACTURER'S STANDARD APPARATUS SHALL BE FURNISHED.
7. WHEN REQUIRED, DRILL 5" MAST FOR WIRE AND CABLE OUTLETS AS INDICATED IN DIAGRAM H.
8. WHERE MAST AND LADDER G1 OR G2 IS LOCATED BETWEEN TRACKS, THE CENTER LINES OF THE TRACKS MUST BE SPACED AT LEAST 25 FEET CENTER TO CENTER.
9. IF SPECIAL COMBINATIONS ARE DESIRED FOR ROUNDEL AND COVER GLASS, SPECIFY ON ORDER.
10. PAINT SHALL BE APPLIED IN ACCORDANCE WITH A.R.A. SPEC. SPECIFICATION 120 MANUAL PART 1.16. ALL EXTERIOR PARTS OF POSITION LIGHT UNITS AND MARKER LIGHTS SHALL BE FURNISHED BY THE MANUFACTURER WITH A FINISH COAT OF DULL BLACK ENAMEL. ALL MAST AND LADDERS SHALL BE FURNISHED BY MANUFACTURER PAINTED WITH PRIMER PAINT, RED LEAD BASE A.A.R. SPEC. SPECIFICATION 201, TYPE 1 OR 2. WHEN IN PLACE THE MAST AND LADDER FOR GROUND POLE SIGNALS SHALL BE PAINTED WITH A FINISH COAT OF ALUMINUM PAINT ON THE BASE AND 6" PIPE SECTION OF THE MAST AND ON THE LADDER AND STAYS UP TO THE PLATFORM FOR THE BOTTOM ARM. THE REMAINING PORTION OF THE MAST AND LADDER INCLUDING THE PLATFORM FOR BOTTOM ARM SHALL BE PAINTED WITH A FINISH COAT OF DULL BLACK ENAMEL. WHEN IN PLACE MASTS AND LADDERS FOR CANTILEVER POSTS AND BRIDGE SIGNALS SHALL BE PAINTED WITH A FINISH COAT OF DULL BLACK ENAMEL.

DULL BLACK ENAMEL SHALL BE DUCO 249-408, S.C.R. 47-2220 OR RUSTOLEUM 8-412, S.C.R. 47-3208, ALUMINUM PAINT SHALL BE S.C.R. 47-3189.

SYMBOLS

⊙ - OPENINGS REQUIRED FOR MARKER ONLY.
⊙ " " ALWAYS REQUIRED FOR TOP ARM, AND FOR BOTTOM ARM WHEN IT IS OTHER THAN MARKER ONLY.
△ - FLEXIBLE DUCT BETWEEN CABLE OUTLET AND BOTTOM ARM. (FURNISHED BY RAILROAD)
Ⓐ - INDICATES A.A.R. SIGNAL SECTION DRAWING.

REVISIONS

REDRAWN FROM APPROVED DRAWING S-400-F, DATED NOV. 10, 1927 AND REVISED. 40030, 40031, 40032, TABLE O, DIAGRAMS D & H, UNITS 4001G, 4001T & 4002E AND REF'S. TO A.A.R. PARTS ADDED. NOTES REVISED.

G JUNE 18, 1953. C.O. MINOR CHANGES MADE IN DIAGRAMS FOR G1 & G2 MASTS, DESIGNATION FOR 40025, 40030, 40035, 40040 & 40045 CHANGED, MINOR CHANGES MADE IN NOTES.

APPROVED H. G. Salmonson

1 SHEET

S-400-6

THE PENNSYLVANIA RAILROAD

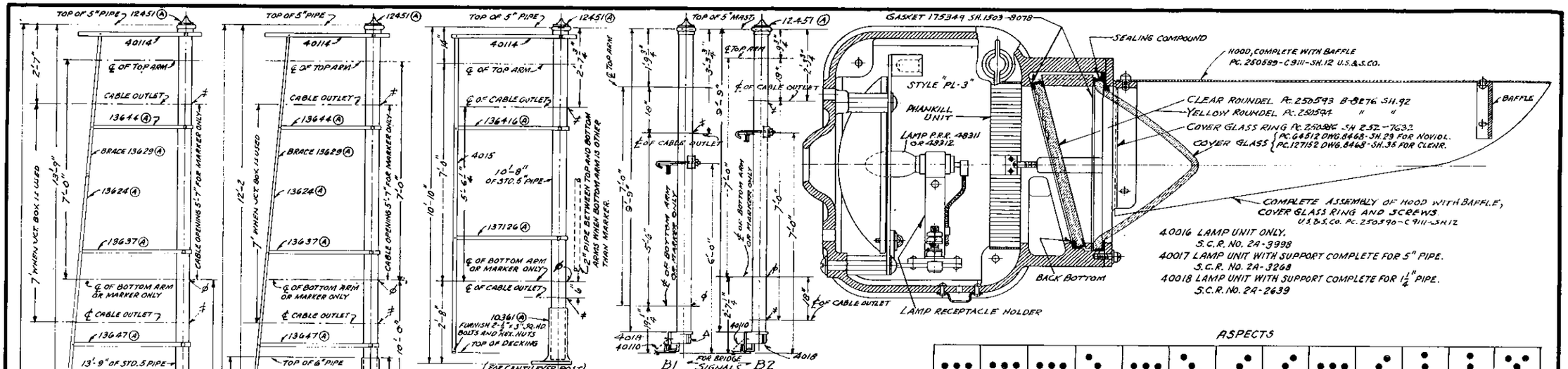
STANDARD

POSITION LIGHT SIGNALS

OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 12, 1952

Approved. H. G. Salmonson
Assistant Chief Engineer-Signals

Approved J. Minnitt
Chief Engineer



40025 MAST & LADDER – G1 (AS SHOWN) STORES CAT. REF. NO. 2A-4060
40026 MAST ONLY WITH 12451 (A) & 16143 (A) STORES CAT. REF. NO. 2A-1510
40027 LADDER ONLY WITH 10521 (A) STORES CAT. REF. NO. 2A-1288 (GROUND SIGNALS)

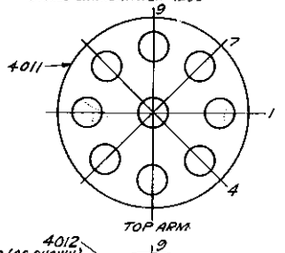
DIAGRAM H
OPENING IN MAST FOR CABLE OUTLET (WHERE REQUIRED)

40030 MAST & LADDER – G2 (AS SHOWN) STORES CAT. REF. NO. 2A-4061
40031 MAST ONLY WITH 12451 (A) & 16143 (A) STORES CAT. REF. NO. 2A-1512
40032 LADDER ONLY WITH 10521 (A) STORES CAT. REF. NO. 2A-1292 (GROUND SIGNALS)

40035 MAST & LADDER – C1 (AS SHOWN) STORES CAT. REF. NO. 2A-4062
40036 MAST ONLY WITH 12451 (A) & 10361 (A) STORES CAT. REF. NO. 2A-1511
40037 LADDER ONLY STORES CAT. REF. NO. 2A-1290

40040 MAST COMPLETE – B1 (AS SHOWN) FOR 1-2-3-4 TRACK TRUSS BRIDGE STORES CAT. REF. NO. 2A-4063
40041 MAST ONLY WITH 4018 & 12451 (A) STORES CAT. REF. NO. 2A-4065

40045 MAST COMPLETE – B2 (AS SHOWN) FOR 5-6 TRACK TRUSS BRIDGE STORES CAT. REF. NO. 2A-4064
40046 MAST ONLY WITH 4018 & 12451 (A) STORES CAT. REF. NO. 2A-4066



TOP ARM :-
BACKGROUND 4011 SHALL BE APPLIED FOR ANY ASPECT, OR COMBINATION OF ASPECTS.

BOTTOM ARM :-
BACKGROUND 4012 SHALL BE APPLIED FOR ASPECT 9, AND FOR ASPECT 7 IF NOT IN COMBINATION WITH ASPECT 7 OF TOP ARM.
BACKGROUND 4013 SHALL BE APPLIED WHERE ASPECT 7 IS IN COMBINATION WITH ASPECT 7 OF TOP ARM.
DUE TO LOCAL CONDITIONS, BACKGROUND 4013 MAY BE APPLIED TO BOTTOM ARM HAVING ANY ASPECTS.

ASPECTS

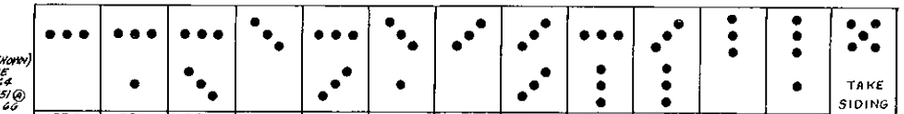


TABLE-O
ORDERING REFERENCES FOR SIGNAL ARMS COMPLETE – LESS MAST AND LADDER – SEE DIAGRAM D

ORDER NUMBER	ASPECTS TOP ARM	ASPECTS BOTTOM ARM	S.C.R. 2A-
4001	1		4352
4002	4		
4003	7		
4004	9		4350
4005	1-4		
4006	1-7		4368
4007	1-9		4355
4008	1-4-7		
4009	1-4-9		4374
4010	1-7-9		4356
4011	1-4-7-9		4358
4012	4-7		4353
4013	4-9		
4014	4-7-9		4357
4015	7-9		4354
SEE NOTE 6 A		4	4364
B		7	4323
C		9	4359
D		4-7	4363
E		4-9	4361
F		4-7-9	4362
G		7-9	4360
H	MARKER 40017		9268

NOTES:
1. SIGNAL ASPECTS INDICATED IN DIAGRAM D SHALL BE ORDERED FROM TABLE O AND SHALL BE FURNISHED COMPLETE WITH HUB, NECESSARY RADIAL ARMS, TERMINAL BOX, FLEXIBLE CONDUIT, CABLE OUTLETS, WIRING BETWEEN TERMINAL BOX AND LIGHT UNITS, BACKGROUND AS INDICATED, BOLTS, NUTS, ETC FOR ATTACHING TO 5 INCH MAST. USE ORDER NUMBER FOR TOP ARM AND LETTER FOR BOTTOM ARM. WHEN ORDERING MARKER H FOR USE ON BOTTOM ARM REQUISITION SHOULD SPECIFY FOR APPLICATION TO 5 INCH MAST OR 1¼ INCH PIPE.
2. ALL OPENINGS IN BACKGROUND SHALL BE CUT, THOSE NOT USED SHALL BE COVERED WITH COPPER BEARING SHEET STEEL DISCS.
3. TAKE SIDING INDICATOR SHALL NOT BE PROVIDED WITH BACKGROUND.
4. SIGNALS FOR BRIDGES SPANNING MORE THAN SIX TRACKS, AND WHERE DEPTH OF CHORDS IS OTHER THAN 6 FT. OR 7 FT., ARE SPECIAL; CROSS-SECTION OF BRIDGE CHORDS SHALL ACCOMPANY ORDER.
5. FOR ARRANGEMENT OF TERMINALS IN JUNCTION BOX, SEE P.R.R. DRAWING S-858.
6. WHERE NO DETAIL REFERENCE IS SHOWN, THE MANUFACTURER'S STANDARD APPARATUS SHALL BE FURNISHED.
7. WHEN REQUIRED, DRILL 5" MAST FOR WIRE AND CABLE OUTLETS AS INDICATED IN DIAGRAM H.
8. WHERE SIGNAL G1 OR G2 IS LOCATED BETWEEN TRACKS, THE CENTER LINE OF THE TRACKS SHALL BE SPACED 25'-0" C. TO C. WHERE PRACTICAL. MINIMUM TRACK CENTERS SHALL BE IN ACCORDANCE WITH CE-78.
9. IF SPECIAL COMBINATIONS ARE DESIRED FOR ROUNDEL AND COVER GLASS, SPECIFY ON ORDER.
10. PAINT SHALL BE APPLIED IN ACCORDANCE WITH A.A.R. SIG. SEC. SPECIFICATION 120, MANUAL PART 110. MANUFACTURER SHALL FURNISH THE POSITION LIGHT SIGNALS AND ALL PARTS THEREOF WITH A FINISH COAT OF DULL BLACK ENAMEL, S.C.R. 47-3208 APPLIED TO ALL EXTERIOR METAL PARTS. THE GROUND POLE SIGNALS SHALL, AFTER INSTALLATION, HAVE A FINISH COAT OF ALUMINUM PAINT, S.C.R. 47-3159 APPLIED TO THE MAST BASE AND ON THE MAST FOR A DISTANCE OF 6'-0" ABOVE THE SIGNAL FOUNDATION. ALL OTHER PARTS FLAT BLACK.

SYMBOLS
Ø – OPENINGS REQUIRED FOR MARKER ONLY.
– " ALWAYS REQUIRED FOR TOP ARM, AND FOR BOTTOM ARM WHEN IT IS OTHER THAN MARKER ONLY.
△ – FLEXIBLE DUCT BETWEEN CABLE OUTLET AND BOTTOM ARM. (FURNISHED BY RAILROAD)
(A) – INDICATES A.A.R. SIGNAL SECTION DRAWING

REVISIONS
REDRAWN FROM APPROVED DRAWING S-400-F, DATED NOV. 10, 1927 AND REVISED. 4003C, 4003I, 4003Z, TABLE O, DIAGRAMS D & H, UNITS 4001G, 4001.7 & 4001B AND REFS. TO A.A.R. O PARTS ADDED. NOTES REVISED.
G JUNE 18, 1953. C.D. MINOR CHANGES MADE IN DIMENSIONS FOR B1 & B2 MASTS. DESIGNATION FOR 40025, 40030, 40035, 40040 & 40045 CHANGED. MINOR CHANGES MADE IN NOTES.
APPROVED W. G. Salmonson
H JUNE 29, 1954. C.D. NOTE 10 REVISED TO SHOW CHANGE IN ALUMINUM PAINTING OF GROUND MASTS. S.C.R. NUMBER FOR FLAT BLACK ENAMEL CHANGED. NOTE 8 REVISED.
APPROVED W. G. Salmonson

1 SHEET

S-400-H

THE PENNSYLVANIA RAILROAD

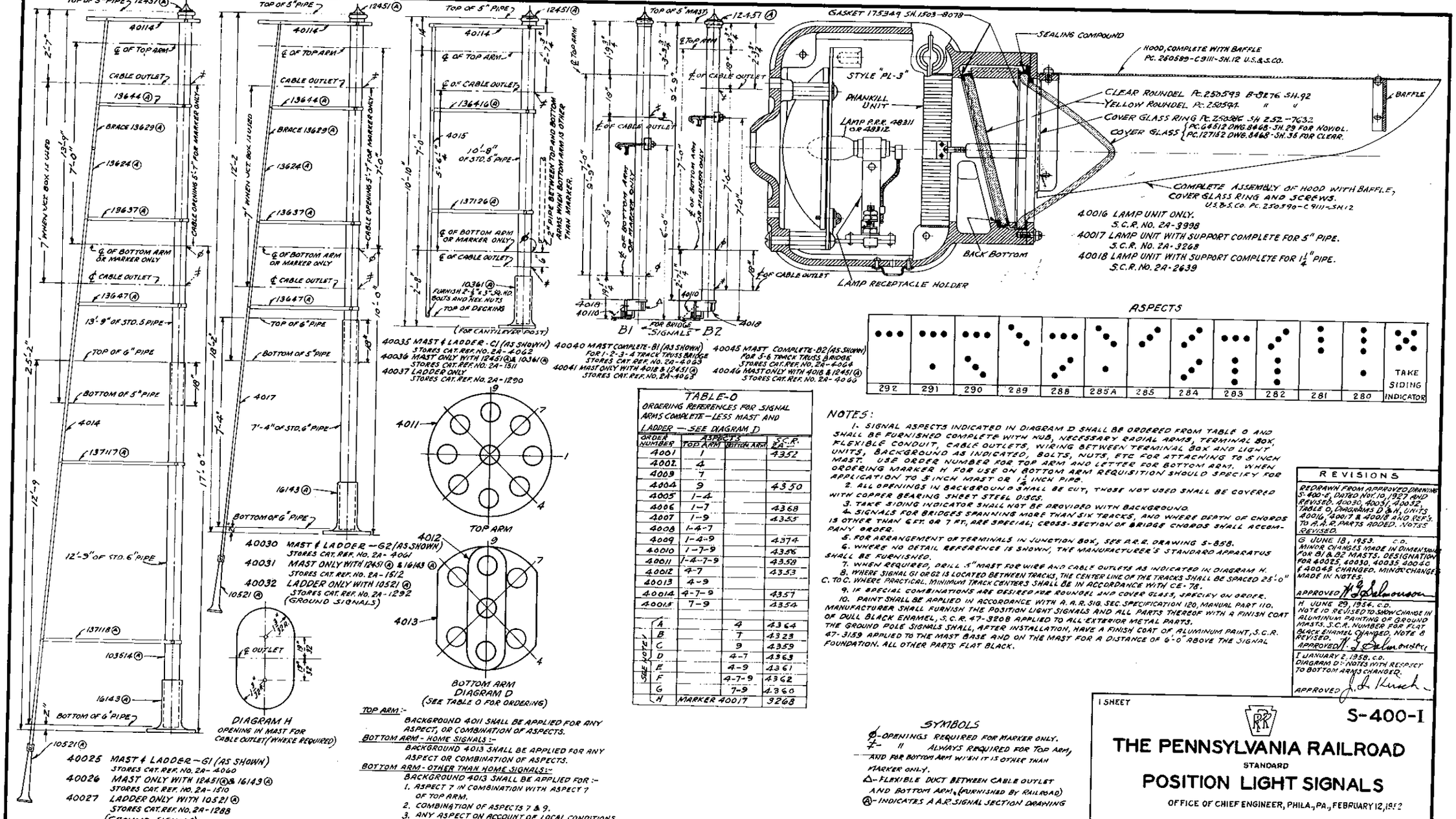
STANDARD

POSITION LIGHT SIGNALS

OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 12, 1952

Approved
W. G. Salmonson
Assistant Chief Engineer-Signals

Approved
J. Quigley
Chief Engineer



ASPECTS

292	291	290	289	288	285A	285	284	283	282	281	280	TAKE SIDING INDICATOR

TABLE-O

ORDERING REFERENCES FOR SIGNAL ARMS COMPLETE — LESS MAST AND LADDER — SEE DIAGRAM D

ORDER NUMBER	ASPECTS TOP ARM	ASPECTS BOTTOM ARM	S.C.R. 2A-
4001	1		4352
4002	4		
4003	7		
4004	9		4350
4005	1-4		
4006	1-7		4368
4007	1-9		4355
4008	1-4-7		
4009	1-4-9		4374
4010	1-7-9		4356
4011	1-4-7-9		4358
4012	4-7		4353
4013	4-9		
4014	4-7-9		4357
4015	7-9		4354
SEE NOTE A		4	4364
SEE NOTE B		7	4323
SEE NOTE C		9	4359
SEE NOTE D		4-7	4363
SEE NOTE E		4-9	4361
SEE NOTE F		4-7-9	4362
SEE NOTE G		7-9	4360
SEE NOTE H	MARKER 40017		3268

NOTES:

1. SIGNAL ASPECTS INDICATED IN DIAGRAM D SHALL BE ORDERED FROM TABLE O AND SHALL BE FURNISHED COMPLETE WITH HUB, NECESSARY RADIAL ARMS, TERMINAL BOX, FLEXIBLE CONDUIT, CABLE OUTLETS, WIRING BETWEEN TERMINAL BOX AND LIGHT UNITS, BACKGROUND AS INDICATED, BOLTS, NUTS, ETC FOR ATTACHING TO 5 INCH MAST. USE ORDER NUMBER FOR TOP ARM AND LETTER FOR BOTTOM ARM. WHEN ORDERING MARKER H FOR USE ON BOTTOM ARM REQUISITION SHOULD SPECIFY FOR APPLICATION TO 5 INCH MAST OR 1 1/4 INCH PIPE.
2. ALL OPENINGS IN BACKGROUND SHALL BE CUT, THOSE NOT USED SHALL BE COVERED WITH COPPER BEARING SHEET STEEL DISCS.
3. TAKE SIDING INDICATOR SHALL NOT BE PROVIDED WITH BACKGROUND.
4. SIGNALS FOR BRIDGES SPANNING MORE THAN SIX TRACKS, AND WHERE DEPTH OF CHORDS IS OTHER THAN 6 FT. OR 7 FT., ARE SPECIAL; CROSS-SECTION OF BRIDGE CHORDS SHALL ACCOMPANY ORDER.
5. FOR ARRANGEMENT OF TERMINALS IN JUNCTION BOX, SEE A.R.E. DRAWING S-858.
6. WHERE NO DETAIL REFERENCE IS SHOWN, THE MANUFACTURER'S STANDARD APPARATUS SHALL BE FURNISHED.
7. WHEN REQUIRED, DRILL .5" MAST FOR WIRE AND CABLE OUTLETS AS INDICATED IN DIAGRAM H.
8. WHERE SIGNAL G1 OR G2 IS LOCATED BETWEEN TRACKS, THE CENTER LINE OF THE TRACKS SHALL BE SPACED 25'-0" C. TO C. WHERE PRACTICAL. MINIMUM TRACK CENTERS SHALL BE IN ACCORDANCE WITH CE-78.
9. IF SPECIAL COMBINATIONS ARE DESIRED FOR ROUNDEL AND COVER GLASS, SPECIFY ON ORDER.
10. PAINT SHALL BE APPLIED IN ACCORDANCE WITH A. A. R. SIG. SEC. SPECIFICATION 120, MANUAL PART 110. MANUFACTURER SHALL FURNISH THE POSITION LIGHT SIGNALS AND ALL PARTS THEREOF WITH A FINISH COAT OF DULL BLACK ENAMEL, S.C.R. 47-3208 APPLIED TO ALL EXTERIOR METAL PARTS. THE GROUND POLE SIGNALS SHALL, AFTER INSTALLATION, HAVE A FINISH COAT OF ALUMINUM PAINT, S.C.R. 47-3159 APPLIED TO THE MAST BASE AND ON THE MAST FOR A DISTANCE OF 6'-0" ABOVE THE SIGNAL FOUNDATION. ALL OTHER PARTS FLAT BLACK.

TOP ARM:-
BACKGROUND 4011 SHALL BE APPLIED FOR ANY ASPECT, OR COMBINATION OF ASPECTS.

BOTTOM ARM - HOME SIGNALS:-
BACKGROUND 4013 SHALL BE APPLIED FOR ANY ASPECT OR COMBINATION OF ASPECTS.

BOTTOM ARM - OTHER THAN HOME SIGNALS:-
BACKGROUND 4013 SHALL BE APPLIED FOR:-
1. ASPECT 7 IN COMBINATION WITH ASPECT 7 OF TOP ARM.
2. COMBINATION OF ASPECTS 7 & 9.
3. ANY ASPECT ON ACCOUNT OF LOCAL CONDITIONS.
BACKGROUND 4012 SHALL BE APPLIED FOR:-
1. ASPECT 9.

SYMBOLS

℄ - OPENINGS REQUIRED FOR MARKER ONLY.
℄ " ALWAYS REQUIRED FOR TOP ARM, AND FOR BOTTOM ARM WHEN IT IS OTHER THAN MARKER ONLY.
Δ - FLEXIBLE DUCT BETWEEN CABLE OUTLET AND BOTTOM ARM (FURNISHED BY RAILROAD)
Ⓐ - INDICATES A.A.R. SIGNAL SECTION DRAWING

REVISIONS

REDRAWN FROM APPROVED DRAWING S-400-E, DATED NOV. 10, 1927 AND REVISED. 40030, 40031, 40032, TABLE O, DIAGRAMS D & H, UNITS 40016, 40017 & 40018 AND REFS. TO A.A.R. PARTS ADDED. NOTES REVISED.
G JUNE 18, 1953. C.O. MINOR CHANGES MADE IN DIMENSIONS FOR B1 & B2 MASTS. DESIGNATION FOR 40025, 40030, 40035, 40040 & 40045 CHANGED. MINOR CHANGES MADE IN NOTES.
APPROVED H. G. Salmonson
H JUNE 29, 1954. C.O. NOTE 10 REVISED TO SHOW CHANGE IN ALUMINUM PAINTING OF GROUND MASTS. S.C.R. NUMBER FOR FLAT BLACK ENAMEL CHANGED. NOTE 8 REVISED.
APPROVED H. G. Salmonson
I JANUARY 2, 1958. C.O. DIAGRAM D:- NOTES WITH RESPECT TO BOTTOM ARMS CHANGED.
APPROVED J. H. Kirsch

1 SHEET

S-400-I

THE PENNSYLVANIA RAILROAD

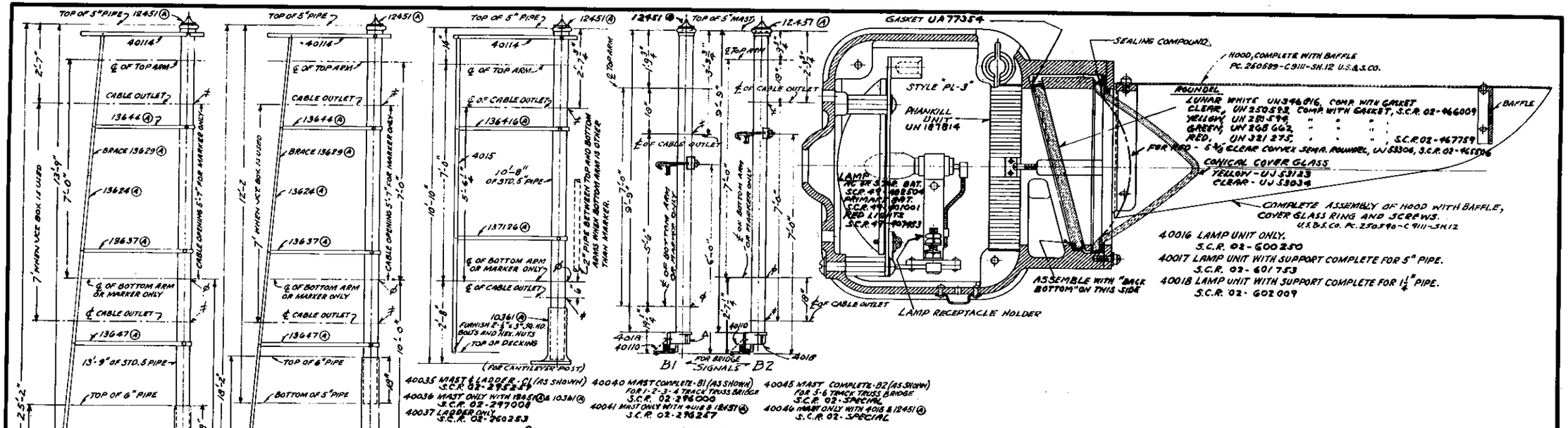
STANDARD

POSITION LIGHT SIGNALS

OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 12, 1952

Approved
H. G. Salmonson
Assistant Chief Engineer-Signals

Approved
J. H. Kirsch
Chief Engineer



40025 MAST & LADDER – G1 (AS SHOWN) S.C.R. 02-SPECIAL
40026 MAST ONLY WITH 12451 A & 16143 A S.C.R. 02-296752
40027 LADDER ONLY WITH 10521 A S.C.R. 02-260006 (GROUND SIGNALS)

40030 MAST & LADDER – G2 (AS SHOWN) S.C.R. 02-SPECIAL
40031 MAST ONLY WITH 12451 A & 16143 A S.C.R. 02-297255
40032 LADDER ONLY WITH 10521 A S.C.R. 02-260501 (GROUND SIGNALS)

40035 MAST & LADDER - G1 (AS SHOWN) S.C.R. 02-295254
40036 MAST ONLY WITH 12451 A & 10361 B S.C.R. 02-297008
40037 LADDER ONLY S.C.R. 02-260253

40040 MAST COMPLETE - B1 (AS SHOWN) FOR 1-2-3-4 TRACK TRUSS BRIDGE S.C.R. 02-296000
40041 MAST ONLY WITH 4018 & 12451 A S.C.R. 02-296257
40045 MAST COMPLETE - B2 (AS SHOWN) FOR 5-6 TRACK TRUSS BRIDGE S.C.R. 02-SPECIAL
40046 MAST ONLY WITH 4018 & 12451 A S.C.R. 02-SPECIAL

TOP ARM:- BACKGROUND 4011 SHALL BE APPLIED FOR ANY ASPECT, OR COMBINATION OF ASPECTS.

BOTTOM ARM - HOME SIGNALS:- BACKGROUND 4013 SHALL BE APPLIED FOR ANY ASPECT OR COMBINATION OF ASPECTS.

BOTTOM ARM - OTHER THAN HOME SIGNALS:- BACKGROUND 4013 SHALL BE APPLIED FOR:-
1. ASPECT 7 IN COMBINATION WITH ASPECT 7 OF TOP ARM.
2. COMBINATION OF ASPECTS 7 & 9.
3. ANY ASPECT ON ACCOUNT OF LOCAL CONDITIONS.

BACKGROUND 4012 SHALL BE APPLIED FOR:-
1. ASPECT 9.

TABLE-O
ORDERING REFERENCES FOR SIGNAL ARMS COMPLETE – LESS MAST AND LADDER – SEE DIAGRAM D

ORDER NUMBER	ASPECTS TOP ARM	ASPECTS BOTTOM ARM	S.C.R.
4001	1		500003
4002	4		
4003	7		
4004	9		
4005	1-4		
4006	1-7		502506
4007	1-9		499505
4008	1-4-7		
4009	1-4-9		500500
40010	1-7-9		499752
40011	1-4-7-9		500252
40012	4-7		499257
40013	4-9		
40014	4-7-9		500005
40015	7-9		
40050	IR		
40051	IR-4		
40052	IR-7		
40053	IR-9		
40054	IR-4-7		
40055	IR-4-9		
40056	IR-7-9		
40057	IR-4-7-9		
SEC. ARM A	A	4	502258
	B	7	500757
	C	9	499800
	D	4-7	502001
	E	4-9	501608
	F	4-7-9	501768
	G	7-9	501260
	H	MARKER	601783

NOTES:
1. SIGNAL ASPECTS INDICATED IN DIAGRAM D SHALL BE ORDERED FROM TABLE O AND SHALL BE FURNISHED COMPLETE WITH HUB, NECESSARY RADIAL ARMS, TERMINAL BOX, FLEXIBLE CONDUIT, CABLE OUTLETS, WIRING BETWEEN TERMINAL BOX AND LIGHT UNITS, BACKGROUND AS INDICATED, BOLTS, NUTS, ETC FOR ATTACHING TO 5 INCH MAST. USE ORDER NUMBER FOR TOP ARM AND LETTER FOR BOTTOM ARM. WHEN ORDERING MARKER H FOR USE ON BOTTOM ARM REQUISITION SHOULD SPECIFY FOR APPLICATION TO 5 INCH MAST (40017) OR 1½ INCH PIPE (40018)
2. ALL OPENINGS IN BACKGROUND SHALL BE CUT, THOSE NOT USED SHALL BE COVERED WITH COPPER BEARING SHEET STEEL DISCS.
3. TAKE SIDING INDICATOR SHALL NOT BE PROVIDED WITH BACKGROUND.
4. SIGNALS FOR BRIDGES SPANNING MORE THAN SIX TRACKS, AND WHERE DEPTH OF CHORDS IS OTHER THAN 6 FT. OR 7 FT., ARE SPECIAL; CROSS-SECTION OF BRIDGE CHORDS SHALL ACCOMPANY ORDER.
5. FOR ARRANGEMENT OF TERMINALS IN JUNCTION BOX, SEE P.R.R. DRAWING S-858.
6. WHERE NO DETAIL REFERENCE IS SHOWN, THE MANUFACTURER'S STANDARD APPARATUS SHALL BE FURNISHED.
7. WHEN REQUIRED, DRILL 5" MAST FOR WIRE AND CABLE OUTLETS AS INDICATED IN DIAGRAM H.
8. WHERE SIGNAL G1 OR G2 IS LOCATED BETWEEN TRACKS, THE CENTER LINE OF THE TRACKS SHALL BE SPACED 25'-0" C. TO C. WHERE PRACTICAL. MINIMUM TRACK CENTERS SHALL BE IN ACCORDANCE WITH C.E.-76.
9. IF SPECIAL COMBINATIONS ARE DESIRED FOR ROUNDEL AND COVER GLASS, SPECIFY ON ORDER.
10. PAINT SHALL BE APPLIED IN ACCORDANCE WITH A.A.R. SIG. SEC. SPECIFICATION 120, MANUAL PART 110. MANUFACTURER SHALL FURNISH THE POSITION LIGHT SIGNALS AND ALL PARTS THEREOF WITH A FINISH COAT OF DULL BLACK ENAMEL, S.C.R. 47-299203 APPLIED TO ALL EXTERIOR METAL PARTS. THE GROUND POLE SIGNALS SHALL, AFTER INSTALLATION, HAVE A FINISH COAT OF DULL BLACK ENAMEL, S.C.R. 47-299203.

SYMBOLS
℄ - OPENINGS REQUIRED FOR MARKER ONLY.
⊥ - " ALWAYS REQUIRED FOR TOP ARM, AND FOR BOTTOM ARM WHEN IT IS OTHER THAN MARKER ONLY.
△ - FLEXIBLE DUCT BETWEEN CABLE OUTLET AND BOTTOM ARM. (FURNISHED BY RAILROAD)
Ⓐ - INDICATES A.A.R. SIGNAL SECTION DRAWING
S.C.R. = STORES CATALOGUE REFERENCE

REVISIONS
REPRODUCED FROM APPROVED DWG. S-900-J, LAST REVISED 1-2-58. DATA FOR RED LIGHTS ADDED. PRINTING CHANGED. S.C.R.'S CHANGED.

1 SHEET

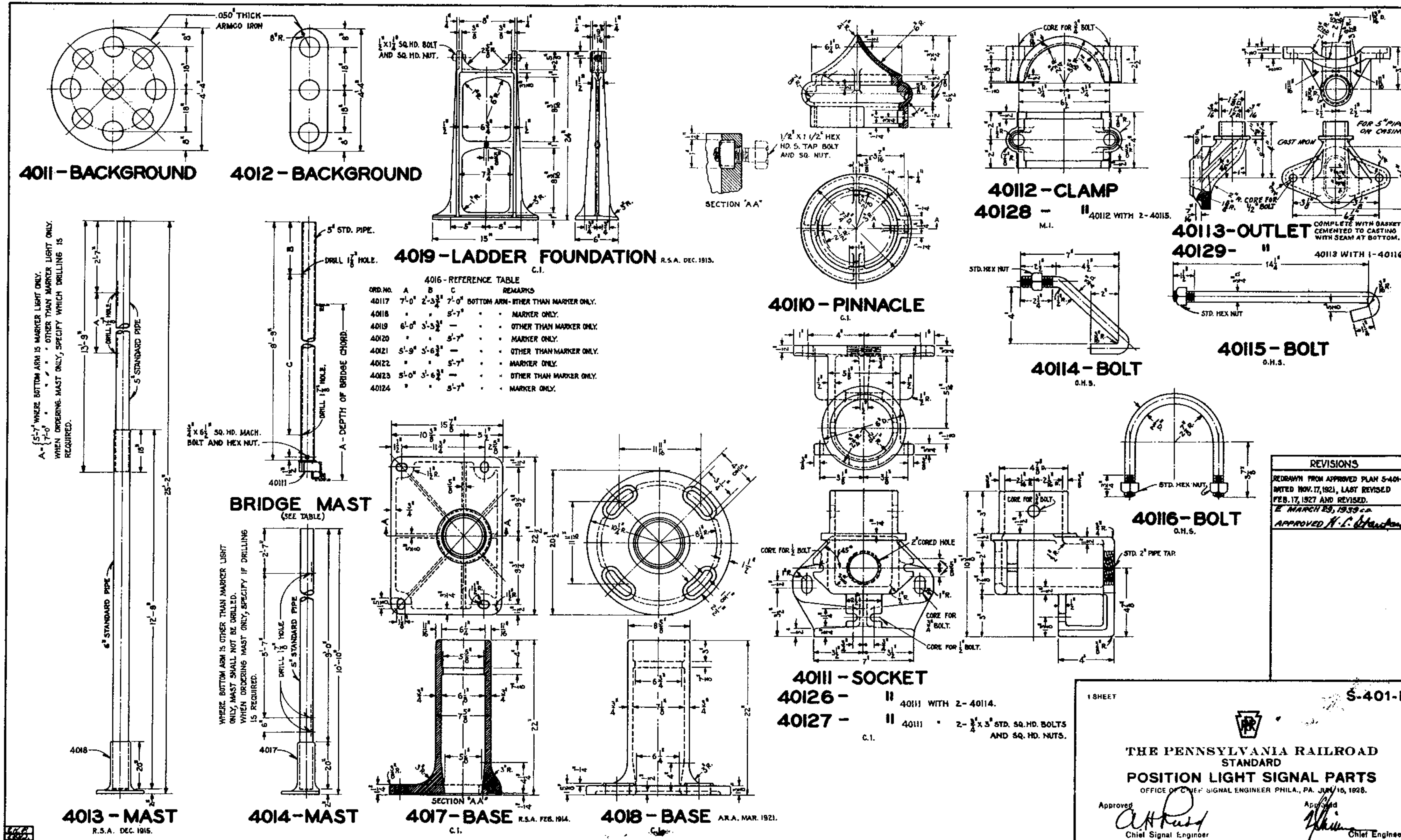
S-400-J

THE PENNSYLVANIA RAILROAD
STANDARD
POSITION LIGHT SIGNALS

OFFICE OF CHIEF ENGINEER, PHILA., PA., OCTOBER 14, 1963.

Approved
J. L. Chatten
System Engr. C. & S.

Approved
C. J. Henry
Chief Engineer



4016 - REFERENCE TABLE

ORD. NO.	A	B	C	REMARKS
40117	7'-0"	2'-3 3/4"	7'-0"	BOTTOM ARM - OTHER THAN MARKER ONLY.
40118	"	"	5'-7"	" " MARKER ONLY.
40119	6'-0"	3'-3 3/4"	—	" " OTHER THAN MARKER ONLY.
40120	"	"	5'-7"	" " MARKER ONLY.
40121	5'-9"	3'-6 3/4"	—	" " OTHER THAN MARKER ONLY.
40122	"	"	5'-7"	" " MARKER ONLY.
40123	5'-0"	3'-6 3/4"	—	" " OTHER THAN MARKER ONLY.
40124	"	"	5'-7"	" " MARKER ONLY.

REVISIONS

REDRAWN FROM APPROVED PLAN S-401-C, DATED NOV. 17, 1921, LAST REVISED FEB. 17, 1927 AND REVISED.

E MARCH 29, 1939 c.a.

APPROVED H. C. Stanton

1 SHEET

S-401-E

THE PENNSYLVANIA RAILROAD

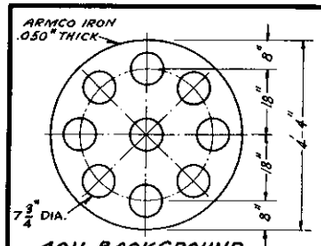
STANDARD

POSITION LIGHT SIGNAL PARTS

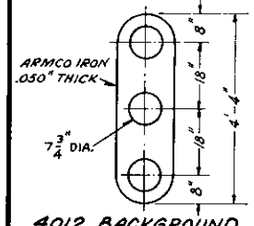
OFFICE OF CHIEF SIGNAL ENGINEER PHILA., PA. JUN 15, 1928.

Approved A H Rudd Chief Signal Engineer

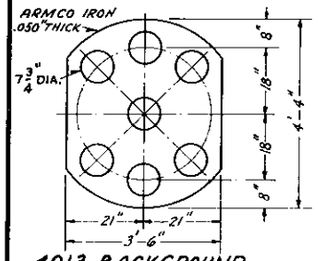
Approved Chief Engineer



4011 BACKGROUND
STORES CAT. REF. NO. 2A-80



4012 BACKGROUND
STORES CAT. REF. NO. 2A-81



4013 BACKGROUND
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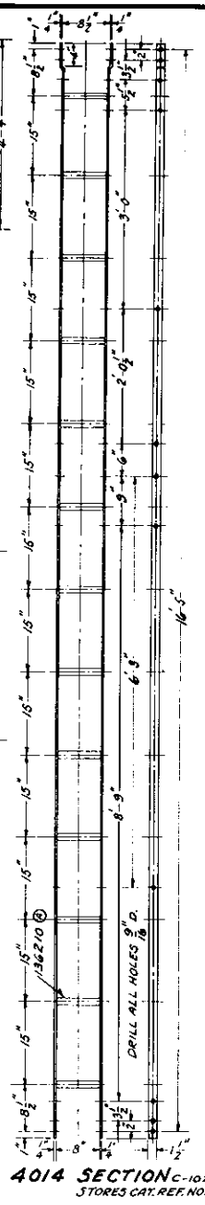
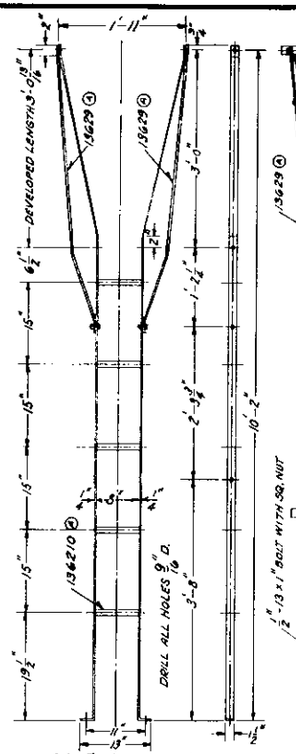
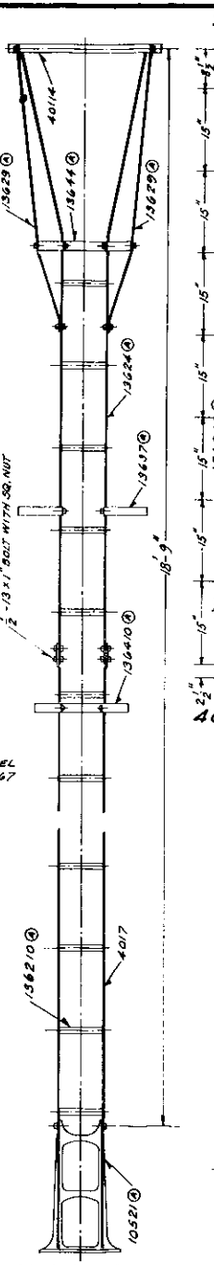


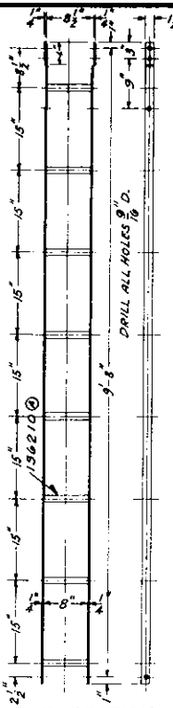
4014 SECTION C-1020 STEEL
STORES CAT. REF. NO. 2A-1491



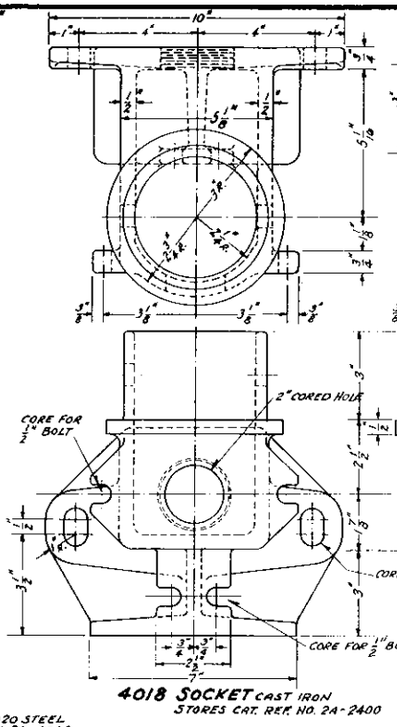
4015 SECTION C-1020 STEEL
STORES CAT. REF. NO. 2A-4067



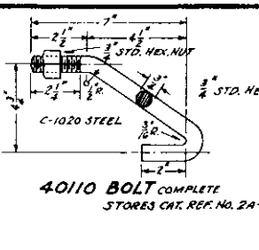
4016 LADDER COMPLETE
STORES CAT. REF. NO. 2A-1292 (SEE 40032, S-400-F)



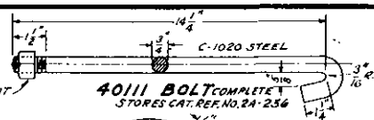
4017 SECTION C-1020 STEEL
STORES CAT. REF. NO. 2A-4068



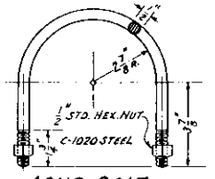
4018 SOCKET CAST IRON
STORES CAT. REF. NO. 2A-2400



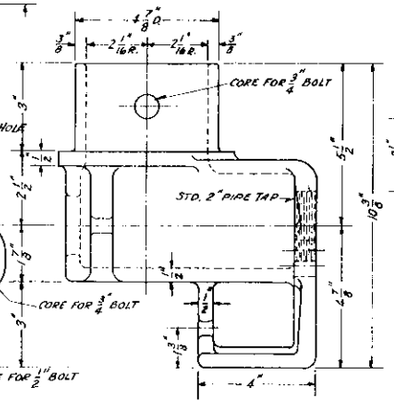
40110 BOLT COMPLETE
STORES CAT. REF. NO. 2A-255

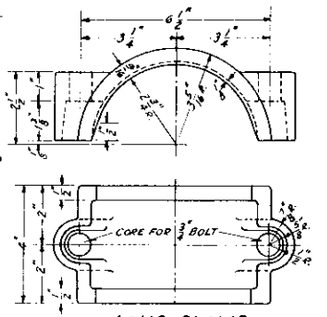


40111 BOLT COMPLETE
STORES CAT. REF. NO. 2A-256

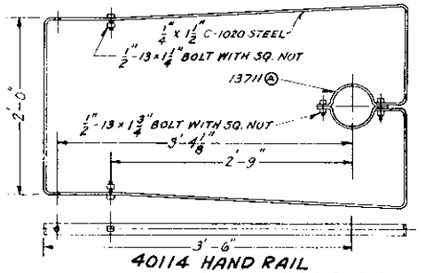


40112 BOLT COMPLETE
STORES CAT. REF. NO. 2A-254

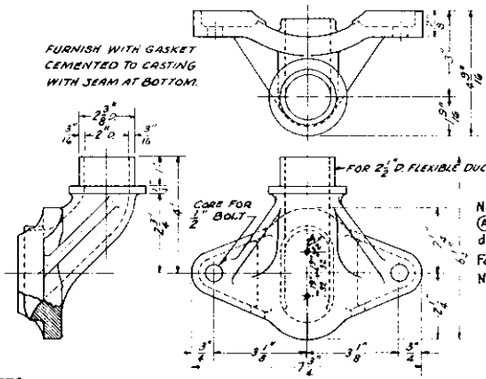




40113 CLAMP MALL. IRON
STORES CAT. REF. NO. 2A-594



40114 HAND RAIL
STORES CAT. REF. NO. 2A-1137



4019 OUTLET CAST IRON
STORES CAT. REF. NO. 2A-4069

Note:-
(A) - Indicates A.A.R. Signal Section drawing.
For Painting see Dwg. S-400, Notes 12 and 13.

REVISIONS
REDRAWN FROM APPROVED DWG. S-401-E DATED JUNE 15, 1931 LAST REVISED MARCH 29, 1937 AND REVISED 4013, LADDER, LADDER SECTIONS & 40114 ADDED, 4013 FORMERLY FOR 2" FLEX. DUCT. REFS. TO A.A.R. PARTS ADDED.

1 SHEET

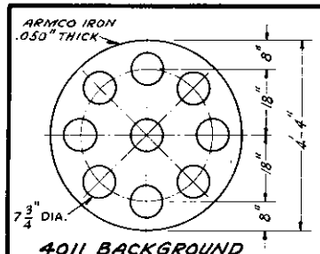
S-401-F

THE PENNSYLVANIA RAILROAD
STANDARD
POSITION LIGHT SIGNAL PARTS

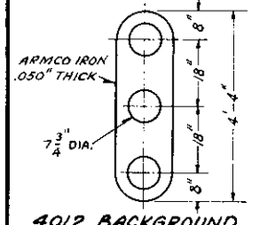
OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 12, 1952

Approved
H. G. Salmonson
Assistant Chief Engineer-Signals

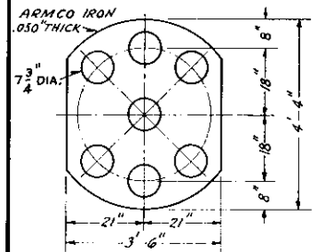
Approved
Chief Engineer



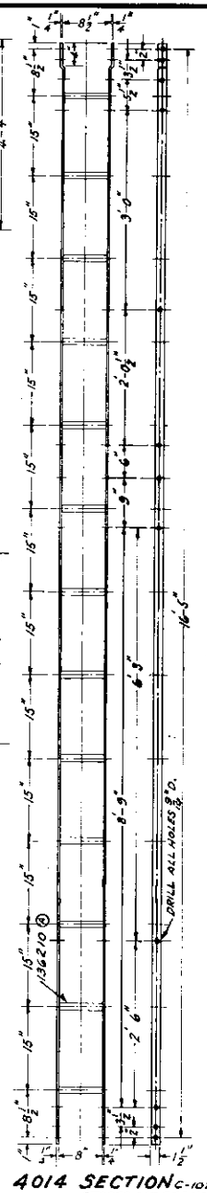
4011 BACKGROUND
STORES CAT. REF. NO. 2A-80



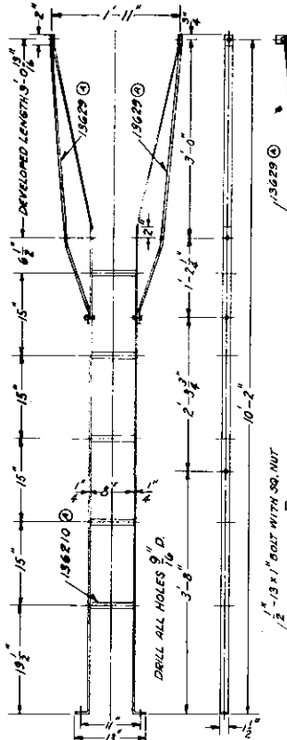
4012 BACKGROUND
STORES CAT. REF. NO. 2A-81



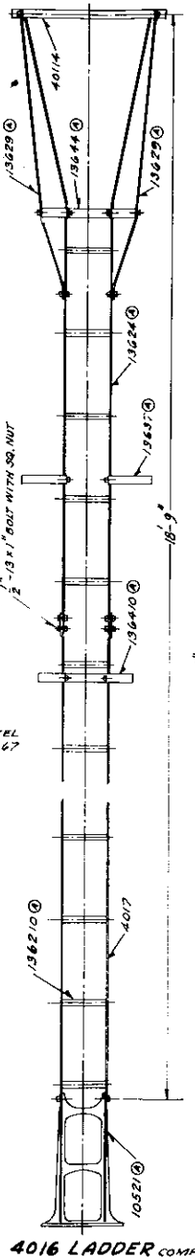
4013 BACKGROUND
STORES CAT. REF. NO. 2A-4059



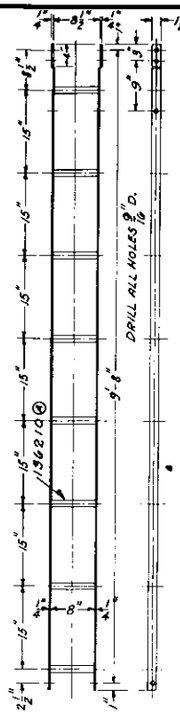
4014 SECTION C-1020 STEEL
STORES CAT. REF. NO. 2A-1491



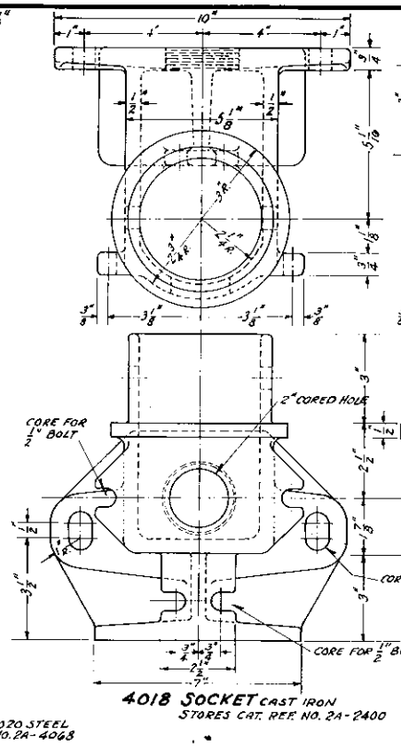
4015 SECTION C-1020 STEEL
STORES CAT. REF. NO. 2A-4067



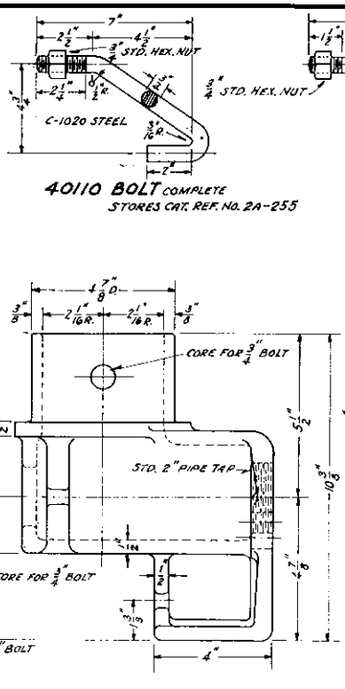
4016 LADDER COMPLETE
STORES CAT. REF. NO. 2A-1292 (SEE 400.32, S-400-F)

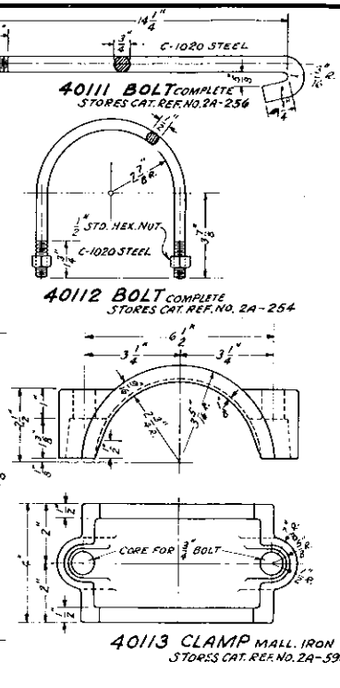


4017 SECTION C-1020 STEEL
STORES CAT. REF. NO. 2A-4068



4018 SOCKET CAST IRON
STORES CAT. REF. NO. 2A-2400





4011 BOLT COMPLETE
STORES CAT. REF. NO. 2A-256

4010 BOLT COMPLETE
STORES CAT. REF. NO. 2A-255

4012 BOLT COMPLETE
STORES CAT. REF. NO. 2A-254

4013 CLAMP MALL. IRON
STORES CAT. REF. NO. 2A-594

4014 HAND RAIL
STORES CAT. REF. NO. 2A-1137

4019 OUTLET CAST IRON
STORES CAT. REF. NO. 2A-4069

Note:-
(A) - Indicates A.A.R. Signal Section drawing.
For Painting see Dwg. S-400, Notes 12 and 13.

REVISIONS
REDRAWN FROM APPROVED DWG. S-401-E DATED JUNE 15, 1951 (LAST REVISED MARCH 29, 1951) AND REVISED 4013, LADDER, LADDER SECTIONS, & 4014 ADDED, 4013 FORMERLY FOR 2" FLEX. DUCT. REFS. TO A.A.R. PARTS ADDED.
6 AUGUST 12, 1954 C.O. MINOR CHANGES MADE IN DIMENSIONS OF 4014 & 4014.
APPROVED W. G. Salmonson

1 SHEET

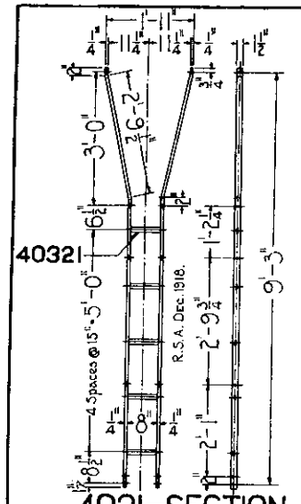
S-401-6

THE PENNSYLVANIA RAILROAD
STANDARD
POSITION LIGHT SIGNAL PARTS

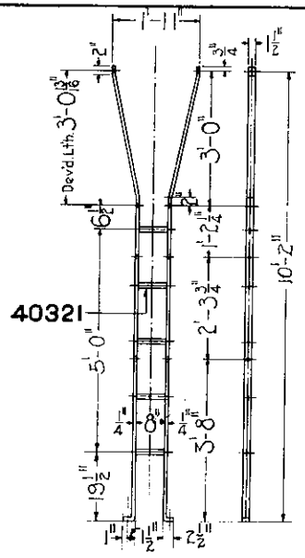
OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 12, 1952

Approved W. G. Salmonson
Assistant Chief Engineer-Signals

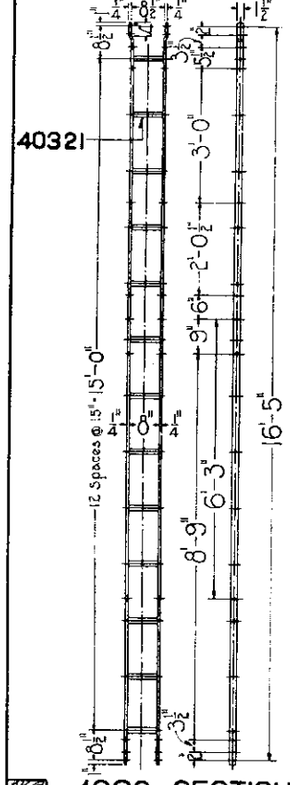
Approved
Chief Engineer



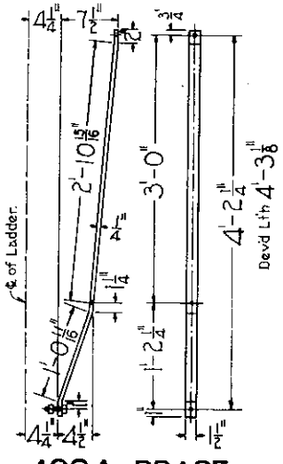
4031–SECTION.



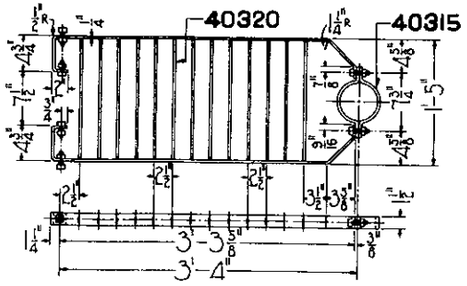
4033–SECTION



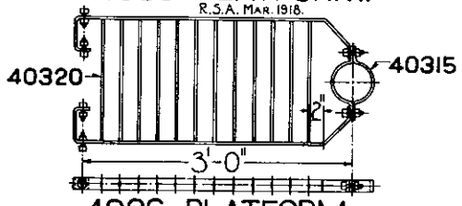
4032–SECTION.



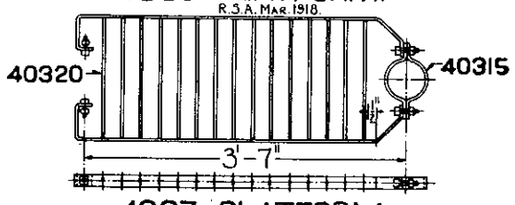
4034–BRACE.
R.S.A. Dec. 1916.



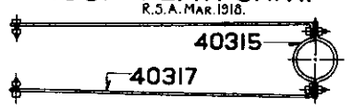
4035–PLATFORM.
R.S.A. Mar. 1918.



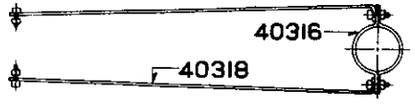
4036–PLATFORM.
R.S.A. Mar. 1918.



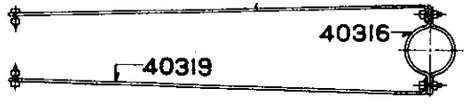
4037–PLATFORM.
R.S.A. Mar. 1918.



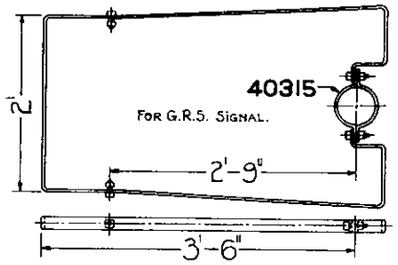
4038–STAY.
R.S.A. Dec. 1918.



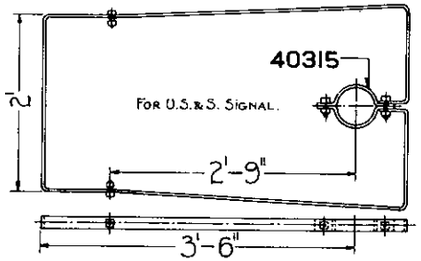
4039–STAY.
R.S.A. Dec. 1918.



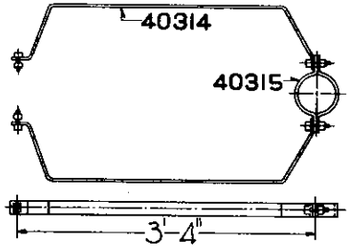
40310–STAY.
R.S.A. Dec. 1918.



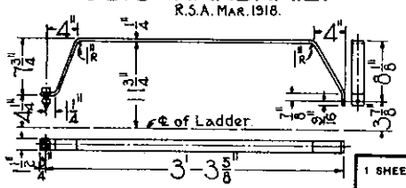
40311–HANDRAIL.



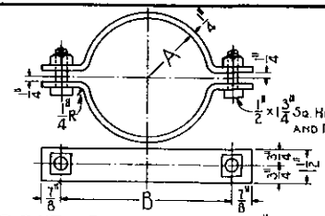
40312–HANDRAIL.



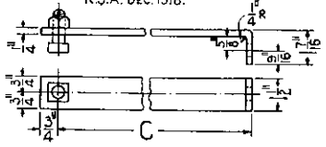
40313–HANDRAIL.
R.S.A. Mar. 1918.



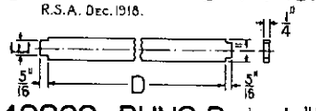
40314–HANDRAIL SIDE.
R.S.A. Mar. 1918.



40315–CLAMP A=2¾", B=7¾".
40316– " A=3 5/16, B=8⅞".
R.S.A. Dec. 1918.



40317–STAY SIDE C=3'-3 5/8".
40318– " " C=4'-0 1/8".
40319– " " C=4'-7 1/8".
R.S.A. Dec. 1918.



40320–RUNG D=1'-4½", E=½"
40321– " D=0'-8", E=¾"

NOTE:-
ALL MATERIAL SHALL BE O.H. STEEL.
FIGS. 4036 & 4037 SAME AS FIG. 4035 EXCEPT AS SHOWN.
ALL HOLES SHALL BE 9/16 IN DIA.
" BOLTS AND NUTS NOT OTHERWISE SPECIFIED, SHALL BE ½" x 1".
4032 MAY BE FURNISHED IN TWO SECTIONS

REVISIONS.
B Feb. 17, 1927.
Approved: A.H. Rudd

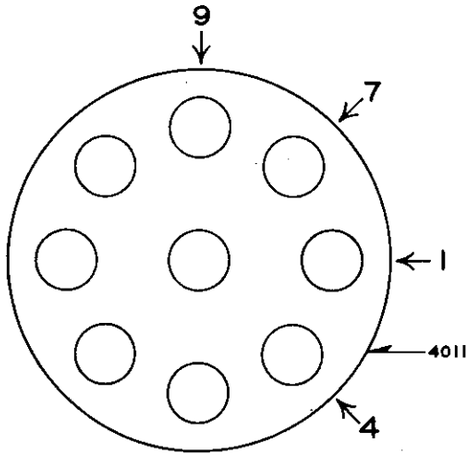
1 SHEET

S-403-B

THE PENNSYLVANIA RAILROAD
STANDARD
LADDER PARTS
FOR POSITION LIGHT SIGNALS
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., NOV. 17, 1921

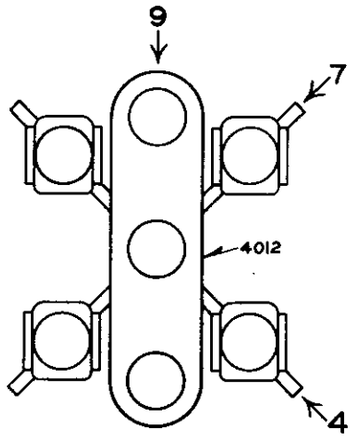
Correct
A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer



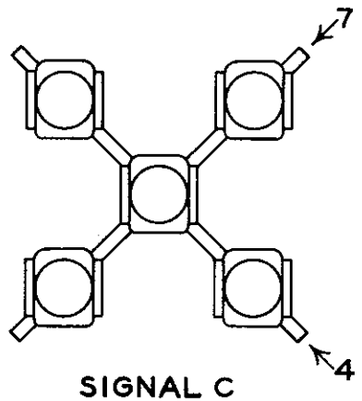
SIGNAL A

ORDER NO.	SIGNAL ASPECTS
4051	1
4052	4
4053	7
4054	7-9
4055	1-9
4056	4-9
4057	1-7-9
4058	4-7-9
4059	1-4-7-9
40510	1-4-9
40511	1-7
40512	4-7
40513	1-4-7
40514	1-4



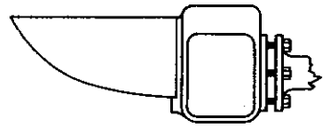
SIGNAL B

ORDER NO.	SIGNAL ASPECTS
40517	9
40518	7-9
40519	4-9
40520	4-7-9



SIGNAL C

ORDER NO.	SIGNAL ASPECTS
40523	7
40524	4
40525	4-7



MARKER

ORDER NO.	SINGLE UNIT
40528	COMPLETE FOR ATTACHING TO 5" STANDARD MAST.
40529	COMPLETE FOR ATTACHING TO 1¼" LORICATED PIPE.

NOTE:-
SIGNALS SHALL BE COMPLETE WITH HUB, NECESSARY RADIAL PIPING, JUNCTION BOX, FLEXIBLE CONDUIT AND WIRING BETWEEN JUNCTION BOX AND LIGHT UNITS, BACKGROUND (AS SHOWN), BOLTS ETC., FOR ATTACHING TO 5" STANDARD MAST, UNLESS OTHERWISE SPECIFIED.

REVISIONS

1 SHEET

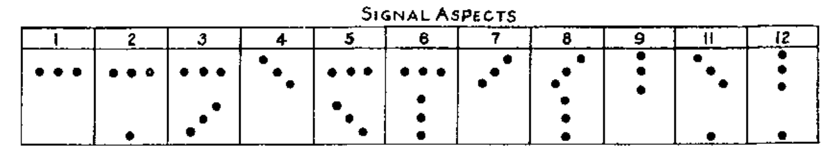
S-405-A

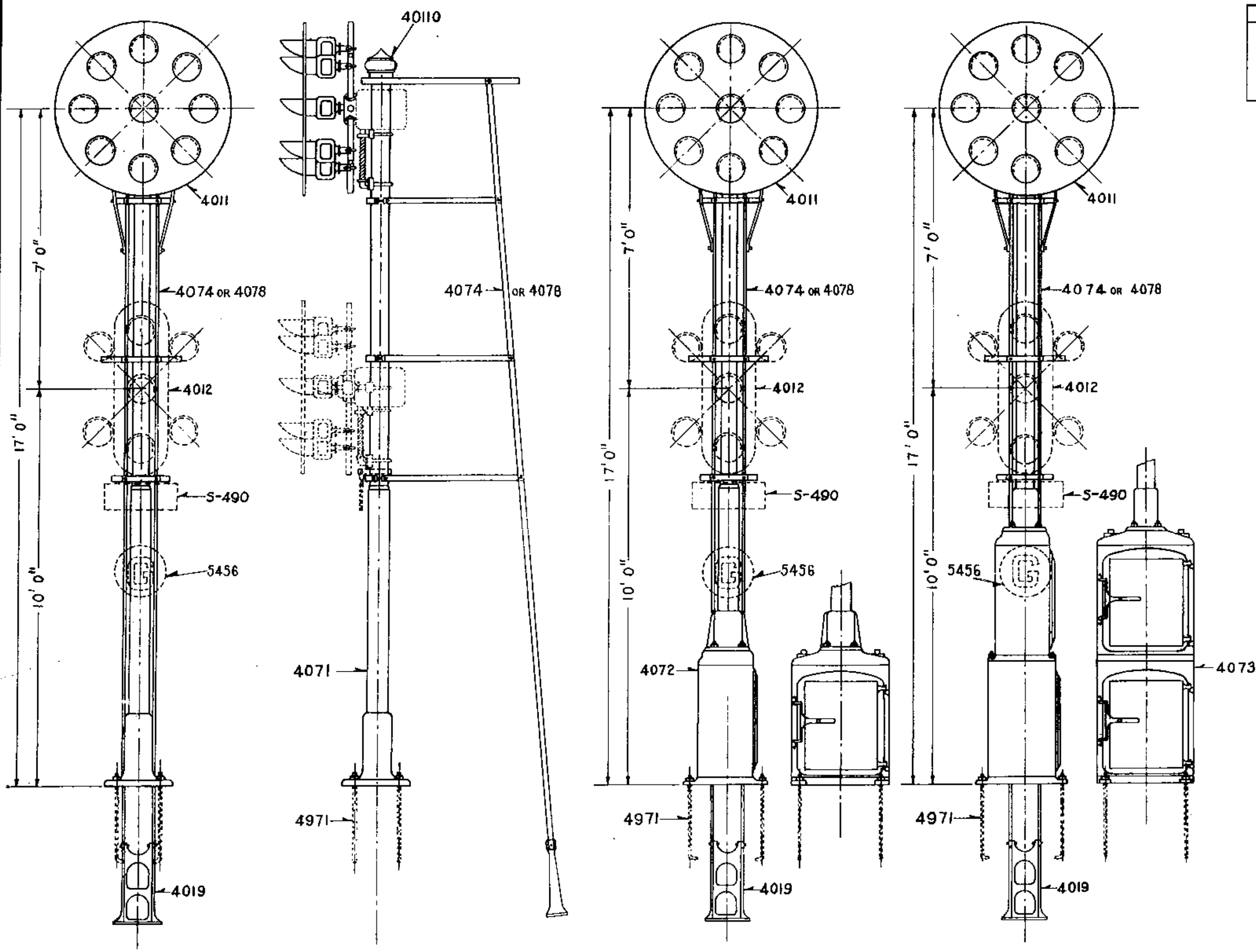
PENNSYLVANIA RAILROAD SYSTEM
STANDARD
SIGNALS
POSITION LIGHT

OFFICE OF CHIEF SIGNAL ENGINEER PHILA., PA., AUG. 31, 1925.

Approved
Chief Signal Engineer

Approved
Chief Engineer





4061-SIGNAL

4062-SIGNAL

4063-SIGNAL

Notes:-

1. Marker Light Shall Be Single Lamp Unit Without Background But With Necessary Fittings For Attaching To 5" Standard Pipe.

2. Signals Shall Be Complete With Hub, Necessary Radial Piping, Junction Box, Background, Lamp Units As Ordered, Bolts, Etc., For Installation, Except Foundation Bolts Which Shall Be Ordered From Standard Plan S-497

3. All Openings In Background Shall Be Cut, Those Not Used Shall Be Covered With Sheet Iron Discs.

4. For Wiring Of Terminals See Standard Plan S-858

5. Where Signal Is Located Between Tracks, The Tracks Shall Be Not Less Than 20'-0" Centers.

6. When Ordering Signals Specify Figure Number, Together With Aspects Desired.

7. Circular Background Shall Be Furnished For Top Arm Of All Signals.

8. Background 4012 Shall Be Furnished For Bottom Arm, Only Where Aspect No.6 Or No.8 Is To Be Displayed.

9. When No Detailed Reference Is Shown, The Manufacturer's Standard Apparatus Shall Be Furnished.

10. Foundation Bolt Holes In Base Casting Shall Be Filled With Putty After Installation

Revisions

1 SHEET

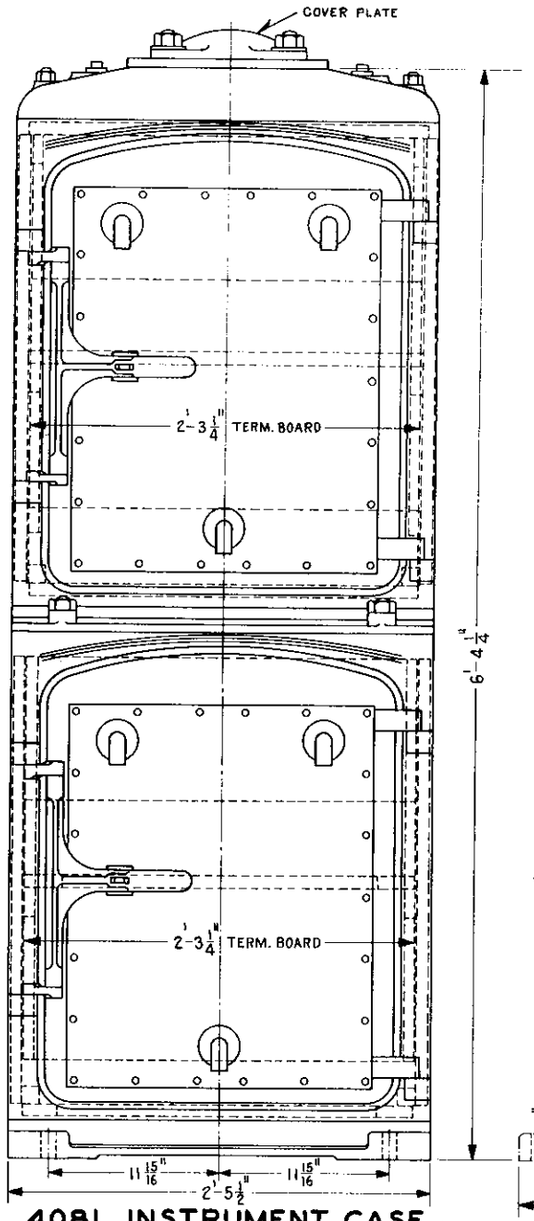
S-406-A

THE PENNSYLVANIA RAILROAD
STANDARD
SIGNALS
POSITION LIGHT

OFFICE OF CHIEF SIGNAL ENGINEER. PHILA., PA., MAY 14, 19[illegible]

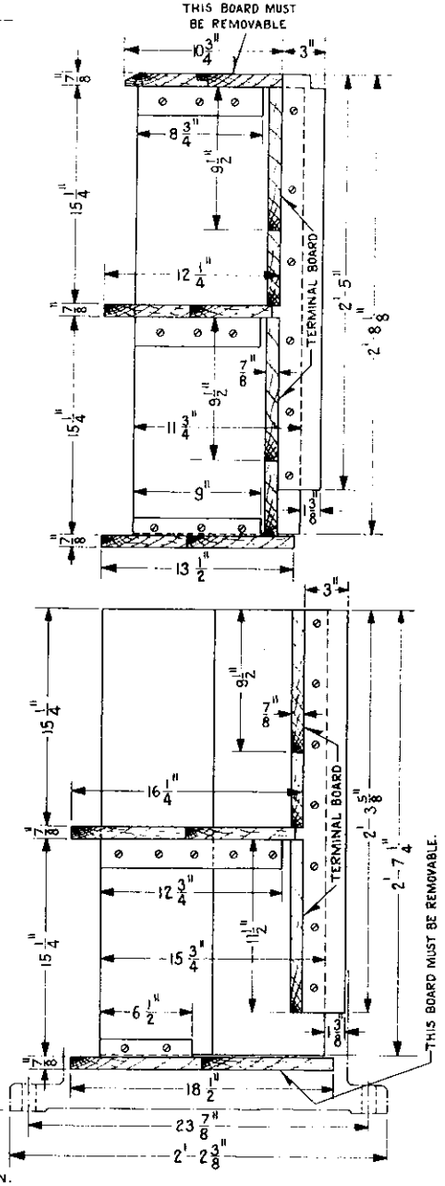
Approved
Chief Signal Engineer

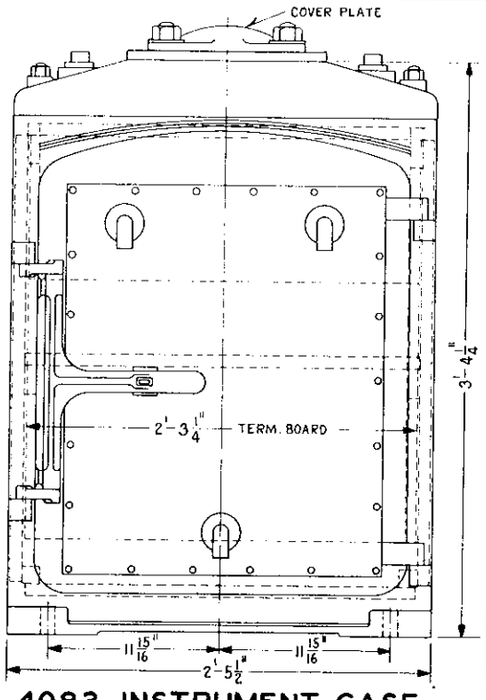
Approved
Chief Engineer



4081 INSTRUMENT CASE AS SHOWN.

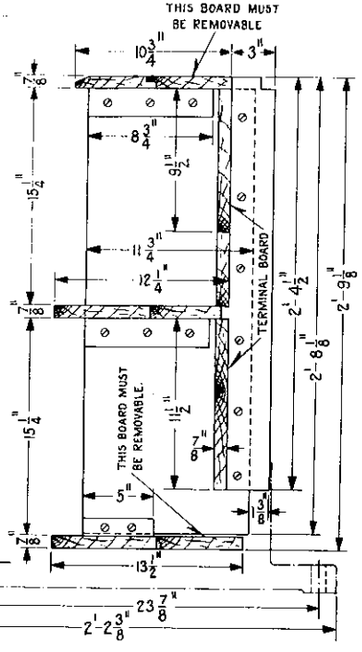
4082 " " " " WITHOUT COVER PLATE.

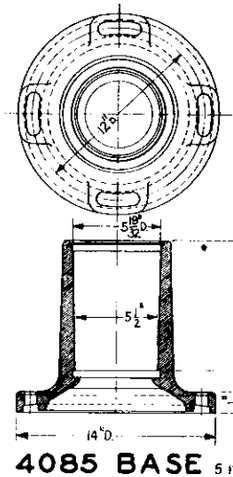




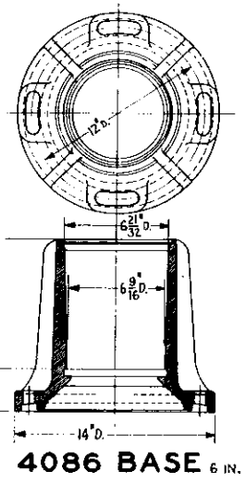
4083 INSTRUMENT CASE AS SHOWN.

4084 " " " " WITHOUT COVER PLATE.





4085 BASE 5 IN. PIPE



4086 BASE 6 IN. PIPE

NOTE :-

TERMINAL BOARDS SHALL BE MADE OF CLEAR POPLAR OR WHITE PINE, SURFACED TO 7/8", SHELLACED (TWO COATS) AND VARNISHED.

INSIDE OF CASES, EXCEPT TERMINAL BOARDS SHALL BE GIVEN TWO COATS OF SLATE COLOR FIRE RETARDING PAINT.

LININGS SHALL BE MADE OF WHITE PINE OR POPLAR AND SHALL FIT SNUG IN CASE.

PAINT OUTSIDE OF ALL CASES BLACK.

AFTER WIRING HAS BEEN COMPLETED CLOSE ALL OPENINGS SO AS TO PREVENT RODENTS FROM ENTERING.

FOR FOUNDATIONS SEE PLAN S-497.

REVISIONS
B- SEPT. 21, 1927.
APPROVED: A.H. Rudd

1 SHEET

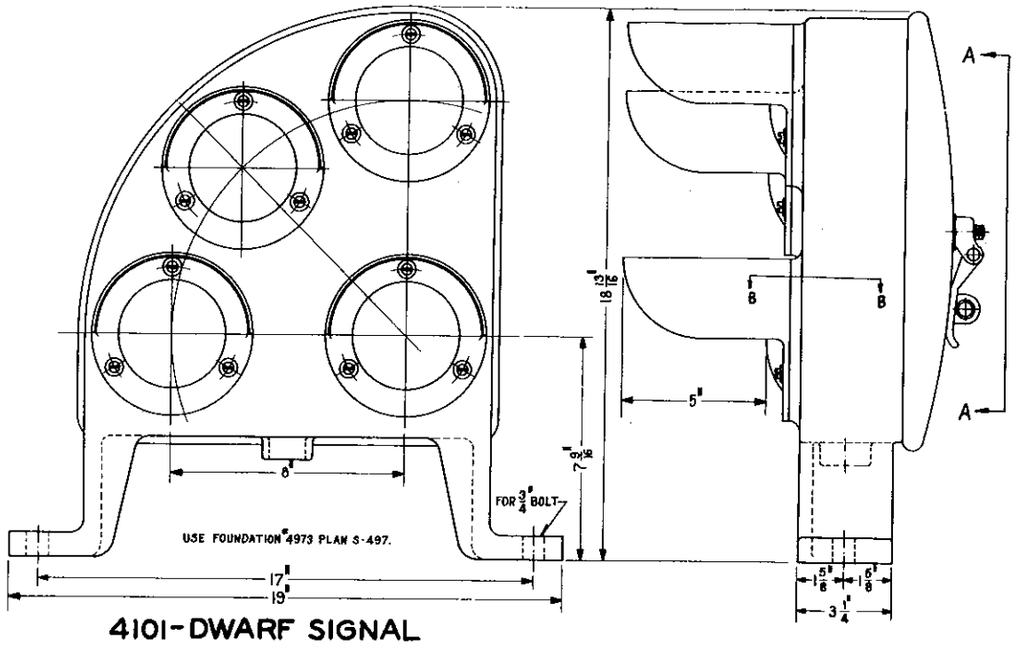
S-408-B

THE PENNSYLVANIA RAILROAD
STANDARD
INSTRUMENT CASES AND BASES
FOR SIGNAL MASTS

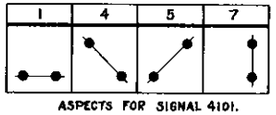
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., JAN. 26, 1927

Approved A.H. Rudd Chief Signal Engineer

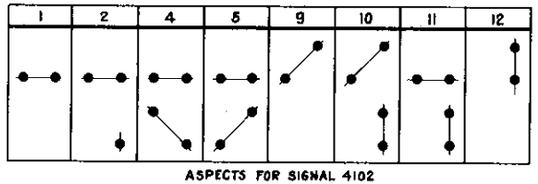
Approved Chief Engineer



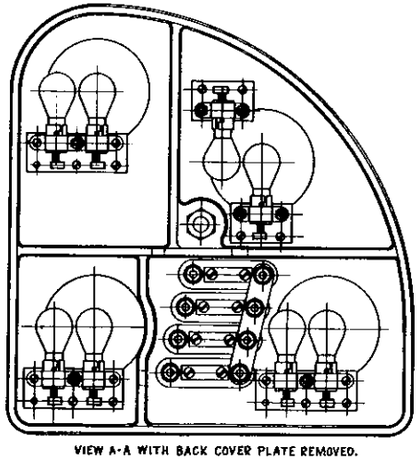
4101-DWARF SIGNAL



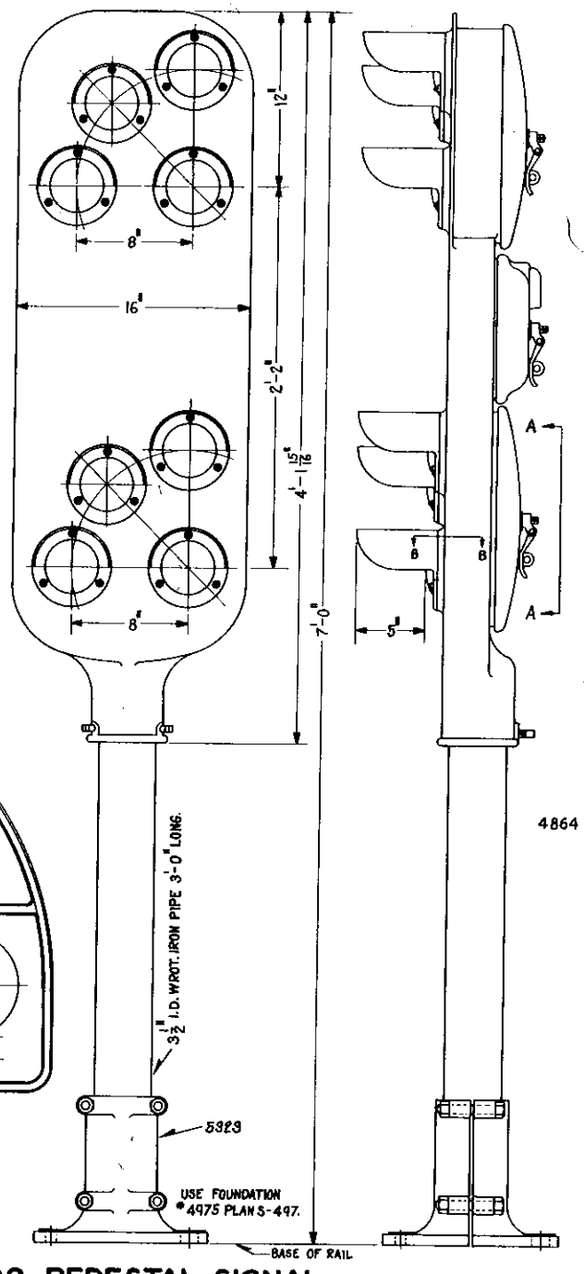
ASPECTS FOR SIGNAL 4101.



ASPECTS FOR SIGNAL 4102



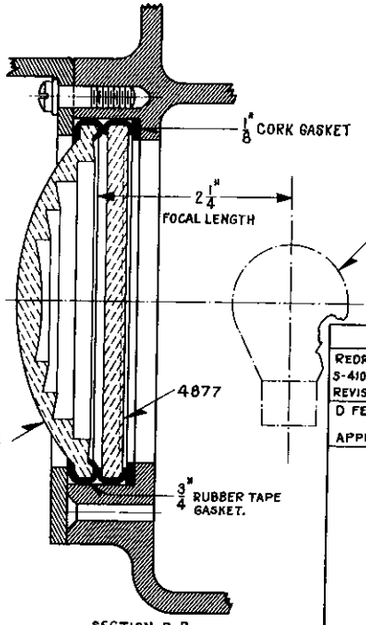
VIEW A-A WITH BACK COVER PLATE REMOVED.



4102-PEDESTAL SIGNAL

NOTE:-

1. WHEN ORDERING SIGNALS, SPECIFY FIGURE NUMBER, TOGETHER WITH ASPECTS DESIRED.
2. SIGNALS SHALL BE FURNISHED COMPLETE AS SHOWN WITHOUT LAMPS.
3. WHEN INSTALLING, SIGNALS SHALL BE WIRED IN ACCORDANCE WITH STANDARD PLAN S-858.
4. ALL INDICATIONS NOT USED SHALL BE BLANKED.



SECTION B-B
ARRANGEMENT OF LENSES

REVISIONS
REDRAWN FROM APPROVED PLAN S-410-B, DATED FEB. 11, 1922, LAST REVISED NOV. 9, 1926 AND REVISED.
D FEBRUARY 13, 1934. C[illegible]
APPROVED:- A.H. Rudd

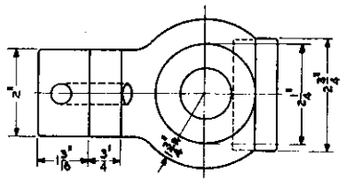
1 SHEET

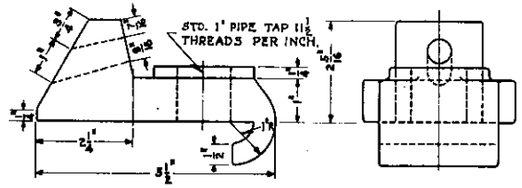
S-410-D

THE PENNSYLVANIA RAILROAD
STANDARD
SIGNALS
POSITION LIGHT
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., FEB. 2, 1932.

Approved
A.H. Rudd
Chief Signal Engineer

Approved
[signature]
Chief Engineer.

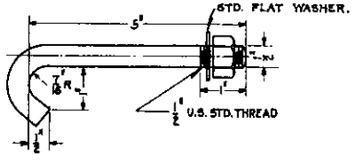




4291 - FLANGE

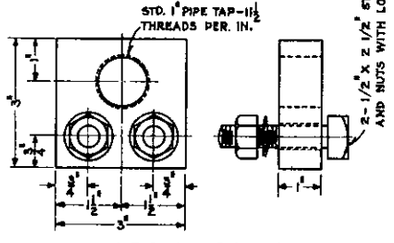
4292 - " WITH 4293.

C. I.



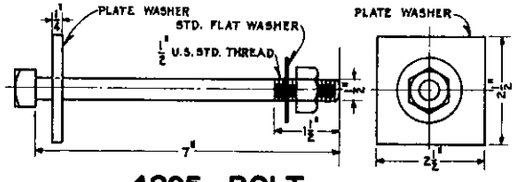
4293 - BOLT

O. H. S.



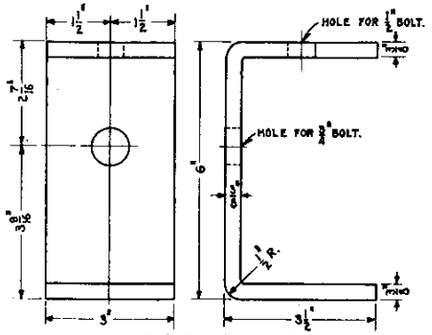
4294 - FLANGE

O. H. S.



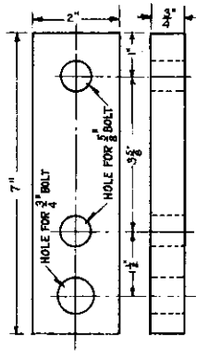
4295 - BOLT

O. H. S.



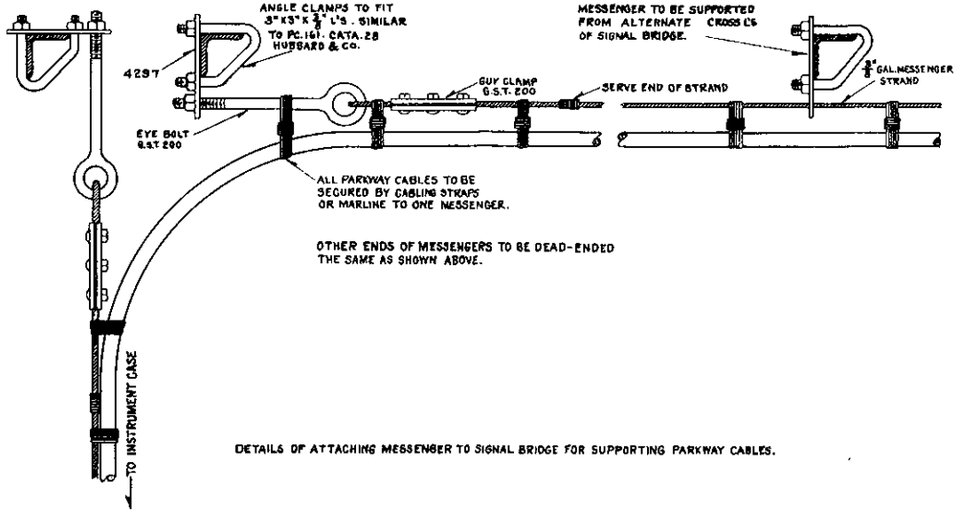
4296 - FILLER

O. H. S.

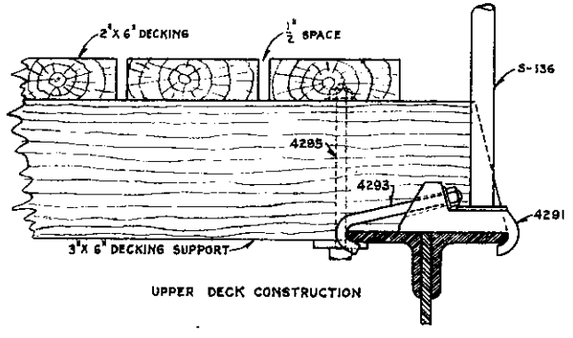


4297 - ANGLE CLAMP WASHER

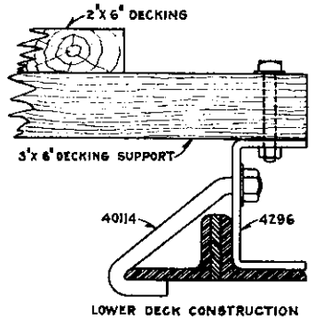
O. H. S.



DETAILS OF ATTACHING MESSENGER TO SIGNAL BRIDGE FOR SUPPORTING PARKWAY CABLES.



UPPER DECK CONSTRUCTION



LOWER DECK CONSTRUCTION

REVISIONS
REDRAWN FROM APPROVED PLAN S-429-B, DATED 2-11-22, LAST REVISED 1-26-27, AND REVISED.
D AUGUST 26, 1931.
APPROVED:

1 SHEET

S-429-D

THE PENNSYLVANIA RAILROAD
STANDARD

PARTS FOR DECKING, RAILING AND CABLE SUPPORTS

FOR SIGNAL BRIDGES AND CANTILEVERS

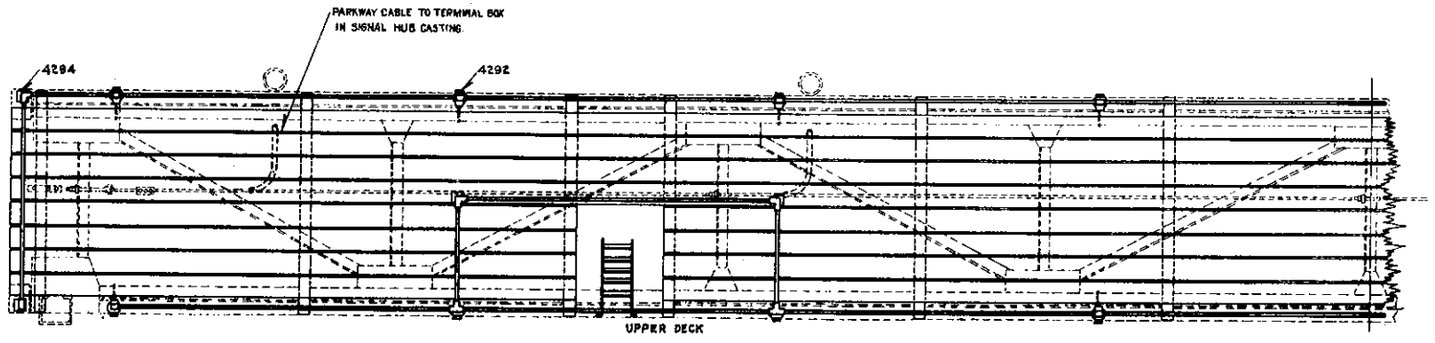
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. MAY 22 1926.

Approved
Chief Signal Engineer

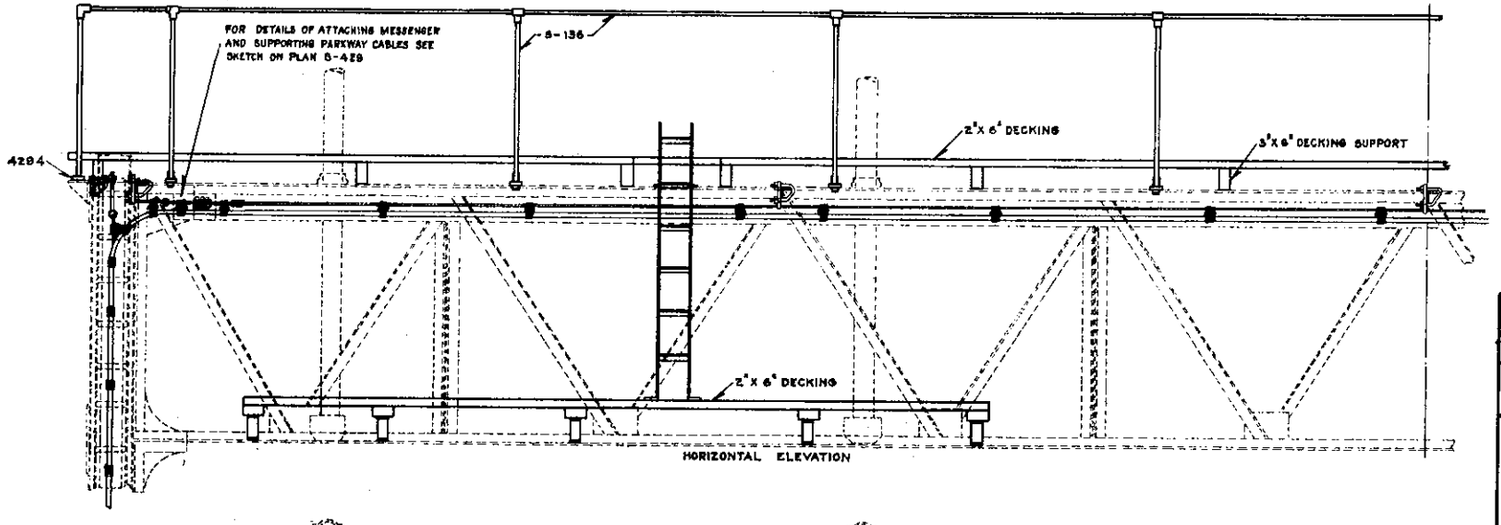
Approved
Chief Engineer

NOTE:-

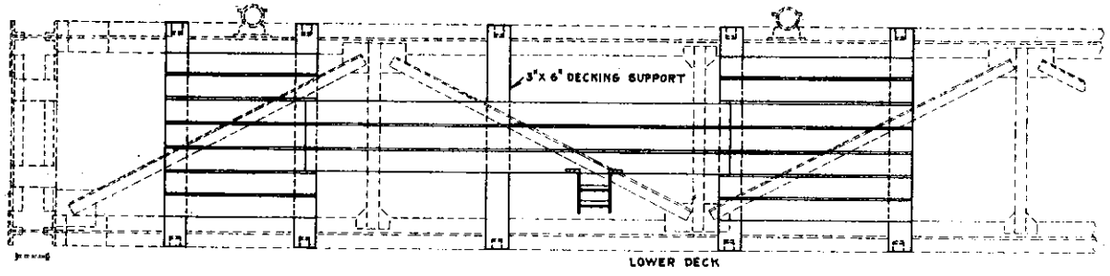
DECKING SHALL BE PAINTED WITH NOT LESS THAN TWO COATS OF SLATE COLORED FIRE RETARDING PAINT APPROVED BY THE CHIEF SIGNAL ENGINEER.



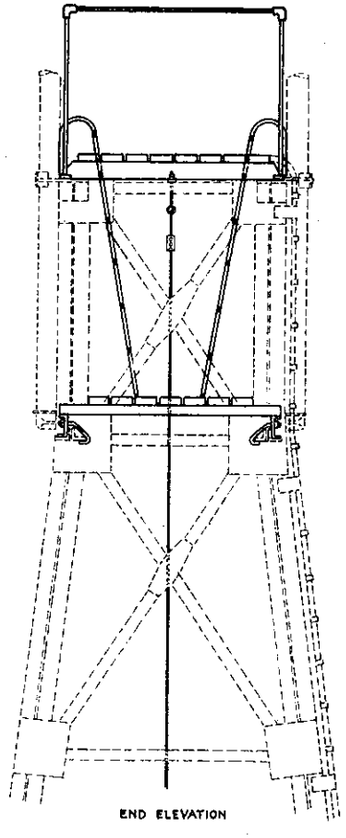
UPPER DECK



HORIZONTAL ELEVATION



LOWER DECK



END ELEVATION

REVISIONS
REDRAWN IN PART FROM APPROVED PLAN S-430-A, DATED 2-11-22, AND REVISED.
B AUGUST 26, 1931.
APPROVED A.H. Rudd

1 SHEET

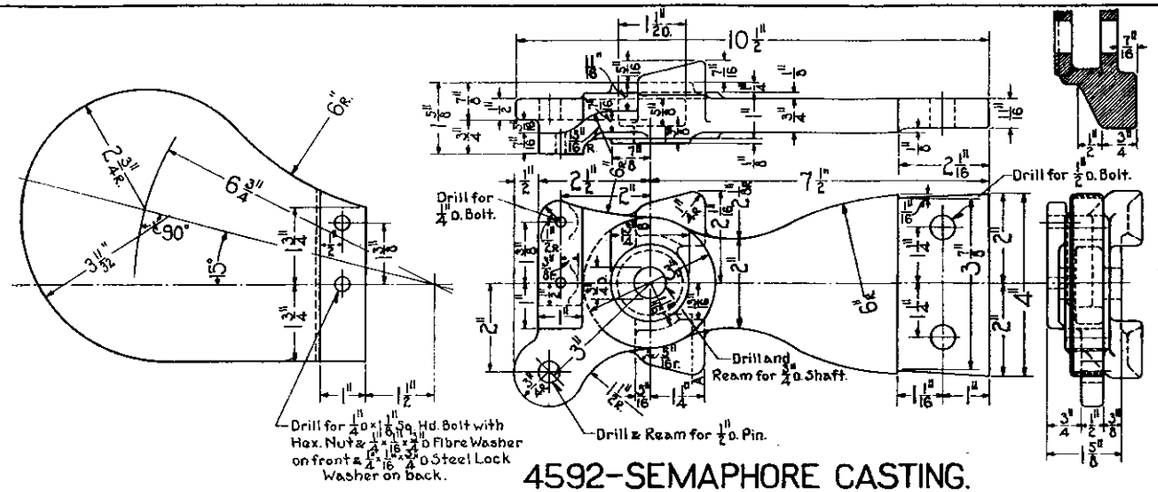
S-432-B

THE PENNSYLVANIA RAILROAD
STANDARD
ARRANGEMENT OF DECKING RAILING AND CABLE SUPPORTS
ON SIGNAL BRIDGES

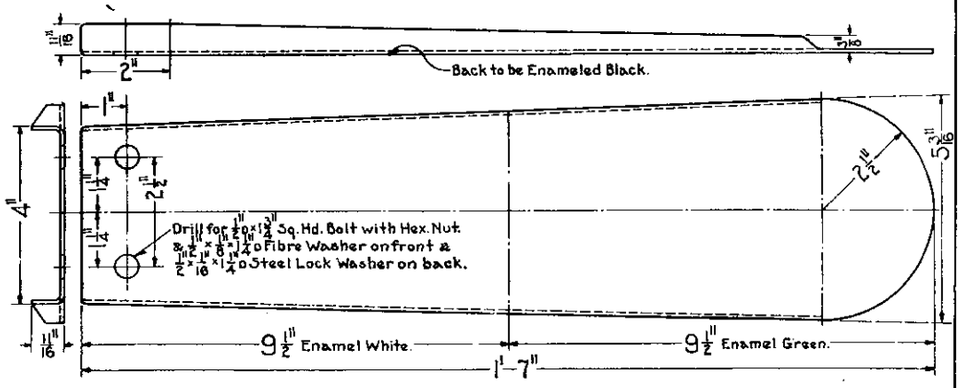
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA MAY 22, 1922

Approved A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer

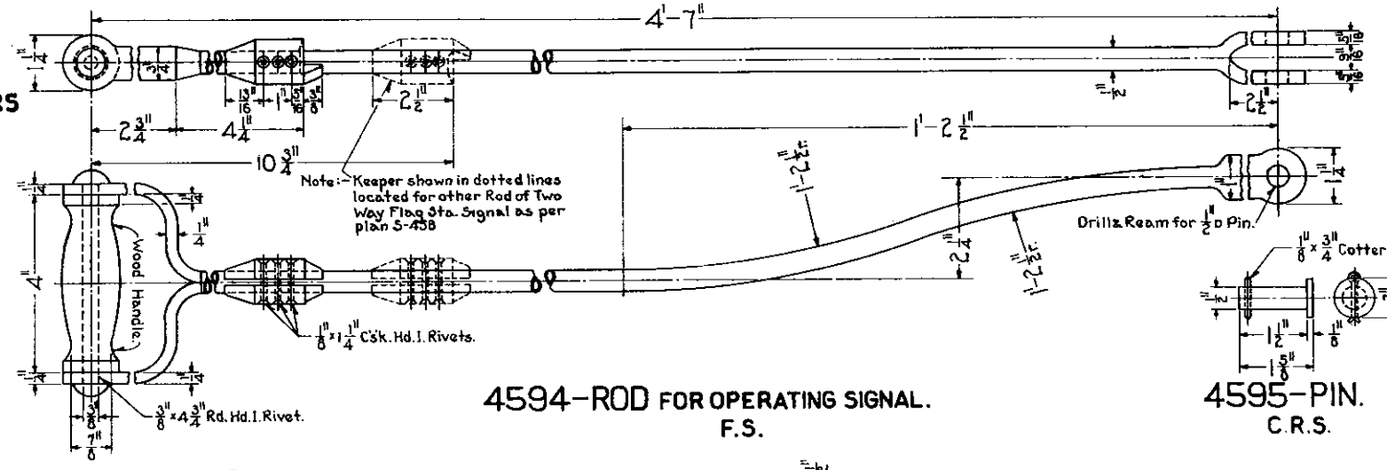


4592-SEMAPHORE CASTING.
C.I.



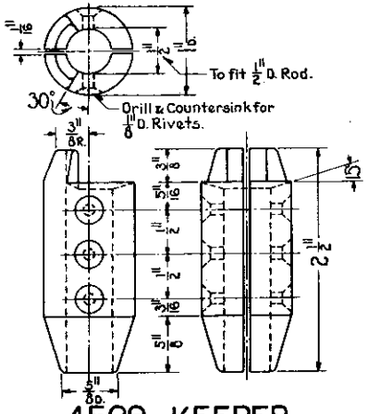
4593-BLADE WITH BOLTS, NUTS AND WASHERS.
NO. 18 U.S. STD. SHEET STEEL.

4591-SHIELD WITH BOLTS NUTS AND WASHERS
NO. 16 U.S. STD. SHEET STEEL

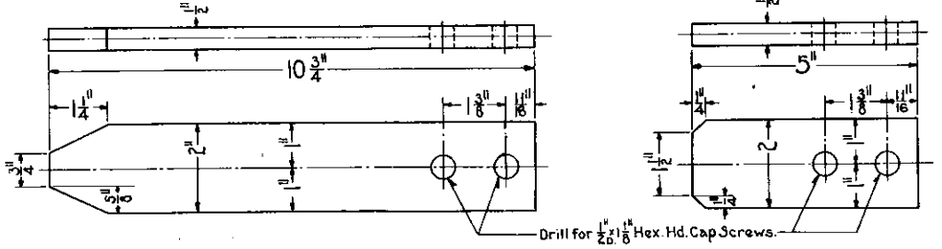


4594-ROD FOR OPERATING SIGNAL.
F.S.

4595-PIN.
C.R.S.



4596-KEEPER.
C.I.



4597-BRACKET LAMP, WITH CAP SCREWS.
W.I.

4598-BRACKET LAMP, WITH CAP SCREWS.
W.I.

REVISIONS
8-FEB., 23, 1927
APPROVED:- A.H. Rudd

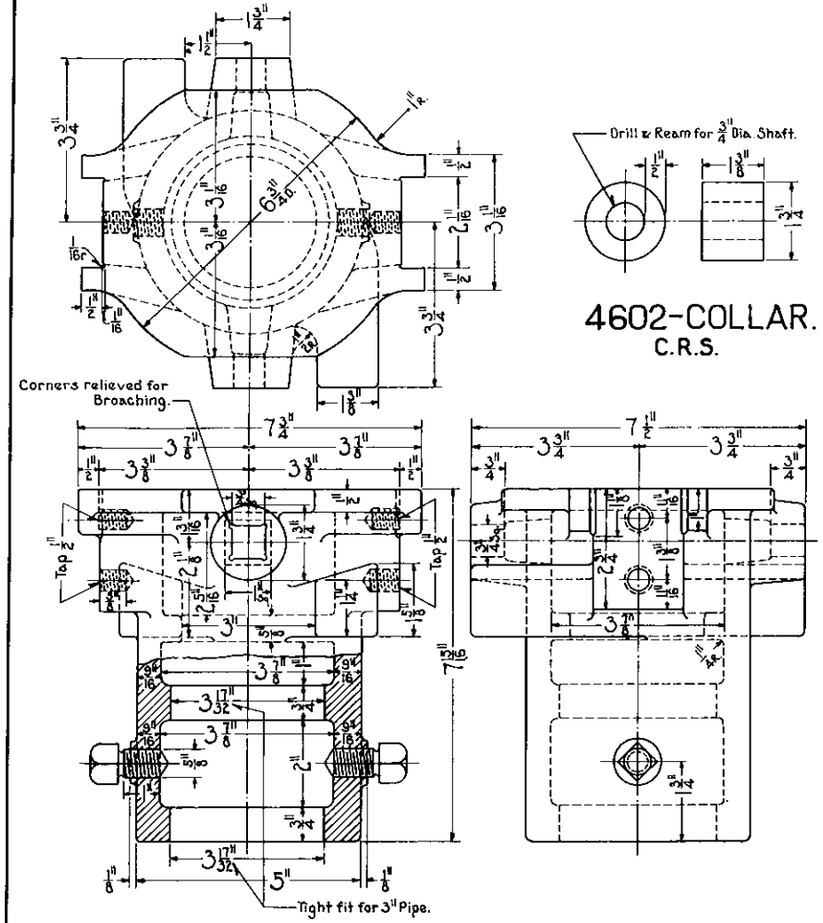
1 SHEET

S-459-B

THE PENNSYLVANIA RAILROAD
STANDARD
SIGNAL PARTS
ONE AND TWO-WAY FLAG STATION
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., APRIL 8, 1921

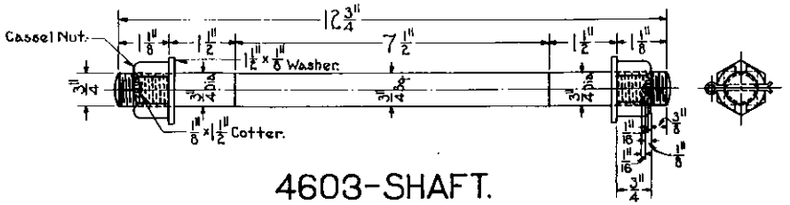
Correct
A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer

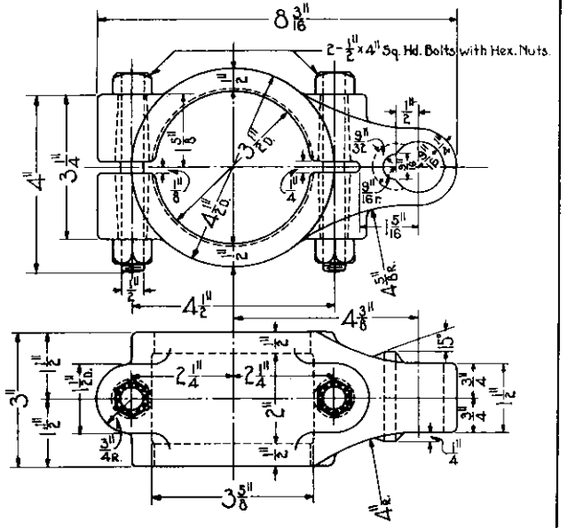


4601-BEARING, SEMAPHORE WITH 2 SET SCREWS.
C.I.

4602-COLLAR.
C.R.S.



4603-SHAFT.
C.R.S.



4604-CLAMP.
C.I.

REVISIONS.

1 SHEET

S-460-A

PENNSYLVANIA SYSTEM

STANDARD
SIGNAL PARTS
ONE AND TWO-WAY FLAG STATION

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., APRIL 8, 1921

Correct
A. H. Rudd
Chief Signal Engineer

Approved
Chief Engineer

0" 1" 3" 5"
SCALE
For all parts.

W.F.K.

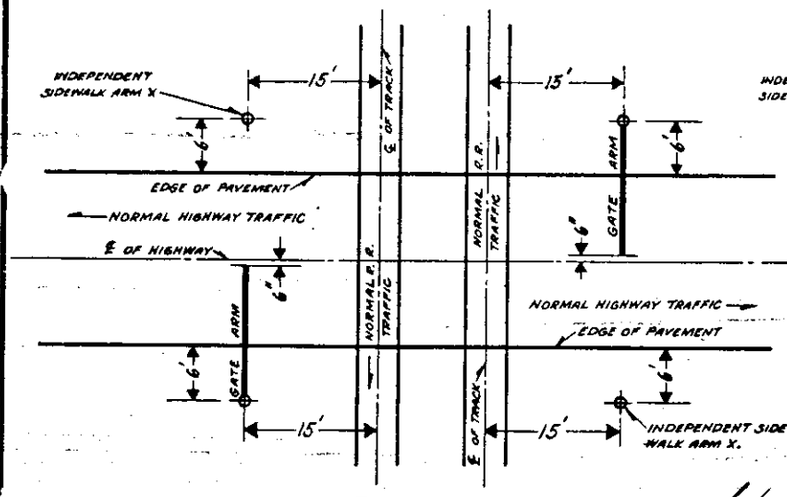


FIGURE 1.

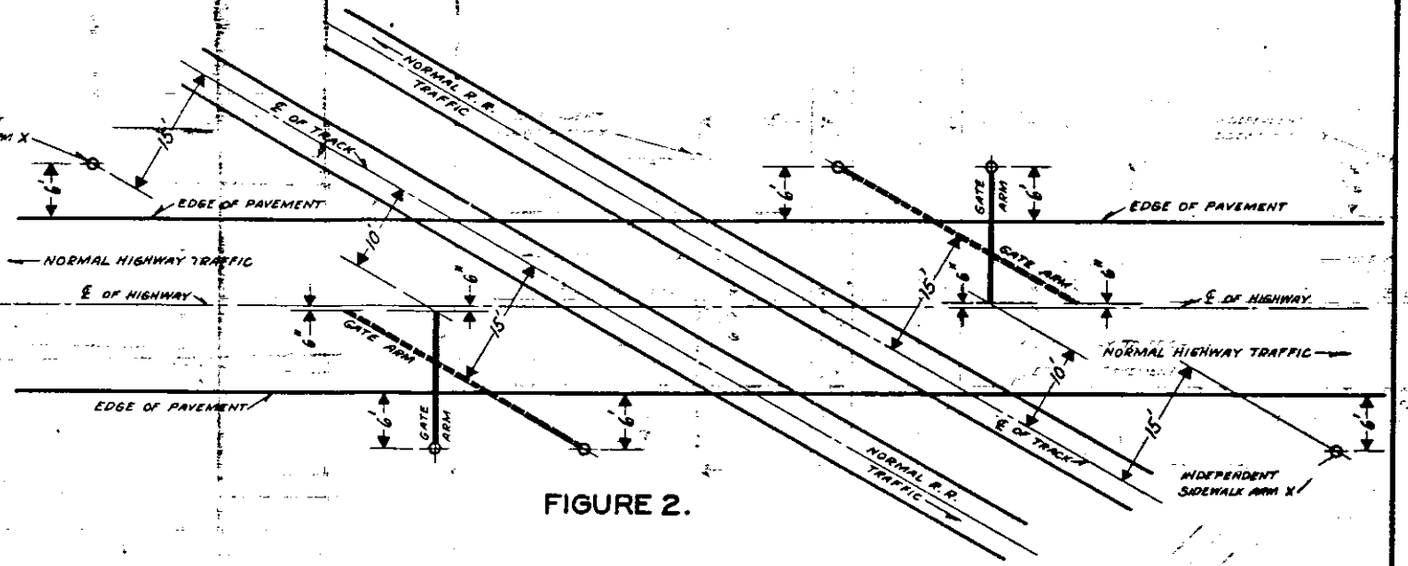


FIGURE 2.

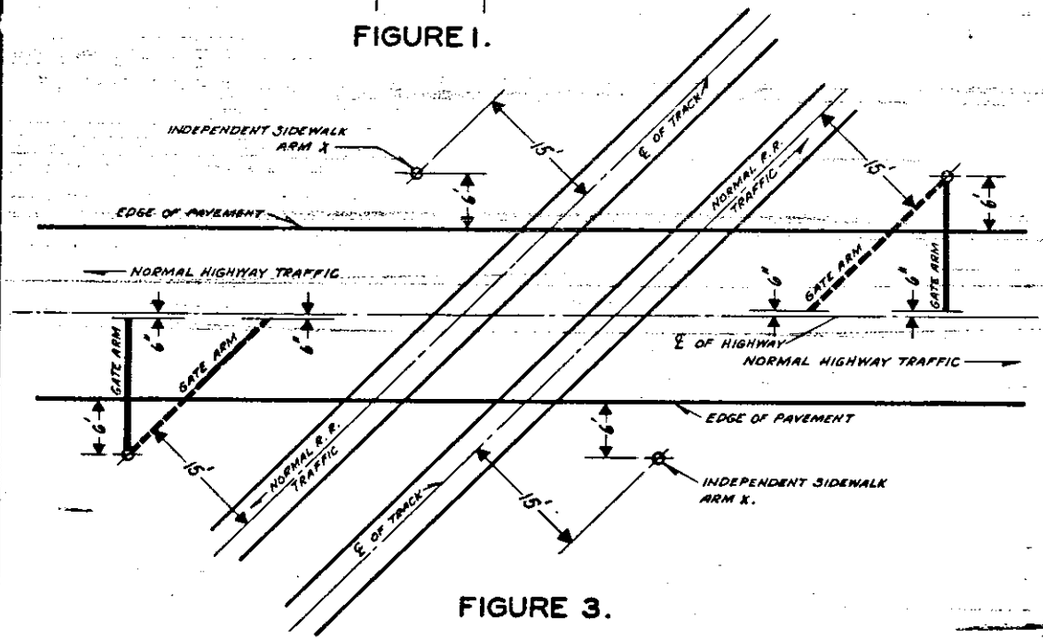


FIGURE 3.

NOTES :-

1. AUTOMATIC CROSSING GATE ARMS SHALL BE INSTALLED AT RIGHT ANGLES TO THE HIGHWAY, EXCEPT :-
   - (a) WHERE PHYSICAL CHARACTERISTICS DO NOT PERMIT. (CARE MUST BE EXERCISED TO AVOID INTERFERENCE WITH OVERHEAD WIRES).
   - (b) WHEN REQUIRED OTHERWISE BY STATE OR LOCAL AUTHORITY.
2. AUTOMATIC CROSSING GATE ARMS SHOULD NOT EXCEED 34 FEET IN LENGTH. GATE ARMS EXCEEDING 34 FEET IN LENGTH WHEN REQUIRED BY THE STATE, LOCAL AUTHORITY, OR OTHER CONDITIONS, OR WHERE TROUBLE MIGHT BE EXPECTED DUE TO SNOW, ICE OR WIND, SHOULD BE EQUIPPED WITH DRIVE-DOWN MECHANISM.
3. ADDITIONAL FLASHING TIME SHALL BE PROVIDED WHERE THE LOCATION OF GATE ARM MATERIALLY INCREASES THE DISTANCE BETWEEN GATE ARM AND CENTER OF TRACK INVOLVED (SEE DRAWING NO. S-860).
4. WHERE PROTECTION FOR SIDEWALK IS REQUIRED BY STATE OR LOCAL AUTHORITY :-
   - (a) WHERE PRACTICABLE, HIGHWAY GATE ARM MECHANISM SHALL BE SO LOCATED AS TO PROVIDE PROTECTION TO BOTH SIDEWALK AND HIGHWAY.
   - (b) WHERE NOT PRACTICABLE TO FOLLOW (a), ADDITIONAL SIDEWALK ARM ATTACHED TO AND OPERATED BY HIGHWAY ARM MECHANISM SHALL BE PROVIDED.
   - (c) INDEPENDENT SIDEWALK ARMS X TO BE PROVIDED ONLY WHEN REQUIRED AS PORTION OF PROTECTION AT ANY PARTICULAR CROSSING.

REVISIONS

1 SHEET

S-462-A

THE PENNSYLVANIA RAILROAD

STANDARD

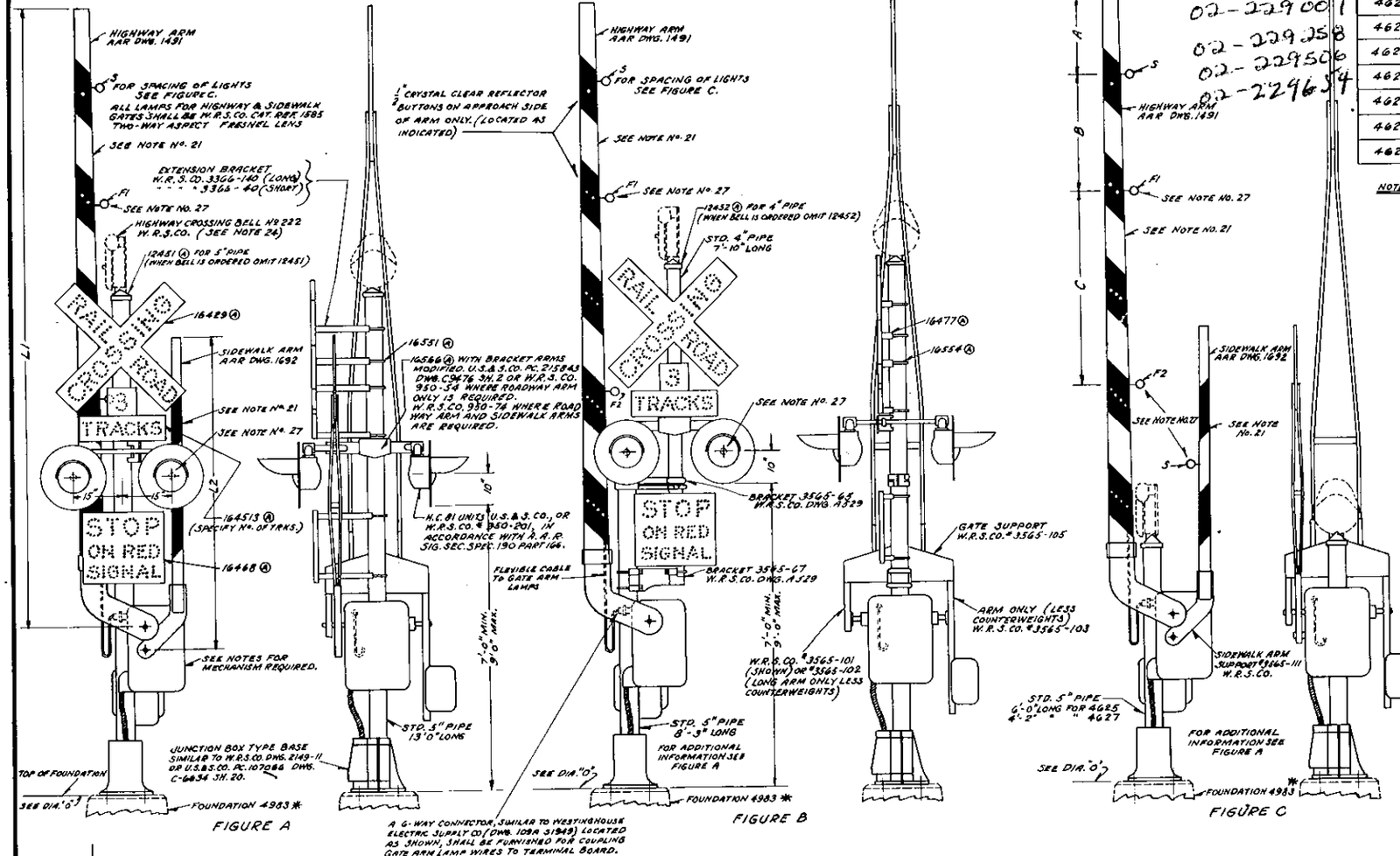
LAYOUT

FOR AUTOMATIC HIGHWAY CROSSING GATES.

OFFICE OF CHIEF ENGINEER, PHILA., PA., SEPTEMBER 30, 1947.

Approved _____ Assistant Chief Engineer - T.C.& S.

Approved _____ Chief Engineer



NOTE:- * WHERE SOIL CONDITIONS ARE SUCH THAT A DEEPER FOUNDATION IS DESIRED, 4984 MAY BE APPLIED.

ORDERING REFERENCE

ORDER NUMBER	FIGURE	REQUIRED	STORES CAT. REF. No.
4621	A	HIGHWAY & SIDEWALK ARMS - SIMILAR TO W.R.S.CO. DWG. A538, A539 MECHANISM W.R.S.CO. DWG. 3564-72, 3564-122.	02-2290011 2A-5621
4622	A	HIGHWAY ARM - NO SIDEWALK ARM - SIMILAR TO W.R.S.CO. DWG. A524, A525 MECHANISM - W.R.S.CO. DWG. 3564-71, 3564-121.	02-229358 2A-5622
4623	B	HIGHWAY ARM - NO SIDEWALK ARM - SIMILAR TO W.R.S.CO. DWG. A539 MECHANISM - W.R.S.CO. DWG. 3564-71, 3564-121.	02-229506 2A-5623
4624	C	HIGHWAY & SIDEWALK ARMS - SIMILAR TO W.R.S.CO. DWG. A550, A551 MECHANISM - W.R.S.CO. DWG. 3564-72, 3564-122.	02-229654 2A-5624
4625	C	HIGHWAY ARM - NO SIDEWALK ARM - SIMILAR TO W.R.S.CO. DWG. A542, A543 MECHANISM - W.R.S.CO. DWG. 3564-71, 3564-121.	2A-5625
4626	C	SIDEWALK ARM - NO HIGHWAY ARM - SIMILAR TO W.R.S.CO. DWG. A598. MECHANISM - W.R.S.CO. DWG. 3564-71, 3564-121	2A-5626
4627	C	SIDEWALK ARM - NO HIGHWAY ARM - SIMILAR TO W.R.S.CO. DWG. A503 GL-1R MECHANISM - W.R.S.CO. DWG. 3561-216L-90 (G.R.S.CO. SIGNAL MECH.)	2A-5627

NOTES:-

1. MECHANISM DWG. 3564-71 IS "GRAVITY DOWN TYPE" (U.S.&S.CO.) FOR HIGHWAY ARM ONLY.
2. " " 3564-72 " " " " " " AND SIDEWALK ARMS.
3. " " 3564-181 " POWER " " " " " ARM ONLY.
4. " " 3564-182 " " " " " " AND SIDEWALK ARMS.
5. " " 3561-216L-90 IS GRAVITY " " (G.R.S.CO.) " SIDEWALK ARM ONLY.
6. " " 3564-72, 3564-71, X501-216L APPLIED WHERE ARMS ARE NOT OVER 34 FEET.
7. " " 3564-182, 3564-121 APPLIED WHERE ARMS ARE OVER 34 FEET OR OTHERWISE REQ.
8. PAINTING SHALL BE IN ACCORDANCE WITH AAR 316. SPEC. SPEC. No. 120 MANUAL PART 1-10 AND DWG. 169C. FRONT EXPOSED PORTIONS OF LIGHT UNITS, GATE LAMPS, HOODS AND BACKGROUNDS SHALL BE PAINTED WITH A FINISH COAT OF DUCO DULL FINISH BLACK S.C.R. 41-2020. ALL OTHER PARTS SHALL BE PAINTED ALUMINUM.
9. FOR SIDEWALK ARMS ONLY, USE FND. 4983, EXCEPT APPLY 4-4983D INSTEAD OF 6.
10. WHERE POWER LINES PASS HIGHWAY GATE ARMS, CARE SHOULD BE EXERCISED TO MAKE CERTAIN THAT GATE ARM WILL AT ALL TIMES BE SAFELY CLEAR OF SUCH POWER WIRES. GATE MECHANISMS SHALL BE GROUNDED.
11. GATE ARM LAMPS F1 AND F2 SHALL FLASH IN UNISON WITH THE HC81 UNITS, LAMP S SHALL SHOW STEADY LIGHT.
12. THE USE OF PHANKILL SHIELD TO THE HC81 UNITS TO BE MADE AS REQUIRED.
13. THE OPERATING MECHANISM SHALL MEET THE REQUIREMENTS OF AAR SIG. SEC. SPEC. No. 199, MANUAL PART 9K, AND SHALL BE COMPLETE WITH ALL PARTS READY FOR OPERATION AND CLAMPING TO STANDARD 5" PIPE.
14. FLASHING LIGHT SIGNALS SHALL BE MOUNTED ON SAME MAST AS CROSSING SIGN, BEING LOCATED IN ACCORDANCE WITH SHEET No. 1 OF THIS DRAWING.
15. PARTS MARKED WITH (A) REFER TO CURRENT ISSUE OF AAR SIG. SEC. DRAWINGS.
16. FOR CONTROL CIRCUITS FOR MECHANISMS, LIGHTS AND BELL SEE DRAWING S-460.
17. CROSSING SIGN (A) 16429, AS INDICATED, SHALL BE APPLIED AS STANDARD. OTHER CROSSING SIGN, ALSO ILLUMINATED STOP SIGN AAR SIG. SEC. DWG. 1656 E IN LIEU OF "STOP ON RED SIGNAL" SIGN ARE PERMISSIBLE WHERE REQUIRED BY LOCAL OR STATE AUTHORITIES.
18. STAINING OF GATE ARMS SHALL BE IN ACCORDANCE WITH AAR 516. SEC. DWG. No. 1491.
19. HIGHWAY GATE ARMS SHOULD NOT EXCEED 34 FEET IN LENGTH, EXCEPT WHEN REQUIRED BY STATE, LOCAL AUTHORITIES, OR LOCAL CONDITIONS. DRIVE DOWN TYPE MECHANISMS SHALL BE USED FOR GATES OVER 34 FT. IN LENGTH OR WHERE TROUBLE MAY BE ANTICIPATED FROM WIND, ICE OR SNOW.
20. LAMP S FOR SIDEWALK ARM SHALL BE LOCATED AT CENTER OF ARM. SEE TABLE HL FOR SPACING OF LAMPS ON HIGHWAY ARM.
21. WHEN ORDERING SPECIFY LENGTH L1 & L2 OF HIGHWAY AND SIDEWALK ARMS, IF ARMS ONLY, ALSO SPECIFY TYPE OF GATE ARM CASTING.
22. FOUNDATIONS SHALL BE ORDERED SEPARATELY.
23. FOUNDATION BOLTS SHALL NOT BE FURNISHED WITH FIGURES A, B & C.
24. ONE HIGHWAY CROSSING BELL, LOCATED ON TOP OF MAST, SHALL BE INSTALLED AT EACH CROSSING, EXCEPT WHERE LOCAL CONDITIONS, OR LOCAL, STATE, OR FEDERAL AUTHORITIES REQUIRE OTHERWISE.
25. INSTALLATION AND MAINTENANCE OF OPERATING MECHANISMS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
26. SIDEWALK GATE ARM ONLY, ORDER NUMBER 4626 SHALL APPLY AT LOCATIONS WHERE OTHER GATE ARM MECHANISMS ARE OF THE SAME TYPE, PROVIDED THERE IS SUFFICIENT SPACE FOR PARTS TO CLEAR HIGHWAY. AT LOCATIONS WHERE THE CLEARANCE MENTIONED IS NOT SUFFICIENT AND AT LOCATIONS WHERE THE TYPE OF MECHANISM DOES NOT MAKE ANY MATERIAL DIFFERENCE, ORDER NUMBER 4627 SHALL BE APPLIED.
27. USE 10 V.-18 W. LAMPS PC. 151138 (U.S.&S.CO.) FOR "HC-81" UNITS AND FOR S, F1 & F2 LIGHTS ON GATE ARMS, WITH CIRCUITS ARRANGED TO PROVIDE 9.0 TO 9.5 VOLTS AT LAMPS.

LIGHT BEAMS:- FOR GROUND MASTS: FRONT AND BACK LIGHTS SHALL BE PROVIDED WITH 30° HORIZONTAL SPREAD AND 15° DOWNWARD DEFLECTING COVER GLASS. FOR UNUSUAL FIELD CONDITIONS SPECIAL LENS COMBINATIONS MAY BE OBTAINED.

TABLE HL

SPACING OF LAMPS ON HIGHWAY GATE ARMS

LENGTH OF GATE ARM	DIMENSION A	DIMENSION B	DIMENSION C
13'	6"	24"	5'
14'	6"	36"	5'
15'	18"	36"	5'
16' & 17'	24"	36"	5'
18' & 19'	28"	41"	5'
20' TO 23'	28"	4'	5'
24' TO 28'	28"	5'	5'
29' TO 31'	36"	6'	6'
32' TO 34'	36"	7'-6"	7'-6"
35' TO 37'	36"	9'	9'
38' & OVER	36"	10'	10'

REVISIONS

SHEET 2 OF 2.

S-462-A

THE PENNSYLVANIA RAILROAD

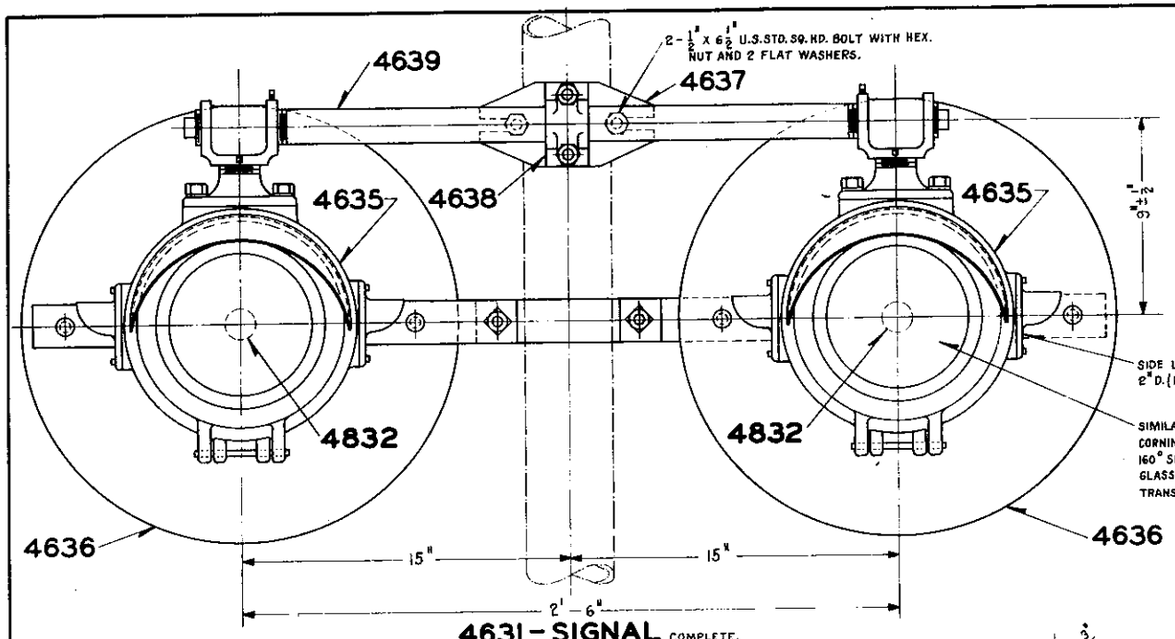
STANDARD

AUTOMATIC CROSSING GATE AND SIGNAL ASSEMBLAGE

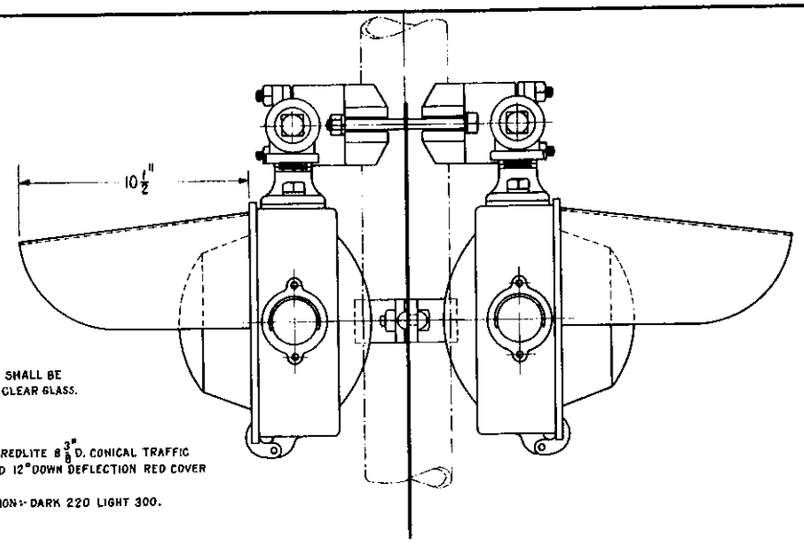
OFFICE OF CHIEF ENGINEER, PHILA., PA., OCTOBER 20, 1949.

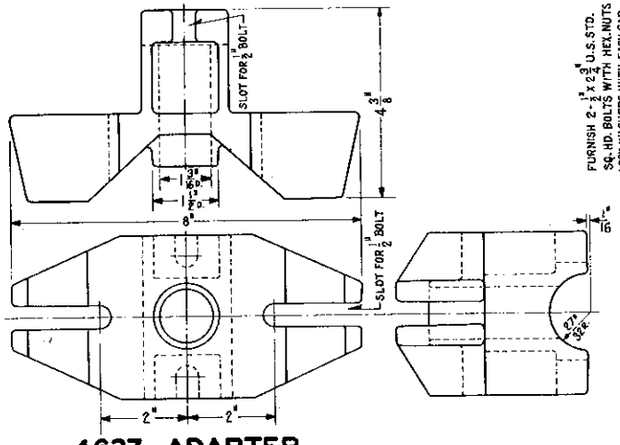
Approved W. G. Salmonson
Assistant Chief Engineer - Signals

Approved J. T. Wallis
Chief Engineer

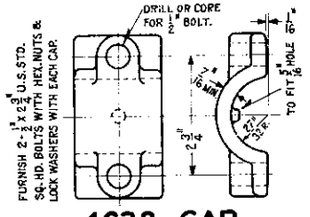


4631 – SIGNAL COMPLETE.
(4 UNIT – 2 DIRECTION)

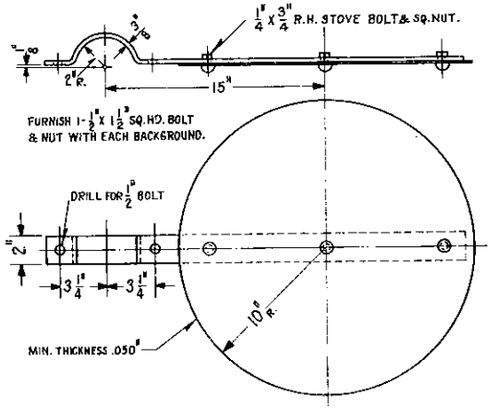




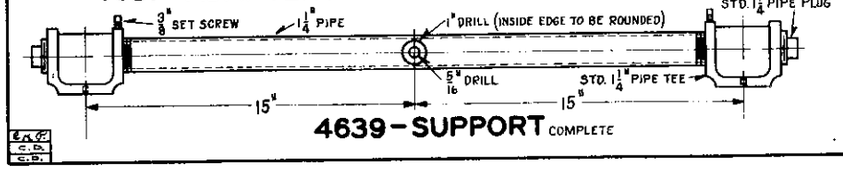
4637 – ADAPTER CAST IRON



4638 – CAP COMPLETE.
CAST IRON



4636 – BACKGROUND COMPLETE



4639 – SUPPORT COMPLETE

NOTE:-
1. ALL MACHINE SCREWS, WASHERS, HINGE PINS, COTTER PINS ETC., EXPOSED TO THE WEATHER SHALL BE OF NON-CORROSIVE METAL, OR CADMIUM PLATED.
2. SIGNAL CASE SHALL BE EQUIPPED WITH HEX. HEAD BOLT FOR LOCKING.
3. HOODS SHALL BE MADE SO THAT THEY CAN BE ROTATED APPROX. 25° IN EITHER DIRECTION FROM CENTER POSITION.
4. SIGNAL UNITS SHALL BE EQUIPPED WITH INSULATED RECEPTACLE FOR SINGLE CONTACT BAYONET CANDELABRA BASE AND WIRE TERMINALS. WIRES SHALL BE RUN BETWEEN RECEPTACLE AND TERMINALS.
5. SIGNAL UNITS SHALL BE COMPLETE FOR ATTACHING TO 1 1/4" STD. TEE.
6. BACKGROUNDS AND HOODS SHALL BE MADE OF COPPER BEARING STEEL.
7. SIGNALS SHALL BE WIRED IN ACCORDANCE WITH PLAN NO. S-860.
8. SIGNALS SHALL NOT BE LIGHTED, EXCEPT FOR APPROACHING TRAINS, WHEN RED LIGHTS FLASHING ALTERNATELY (30 TO 45 TIMES PER MINUTE) MUST BE DISPLAYED.
9. UNLESS OTHERWISE ORDERED, HIGHWAY CROSSING SIGNAL SHALL BE INSTALLED ON HIGHWAY CROSSING SIGN.
10. CONCRETE FOUNDATION SHALL BE USED FOR THE HIGHWAY CROSSING SIGN.
11. PAINT ALL OUTSIDE METAL PARTS BLACK.

REVISIONS
REDRAWN FROM APPROVED PLAN S-463-C, DATED MAR. 22, 1928 AND REVISED.

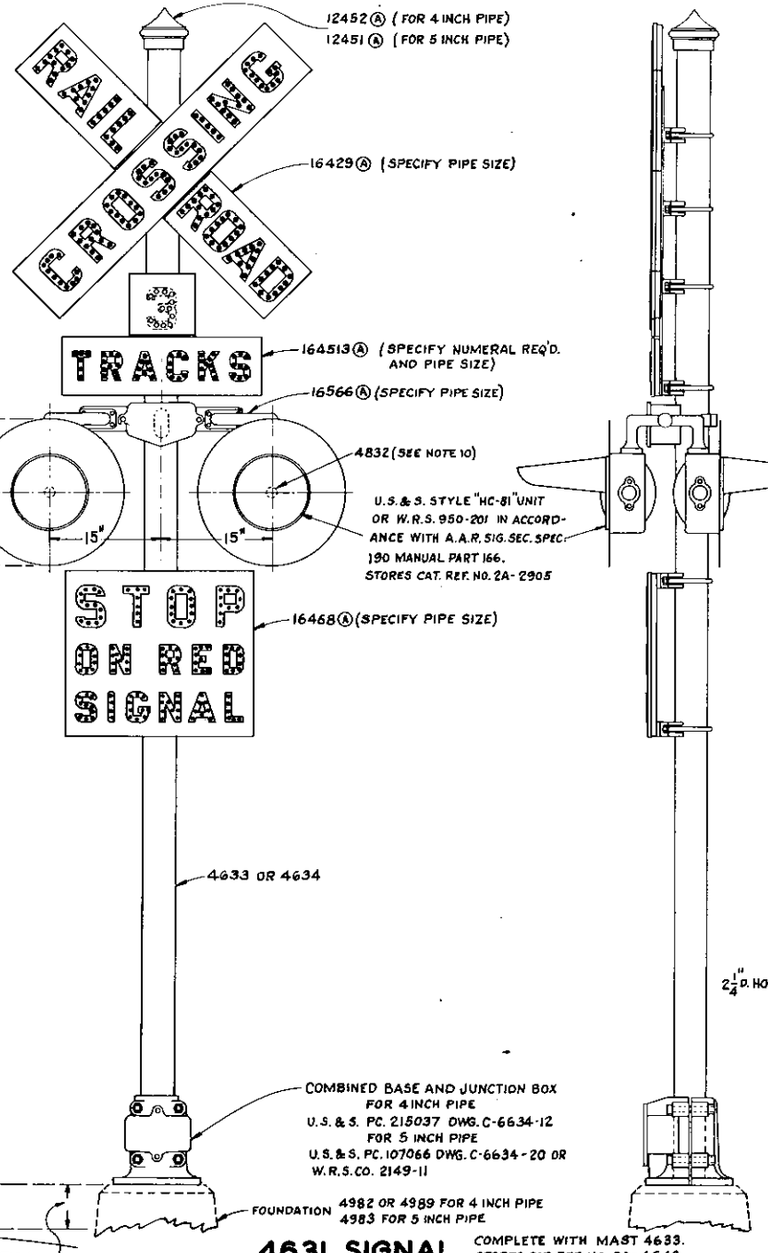
1 SHEET

S-463-D

THE PENNSYLVANIA RAILROAD
STANDARD
SIGNAL
HIGHWAY CROSSING
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., APRIL 8, 1929

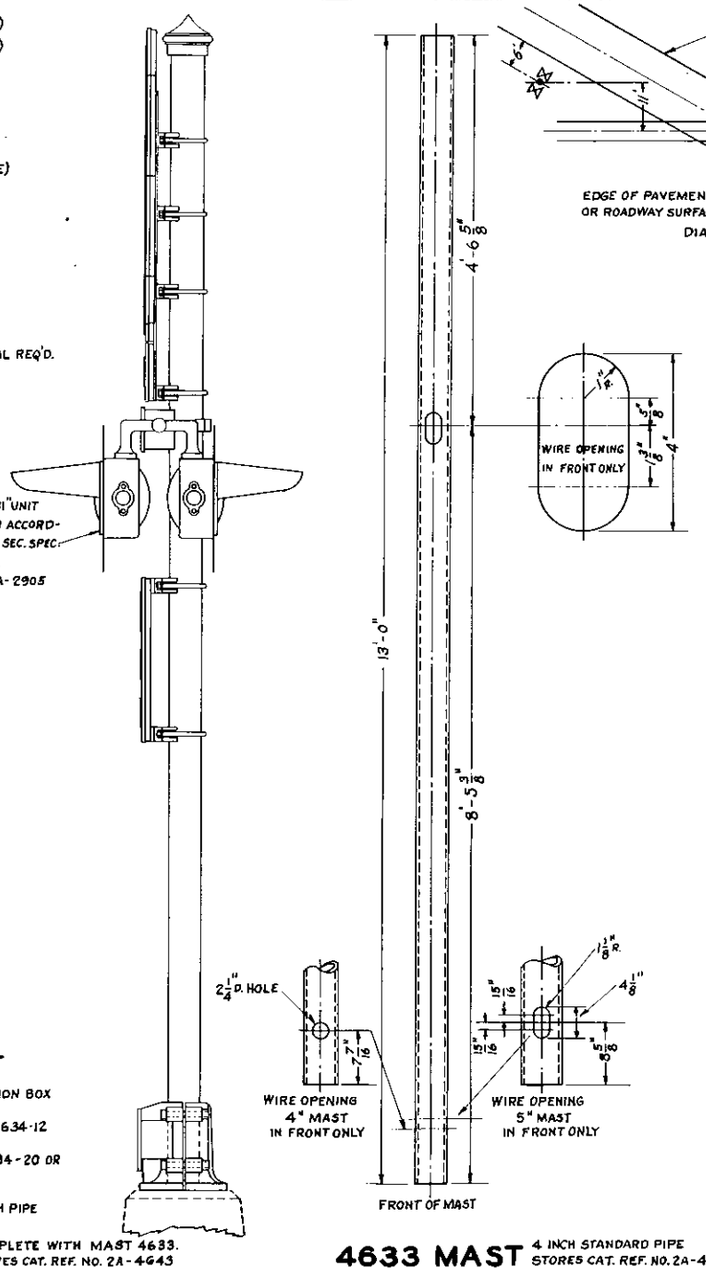
Approved
Chief Signal Engineer

Approved
Chief Engineer



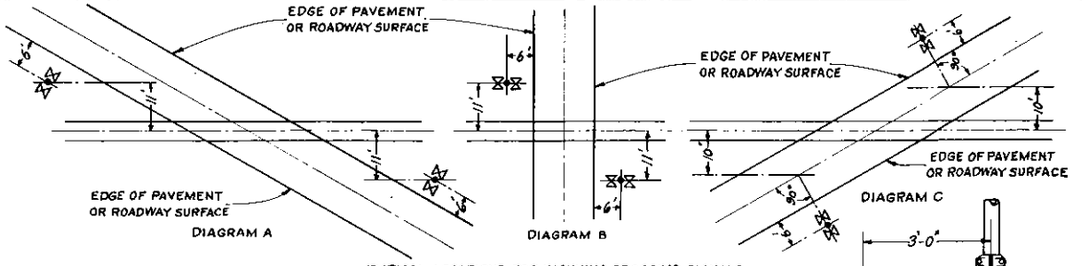
4631 SIGNAL COMPLETE WITH MAST 4633. STORES CAT. REF. NO. 2A-4643

4632 SIGNAL COMPLETE WITH MAST 4634. STORES CAT. REF. NO. 2A-4632

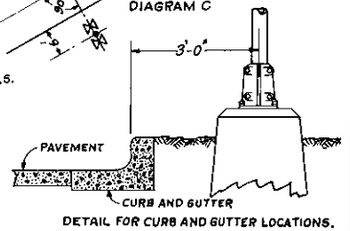


4633 MAST 4 INCH STANDARD PIPE STORES CAT. REF. NO. 2A-4644

4634 MAST 5 INCH STANDARD PIPE STORES CAT. REF. NO. 2A-4634



TYPICAL LOCATIONS FOR HIGHWAY CROSSING SIGNALS.



DETAIL FOR CURB AND GUTTER LOCATIONS.

NOTES:

1. UNLESS OTHERWISE ORDERED, FLASHING LIGHT SIGNALS SHALL BE MOUNTED ON SAME MAST AS CROSSING SIGN (CROSSBUCK), BEING LOCATED IN ACCORDANCE WITH NOTE 13.
2. CROSSING SIGNS AS INDICATED, SHALL BE STANDARD. "STOP" SIGN A.A.R. S16. SEC. DRAWING 1654 IN LIEU OF "STOP ON RED SIGNAL" SIGN AND OTHER SIGNS MAY BE INSTALLED ONLY WHEN REQUIRED BY LOCAL OR STATE AUTHORITIES.
3. WHERE ONLY ONE TRACK CROSSES A HIGHWAY, THE "NUMBER OF TRACKS" 164513 Ⓐ SHALL BE INSTALLED ONLY WHEN REQUIRED BY LOCAL OR STATE AUTHORITIES.
4. PROVIDE PHANKILL SHIELDS IN "HC-81" UNITS IF NECESSARY.
5. PARTS MARKED Ⓐ REFER TO CURRENT ISSUE OF A.A.R. SIG. SEC. DRAWINGS.
6. ONE HIGHWAY CROSSING BELL, LOCATED ON TOP OF MAST SHALL BE INSTALLED AT EACH CROSSING IF DESIRED, OR IF REQUIRED BY LOCAL OR STATE AUTHORITIES.
7. FOR NEW WORK, CONSIDERATION SHOULD BE GIVEN TO THE FUTURE ADDITION OF AUTOMATIC CROSSING GATES. IF GATES ARE TO BE ADDED, MAST 4634 WITH PROPER BASE AND FOUNDATION SHALL BE INSTALLED.
8. FOUNDATIONS WITH FOUNDATION BOLTS SHALL BE ORDERED SEPARATELY.
9. FOR TYPICAL CONTROL CIRCUITS SEE DRAWING S-860.
10. USE LAMP 4832 AS STANDARD. IF BETTER ILLUMINATION IS REQUIRED, USE 10 VOLT, 18 WATT LAMP U.S.& S. PC. 151138 WITH CIRCUITS ARRANGED TO PROVIDE 9.0 TO 9.5 VOLTS AT LAMP.
11. SIGNALS SHALL NOT BE LIGHTED EXCEPT FOR AN APPROACHING TRAIN, THEN RED LIGHTS FLASHING ALTERNATELY 30 TO 45 TIMES PER MINUTE MUST BE DISPLAYED UNTIL TRAIN CLEARS THE CROSSING.
12. ALL MACHINE SCREWS, WASHERS, HINGE PINS, COTTER PINS, ETC. EXPOSED TO THE WEATHER SHALL BE OF NON-CORROSIVE METAL, OR CADMIUM PLATED. BACKGROUNDS AND HOODS SHALL BE MADE OF COPPER BEARING STEEL.
13. DIAGRAMS A, B & C INDICATE TYPICAL LOCATIONS FOR SIGNALS, ACTUAL LOCATIONS ARE DETERMINED BY CONDITIONS IN THE FIELD.
14. PAINTING SHALL BE IN ACCORDANCE WITH A.A.R. S16. SEC. SPEC. 120 MANUAL PART 110. FRONT EXPOSED PORTIONS OF LIGHT UNITS, HOODS AND BACKGROUNDS SHALL BE PAINTED WITH A FINISH COAT OF DULL BLACK S.C.R.A.T-2020 OR 47-3208. ALL OTHER PARTS SHALL BE PAINTED WITH ALUMINUM.
15. AFTER INSTALLATION, ALL FOUNDATION BOLT HOLES IN BASE SHALL BE FILLED WITH NO-OX-ID COMPOUND.
16. IF SOIL CONDITIONS REQUIRE A DEEPER FOUNDATION, AN EXTRA FILLER BLOCK MAY BE ADDED, USING LONGER ANCHOR BOLTS.

REVISIONS

REDRAWN FROM APPROVED DRAWING S-463-D, DATED APRIL 8, 1931. REVISED TO SHOW A.A.R. S16. SEC. SIGNS & PARTS. AND THE COMPLETE HIGHWAY CROSSING SIGNAL. PARTS 4633 & 4634 AND LAMP NO. 4832 TABLES ADDED. NOTES CHANGED ACCORDINGLY.

LIGHT BEAMS

FRONT AND BACK LIGHTS SHALL BE PROVIDED WITH 30° HORIZONTAL SPREAD AND 15° DOWNWARD DEFLECTING COVER GLASS. FOR UNUSUAL FIELD CONDITIONS SPECIAL LENS COMBINATIONS MAY BE OBTAINED.

1 SHEET

S-463-E

THE PENNSYLVANIA RAILROAD

STANDARD

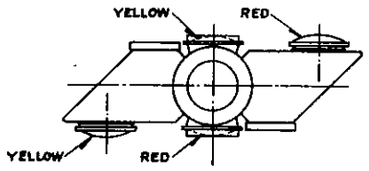
SIGNAL

FLASHING LIGHT HIGHWAY CROSSING

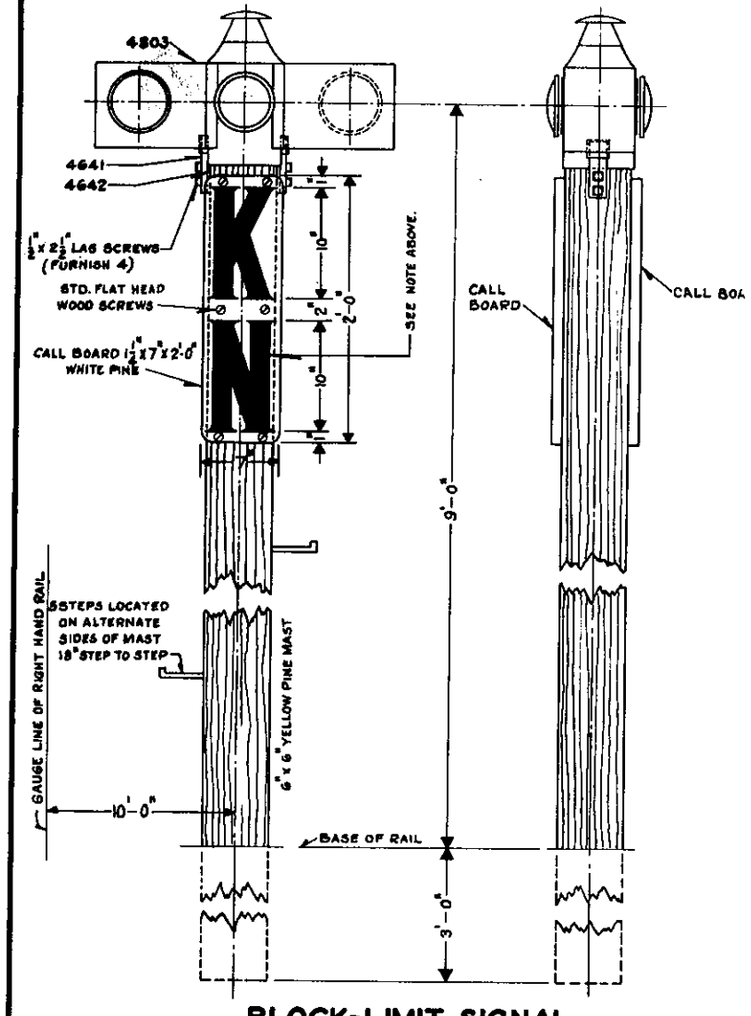
OFFICE OF CHIEF ENGINEER, PHILA., PA., FEBRUARY 26, 1952.

Approved *W. G. Salmonson*
Assistant Chief Engineer-Signals

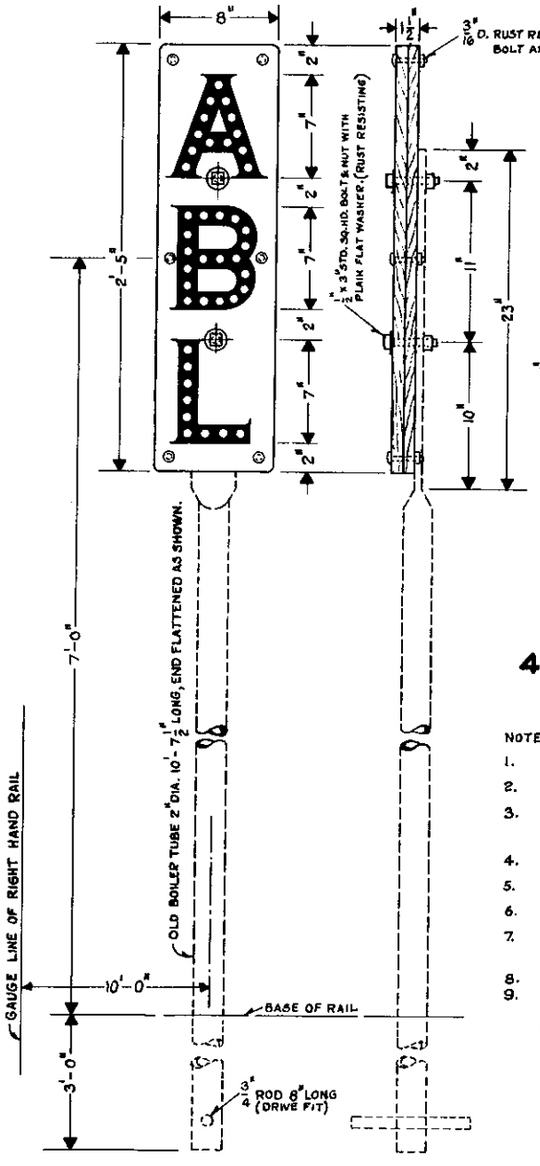
Approved *J. Rossitter*
Chief Engineer



NOTE :- CALL LETTERS SHOWN ARE TYPICAL. IF BLOCK-LIMIT STATION IS DESIGNATED BY NAME, THE HEIGHT OF LETTERS SHOULD BE GOVERNED BY LENGTH OF NAME, BUT NOT LESS THAN 4 INCHES HIGH. NAME MAY BE PLACED EITHER VERTICALLY OR HORIZONTALLY, BUT SHOULD NOT EXTEND BEYOND LIMIT OF LAMP CASE.

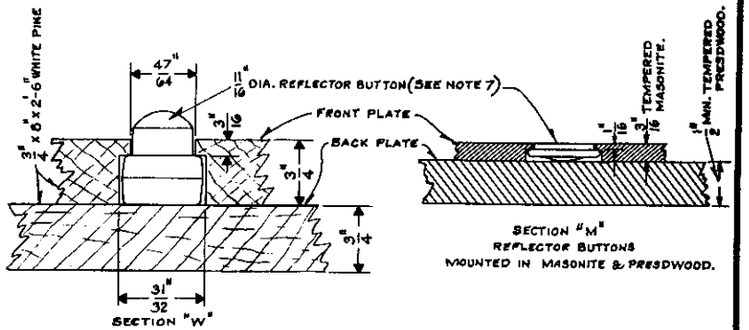


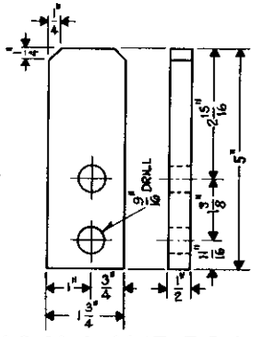
BLOCK-LIMIT SIGNAL.



APPROACH BLOCK-LIMIT SIGN.

STORES CAT. REF. NO. 2A-2448.

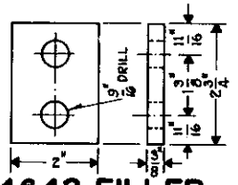




4641 LAMP BRACKET

O. H. S.

STORES CAT. REF. NO. 2A-384.



4642 FILLER

O. H. S.

STORES CAT. REF. NO. 2A-4109.

NOTES :-

BLOCK-LIMIT SIGNAL

1. PAINT FRONT, BACK AND EDGES OF CALL BOARD BLACK, AND THE LETTERS WHITE.
2. PAINT MAST AND LAMP CASE BLACK.
3. LETTERS SHALL BE CONDENSED TYPE IN ACCORDANCE WITH M.W. PLAN NO. 78000-C.

APPROACH BLOCK-LIMIT SIGN.

4. PAINT FACE OF SIGN, CLEVELAND BUFF WITH LETTERS BLACK
5. PAINT EDGES & BACK OF SIGN AND PIPE POST BLACK.
6. LETTERS SHALL BE FULL WIDTH IN ACCORDANCE WITH M.W. PLAN NO. 78000-C.
7. REFLECTOR BUTTONS SHALL BE CLEAR (COLORLESS) SIMILAR TO TYPE 2A "REFLEX" BUTTON, PEERLESS MFG. CO. (11/16" DIA.) OR CODE M, STIMSONITE REFLECTOR BUTTON (11/16" DIA.)
8. BOILER TUBING AND ¾" x 3" BOLTS AND WASHERS TO BE FURNISHED BY THE P.R.R. CO.
9. SIGN MAY BE ATTACHED TO BUILDING OR OTHER STRUCTURE TO SUIT LOCAL CONDITIONS, BUT NOT TO SIGNAL MAST.

REVISIONS

REDRAWN FROM APPROVED PLAN S-464-5, DATED AUGUST 4, 1922, LAST REVISED JULY 31, 1924 AND REVISED AS FOLLOWS :- TITLE FORMERLY "SIGN FOR UNATTENDED BLOCK STATION" APPROACH BLOCK LIMIT SIGN AND NOTES ADDED.

D. MAY 17, 1944. NOTE 7 AMPLIFIED. NOTES 8, 9 & SECTION "M" ADDED. SECTION FOR WOOD SIGN DESIGNATED AS "W". DISTANCE FROM GAUGE LINE FORMERLY 7'-6".

APPROVED :- N. L. Stanton.

1 SHEET

S-464-D

THE PENNSYLVANIA RAILROAD

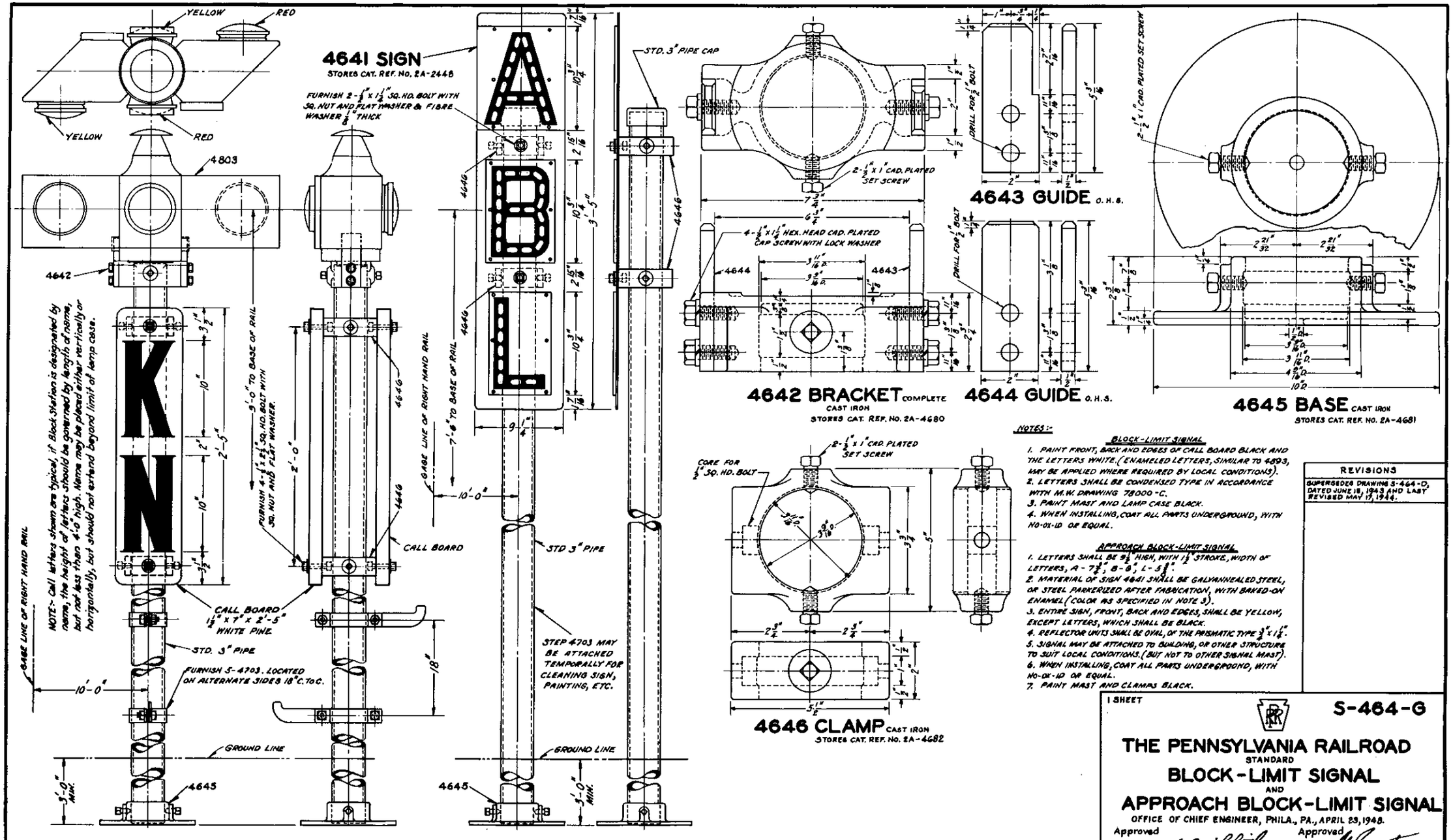
STANDARD

BLOCK-LIMIT SIGNAL AND APPROACH BLOCK-LIMIT SIGN

OFFICE OF CHIEF ENGINEER, PHILA., PA., JUNE 18, 1943.

Approved
N. L. Stanton.
Assistant Chief Engineer-Signals

Approved
J. Minnich
Chief Engineer



NOTES:-

BLOCK-LIMIT SIGNAL

1. PAINT FRONT, BACK AND EDGES OF CALL BOARD BLACK AND THE LETTERS WHITE. (ENAMELED LETTERS, SIMILAR TO 4893, MAY BE APPLIED WHERE REQUIRED BY LOCAL CONDITIONS).
2. LETTERS SHALL BE CONDENSED TYPE IN ACCORDANCE WITH M.W. DRAWING 78000-C.
3. PAINT MAST AND LAMP CASE BLACK.
4. WHEN INSTALLING, COAT ALL PARTS UNDERGROUND, WITH NO-OX-ID OR EQUAL.

APPROACH BLOCK-LIMIT SIGNAL

1. LETTERS SHALL BE 9" HIGH, WITH 1 1/2" STROKE, WIDTH OF LETTERS, A - 7 1/2", B - 6", L - 5 1/2".
2. MATERIAL OF SIGN 4641 SHALL BE GALVANNEALED STEEL, OR STEEL PARKERIZED AFTER FABRICATION, WITH BAKED-ON ENAMEL (COLOR AS SPECIFIED IN NOTE 3).
3. ENTIRE SIGN, FRONT, BACK AND EDGES, SHALL BE YELLOW, EXCEPT LETTERS, WHICH SHALL BE BLACK.
4. REFLECTOR UNITS SHALL BE OVAL, OF THE PRISMATIC TYPE 3" x 1 1/2".
5. SIGNAL MAY BE ATTACHED TO BUILDING, OR OTHER STRUCTURE TO SUIT LOCAL CONDITIONS. (BUT NOT TO OTHER SIGNAL MAST).
6. WHEN INSTALLING, COAT ALL PARTS UNDERGROUND, WITH NO-OX-ID OR EQUAL.
7. PAINT MAST AND CLAMPS BLACK.

REVISIONS
SUPERSEDES DRAWING S-464-D, DATED JUNE 18, 1943 AND LAST REVISED MAY 17, 1944.

1 SHEET

S-464-G

THE PENNSYLVANIA RAILROAD

STANDARD

BLOCK-LIMIT SIGNAL

AND

APPROACH BLOCK-LIMIT SIGNAL

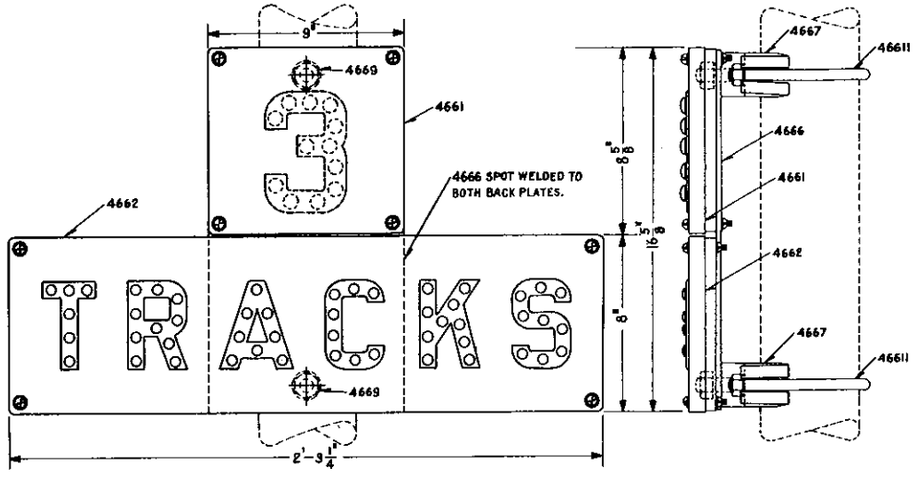
OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 23, 1948.

Approved

Assistant Chief Engineer T. C. & S.

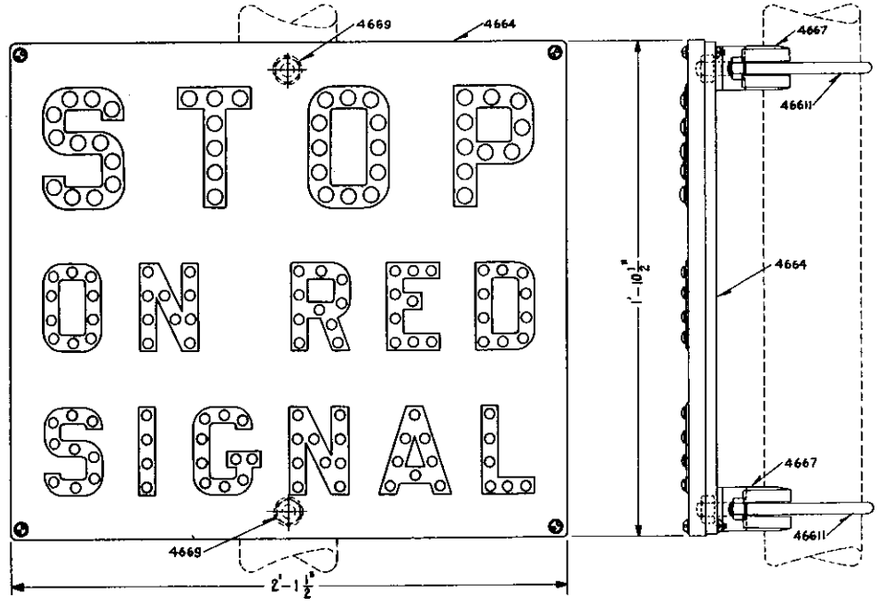
Approved

Chief Engineer



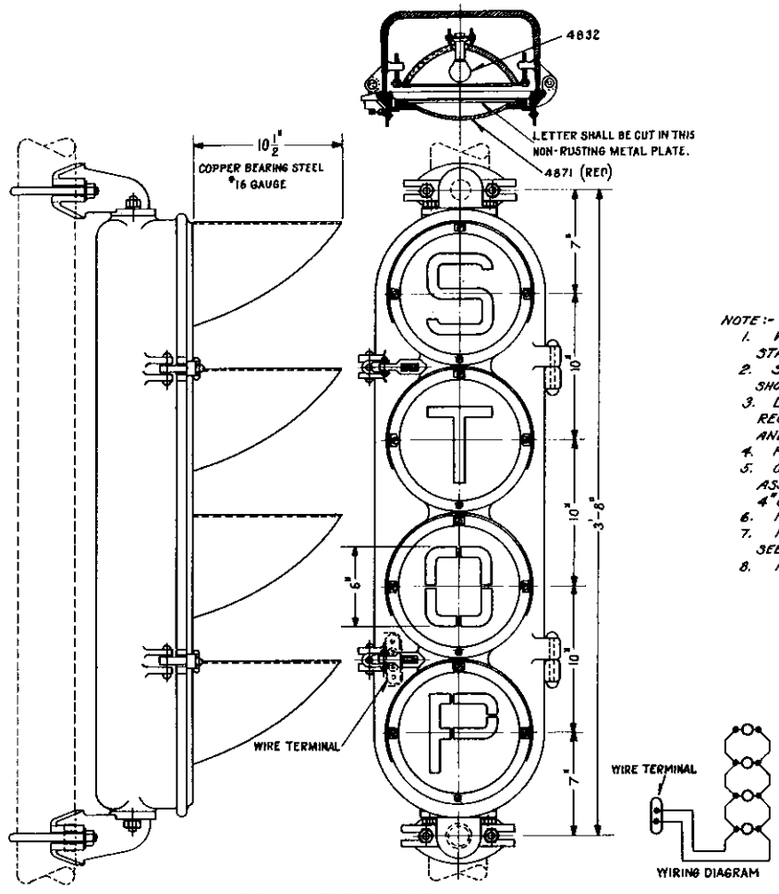
4651 REFLECTOR TRACKS SIGN COMPLETE

SPECIFY NUMERAL REQUIRED ON REQUISITION.
A.R.A. MANUAL MAY 1933.



4652 REFLECTOR STOP ON RED SIGNAL SIGN COMPLETE

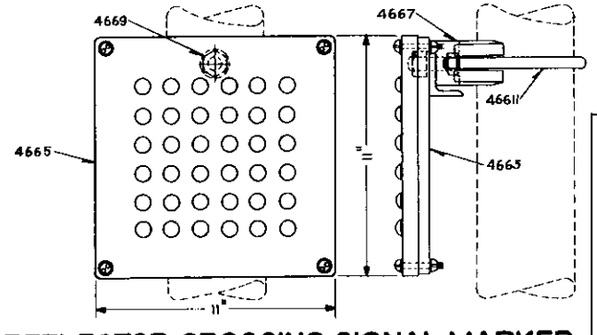
A.R.A. MANUAL MAY 1933



4653 ILLUMINATED STOP SIGN COMPLETE

NOTE :-

1. WHERE NO DETAIL REFERENCE IS GIVEN, THE MANUFACTURER'S STANDARD APPARATUS SHALL BE FURNISHED.
2. SIGN 4653 SHALL BE WIRED IN ACCORDANCE WITH DIAGRAM SHOWN.
3. LIGHT UNITS OF SIGN 4653 SHALL BE EQUIPPED WITH INSULATED RECEPTACLES FOR SINGLE CONTACT BAYONET CANDELABRA BASES AND WIRE TERMINAL.
4. FOR CONTROL CIRCUITS FOR SIGN 4653 SEE PLAN NO. S-860.
5. UNLESS OTHERWISE SPECIFIED, SIGNS SHALL BE FURNISHED ASSEMBLED COMPLETE WITH ALL PARTS FOR ATTACHING TO 4" O.D. PIPE POST.
6. FOR APPLICATION OF SIGNS SEE PLAN NO. 66207.
7. FOR SPECIFICATIONS FOR REFLECTOR SIGNS AND REFLECTOR BUTTONS SEE PLAN S-467.
8. FOR DETAILS OF REFLECTOR SIGNS SEE PLAN S-466.



4654 REFLECTOR CROSSING SIGNAL MARKER COMPLETE

A.R.A. MANUAL MAY 1933

REVISIONS
REDRAWN FROM APPROVED PLAN S-465-A, DATED JUNE 28, 1932 AND REVISED.

1 SHEET

S-465-B

THE PENNSYLVANIA RAILROAD

STANDARD

SIGNS

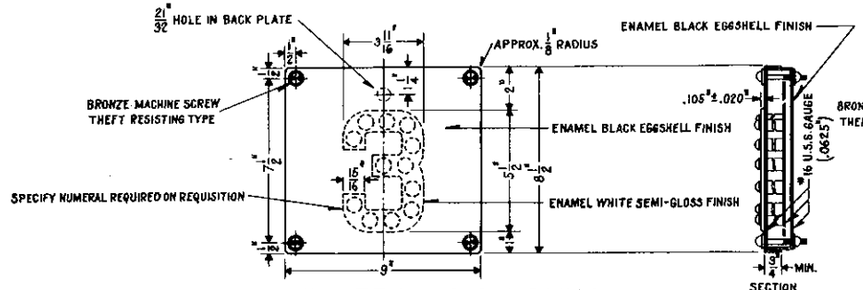
ILLUMINATED AND REFLECTING

FOR HIGHWAY CROSSINGS

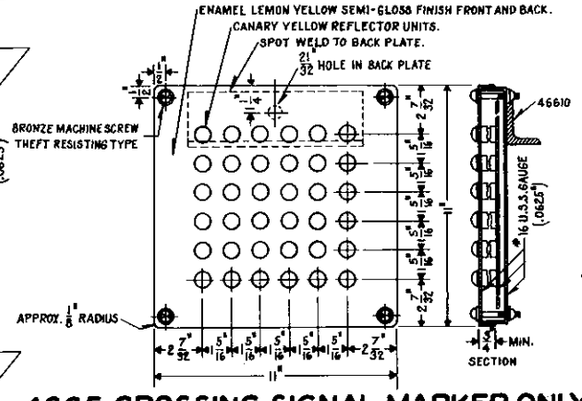
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., OCTOBER 31, 1933.

Approved
Chief Signal Engineer

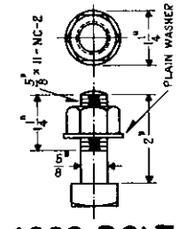
Approved
Chief Engineer



4661 NUMERAL SIGN ONLY

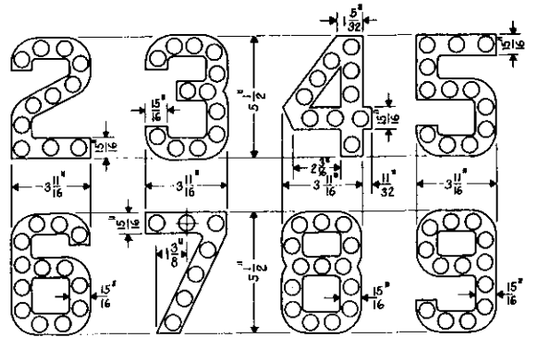


4665 CROSSING SIGNAL MARKER ONLY

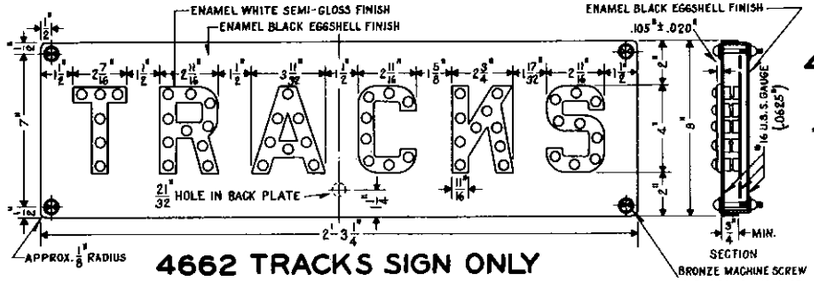


4669 BOLT

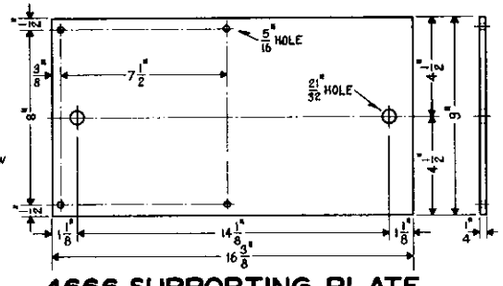
O.H. STEEL CADMIUM PLATED



OUTLINES OF NUMERALS FOR SIGN 4661

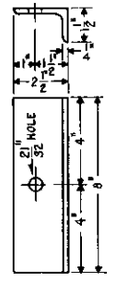


4662 TRACKS SIGN ONLY



4666 SUPPORTING PLATE

O.H. STEEL

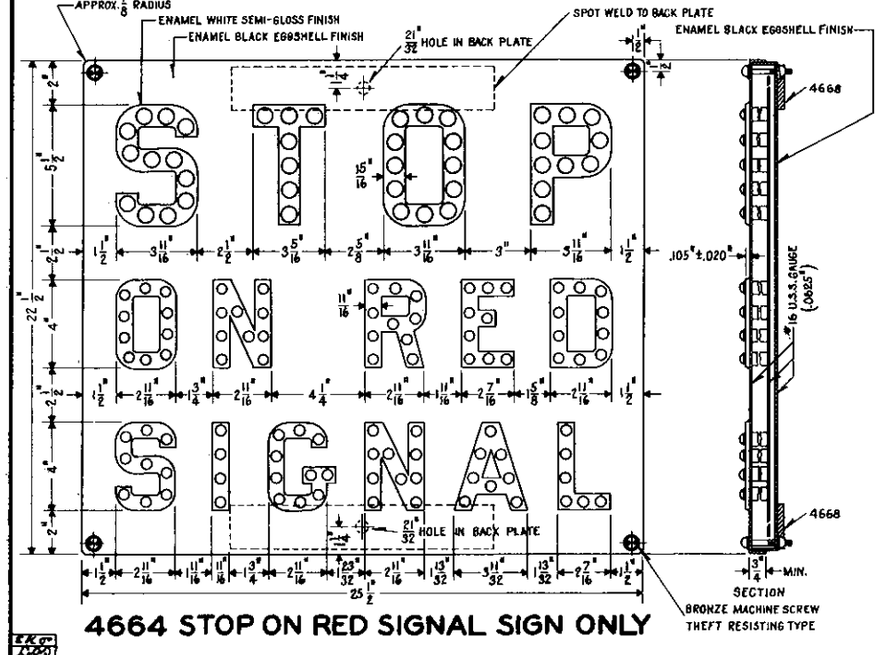


46610 ANGLE

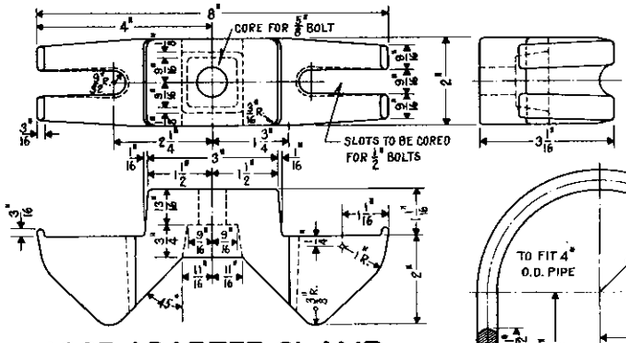
O.H. STEEL

NOTE :-

1. NUMBER AND SPACING OF REFLECTOR UNITS SHALL BE AS SHOWN.
2. FOR SPECIFICATIONS FOR REFLECTOR SIGNS AND REFLECTOR UNITS SEE PLAN S-467.
3. FOR ASSEMBLY OF REFLECTOR SIGNS SEE PLAN S-465.

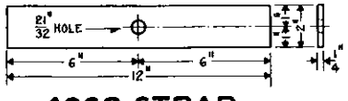


4664 STOP ON RED SIGNAL SIGN ONLY



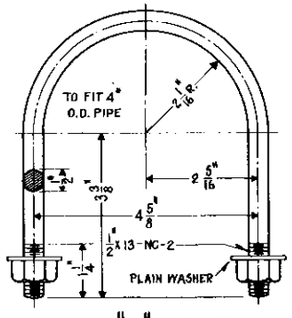
4667 ADAPTER CLAMP

CAST IRON



4668 STRAP

O.H. STEEL



46611 "U" BOLT

O.H. STEEL
NOT A.R.A. STD.

A.R.A. MANUAL MAY 1933.

REVISIONS

1 SHEET

S-466-A

THE PENNSYLVANIA RAILROAD

STANDARD

SIGNS

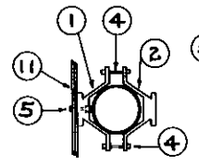
DETAILS OF REFLECTOR SIGNS FOR HIGHWAY CROSSINGS

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., OCTOBER 31, 1933.

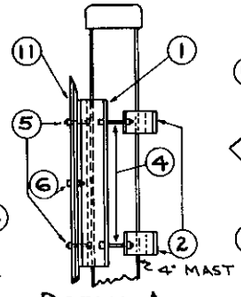
Approved
A. H. Rudd
Chief Signal Engineer

Approved
J. Pillsbury
Chief Engineer

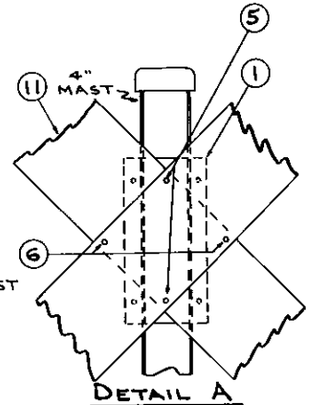
ASSEMBLY DETAILS



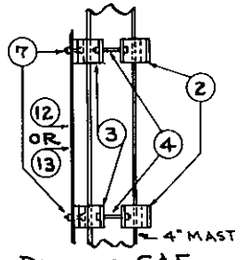
DETAIL A



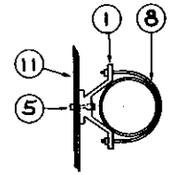
DETAIL A



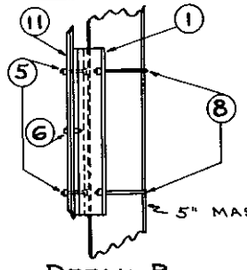
DETAIL A



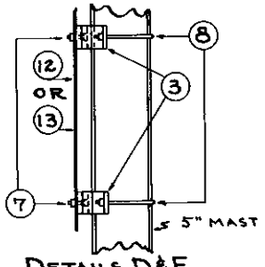
DETAILS C&E



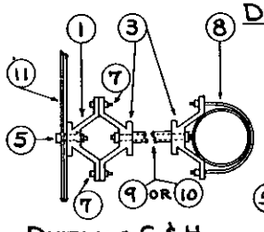
DETAIL B



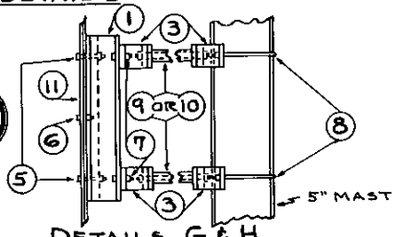
DETAIL B



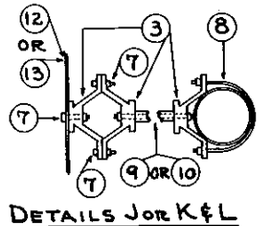
DETAILS D&F



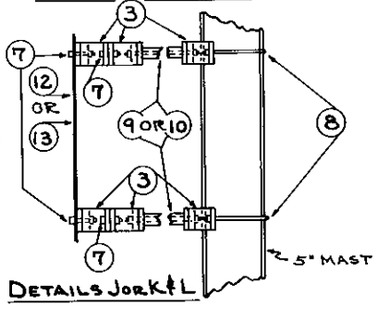
DETAILS G&H



DETAILS G&H



DETAILS J OR K&L



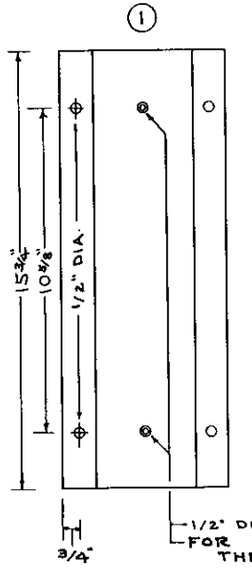
DETAILS J OR K&L

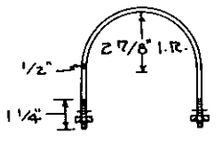
KEY

1. CROSSBUCK BRACKET, SPEC. 6063-T6.
2. BACK CLAMP, SPEC. 6063-T6.
3. COMBINATION CLAMP, SPEC. 6063-T6.
4. ALUM. BOLT, 1/2" X 2 3/4" WITH LOCK WASHER & NUT.
5. ALUM. BOLT, 1/2" X 3" WITH FLAT WASHER & NUT.
6. ALUM. BOLT, 3/8" X 1 1/4" WITH FLAT WASHER & NUT.
7. ALUM. BOLT, 1/2" X 1 1/4" WITH FLAT WASHER & NUT.
8. ALUM. "U" BOLT, 5 3/4" I.D. WITH FLAT WASHERS & NUTS.
9. ALUM. PIPE, 1" I.D. X 3 1/2", ALUM. ROD, 1/2" X 6 1/2" WITH LOCK WASHERS & NUTS.
10. ALUM. PIPE, 1" I.D. X 10 3/4", ALUM. ROD, 1/2" X 13 1/2" WITH LOCK WASHERS & NUTS.
11. CROSSBUCK SIGN, SPEC. 6063-T6, .081", EXTRUDED ALUM.
12. MULTIPLE TRACK SIGN, SPEC. 6061-T6, .081", SHEET ALUM.
13. STOP-ON-RED-SIGNAL SIGN, SPEC. 6061-T6, .081", SHEET ALUM.

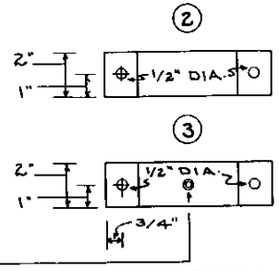
NOTE:
METAL POSTS (S-462, S-463) SHALL HAVE ONE COAT, WHITE PRIMER, REF. 47-2366, THEN ONE FINISH COAT ALUMINUM, REF. 47-3159. POSTS TO BE PAINTED BEFORE ALUMINUM SIGNS, BOLTS AND BRACKETS ARE INSTALLED.

CONSTRUCTION DETAILS

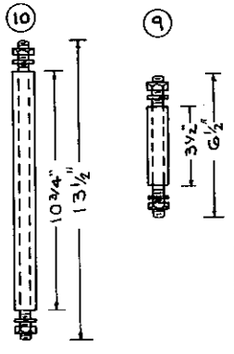




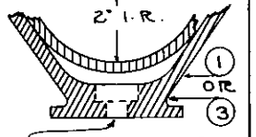
DEVELOPED LENGTH, 14 3/4".



CLAMP EXTENSIONS



DETAIL OF BOLT-HEAD RECESS NECESSARY WHEN MOUNTING BRACKET (1) OR (3) ON 4" I.D. MAST.



FOR 1/2" X 3" ALUMINUM BOLT, (5).

REVISIONS		
JAN. 23, 1961	M.S.	
NOTE FOR PAINTING POSTS ADDED. APPROVED:-		

SHEET 1 OF 2

S-466-B

THE PENNSYLVANIA RAILROAD
STANDARD

HIGHWAY CROSSING SIGNS
REFLECTORIZED ALUMINUM

OFFICE OF CHIEF ENGINEER,
PHILA., PA., MARCH 22, 1960.

APPROVED:-

C. J. Henry
CHIEF ENGINEER

SIGNS SHALL BE ORDERED AND FURNISHED AS A UNIT, COMPLETE WITH ALL FITTINGS.

TYPE OF PROTECTION	SIGN	FOR MAST, I.D.	LENGTH OF GATE ARM	ORDERING REF. NO. FOR SIGN UNIT	DETAIL	QUANTITY AND ITEMS OF MATERIAL PER SIGN UNIT (SEE SHEET 1).
F. L. SIGS.	CROSSING, 90° CROSSBUCK	4"	—	IC-654	A	1 (11), 1 (1), 2 (2), 4 (4), 2 (5), 2 (6).
		5"	—	IC-738	B	1 (11), 1 (1), 2 (5), 2 (6), 2 (8).
	MULTIPLE TRACK	4"	—	IC-682	C	1 (12), 2 (2), 2 (3), 4 (4), 2 (7).
		5"	—	IC-624	D	1 (12), 2 (3), 2 (7), 2 (8).
	STOP ON RED SIGNAL	4"	—	IC-683	E	1 (13), 2 (2), 2 (3), 4 (4), 2 (7).
		5"	—	IC-626	F	1 (13), 2 (3), 2 (7), 2 (8).
AUTO. GATES	CROSSING, 90° CROSSBUCK	5"	UNDER 39'	IC-729	G	1 (11), 1 (1), 4 (3), 2 (5), 2 (6), 4 (7), 2 (8), 2 (9).
		5"	39' & OVER	IC-727	H	1 (11), 1 (1), 4 (3), 2 (5), 2 (6), 4 (7), 2 (8), 2 (10).
	MULTIPLE TRACK	5"	UNDER 39'	IC-623	J	1 (12), 6 (3), 6 (7), 2 (8), 2 (9).
		5"	39' & OVER	IC-622	K	1 (12), 6 (3), 6 (7), 2 (8), 2 (10).
	S. O. R. SIG.	5"	ANY	IC-636	L	1 (13), 6 (3), 6 (7), 2 (8), 2 (10).
	CROSSING, 90° CROSSBUCK	4" OFFSET	"	IC-654	A	1 (11), 1 (1), 2 (2), 4 (4), 2 (5), 2 (6).
	MULT. TRK.	"	"	IC-682	C	1 (12), 2 (2), 2 (3), 4 (4), 2 (7).
	S. O. R. SIG.	"	"	IC-683	E	1 (13), 2 (2), 2 (3), 4 (4), 2 (7).

ORDERING DATA

S-466-B

THE PENNSYLVANIA RAILROAD
STANDARD
HIGHWAY CROSSING SIGNS
REFLECTORIZED ALUMINUM

OFFICE OF CHIEF ENGINEER,
PHILA., PA., MARCH 22, 1960.
APPROVED:—

CHIEF ENGINEER

SPECIFICATION FOR REFLECTOR UNITS.
(A.R.A. SIGNAL SECTION SPECIFICATION 15633.)

1. PURPOSE.
(a) THE PURPOSE OF THIS SPECIFICATION IS TO PROVIDE A REFLECTOR UNIT FOR REFLECTOR SIGNS FOR RAILROAD HIGHWAY GRADE CROSSING PROTECTION.

2. TENDER.
(a) THE TENDER SHALL BE FOR APPARATUS MEETING THE REQUIREMENTS OF THIS SPECIFICATION. IF THE CONTRACTOR WISHES TO VARY FROM THE SPECIFICATION, A TENDER MAY BE SUBMITTED COVERING THE APPARATUS HE DESIRES TO FURNISH. THIS TENDER SHALL BE ACCOMPANIED BY FULL INFORMATION SHOWING WHEREIN THE REQUIREMENTS OF THIS SPECIFICATION ARE NOT MET.

3. MATERIAL AND WORKMANSHIP.
(a) MATERIAL AND WORKMANSHIP SHALL BE FIRST-CLASS IN EVERY RESPECT.

4. TYPE.
(a) THE REFLECTOR UNIT SHALL BE OF THE SINGLE OR DOUBLE REFRACTION TYPE AND SHALL BE IN ACCORDANCE WITH PURCHASER'S REQUIREMENTS.

5. LENSES.
(a) THE LENS SHALL BE MADE OF CLEAR COLORLESS OR CANARY YELLOW GLASS OF UNIFORM REFLECTING POWER. IT SHALL BE ACCURATELY FORMED AND FREE FROM ALL DEFECTS WHICH WOULD AFFECT ITS OPTICAL OR PHYSICAL PROPERTIES. IT SHALL BE PRACTICALLY FREE FROM CHROMATIC ABERRATION WHEN VIEWED WITHIN AN ANGLE OF 30 DEG. FROM ITS AXIS.
(b) THE LENS SHALL BE SO DESIGNED THAT A LIGHT AT ANY POINT WITHIN 30 DEG. OF THE AXIS OF THE LENS WILL BE REFLECTED TO A POINT 40 IN. ABOVE THE SOURCE WITH SATISFACTORY INTENSITY. THE SOURCE OF LIGHT SHALL BE AN APPROVED TYPE OF AUTOMOBILE HEADLIGHT AND SHALL BE LOCATED 300 FT. FROM REFLECTOR UNIT.

6. REFLECTOR UNITS.
(a) THE REFLECTOR UNIT SHALL BE OF SUBSTANTIAL DESIGN, ACCURATELY FORMED AND CONSTRUCTED FOR CORRECT FOCUS.
(b) IF THE REFLECTOR UNIT IS OF THE DOUBLE REFRACTION TYPE, IT SHALL BE ACCURATELY FITTED TO THE LENS AND THE TWO SHALL BE SEALED INTO A CORROSION RESISTING RETAINER SO AS TO FORM A JOINT THAT WILL PREVENT THE ADMISSION OF LIQUID OR GAS BETWEEN THE REFLECTOR AND LENS.
(c) IF THE REFLECTOR UNIT IS OF THE SINGLE REFRACTION TYPE, THE REFLECTOR BACKING SHALL CONSIST OF A HEAVY COAT OF METALLIC SILVER. IT SHALL BE HOMOGENEOUS, EVENLY APPLIED TO THE SURFACE OF THE GLASS AND BE SO FITTED AS TO FORM AN AIR-TIGHT JOINT BETWEEN IT AND THE GLASS. THE BACKING SHALL BE SUCH THAT IT WILL PREVENT THE ADMISSION OF AIR OR ANY FOREIGN SUBSTANCE BETWEEN IT AND THE GLASS. OVER THE REFLECTIVE BACKING SHALL BE PLACED A PROTECTIVE BACKING OF ONE HEAVY COAT OF METALLIC COPPER, AND OVER THIS COPPER PLATE A COATING OF PROTECTIVE MATERIAL WHICH SHALL SO SEAL THE BACKING AS TO RENDER IT WATERPROOF AND AIR-TIGHT.

7. MOUNTING.
(a) THE REFLECTOR UNIT SHALL BE DESIGNED SO AS TO ENTER THE APERTURE IN THE FACE OF SIGN FROM THE REAR AND SHALL BE HELD IN A FIXED RELATION TO THE FACE OF SIGN WITH ITS AXIS NORMAL TO THE APERTURE.
(b) THE REFLECTOR UNIT SHALL BE SO CONSTRUCTED THAT NOT MORE THAN 1/32 IN. OF THE RETAINER OR HOUSING SHALL BE EXPOSED TO VIEW WHEN THE REFLECTOR UNIT IS ASSEMBLED IN THE SIGN.

8. INSPECTION.
(a) PURCHASER MAY INSPECT MATERIAL AT ALL STAGES OF MANUFACTURE.
(b) PURCHASER MAY INSPECT THE COMPLETED PRODUCT TO DETERMINE THAT THE REQUIREMENTS OF THIS SPECIFICATION HAVE BEEN MET.
(c) IF MATERIAL HAS NOT BEEN ACCEPTED AT POINT OF PRODUCTION AND IF, UPON ARRIVAL AT DESTINATION, IT DOES NOT MEET THE REQUIREMENTS OF THIS SPECIFICATION, IT MAY BE REJECTED, AND THE CONTRACTOR, UPON REQUEST, SHALL ADVISE THE PURCHASER WHAT DISPOSITION IS TO BE MADE OF THE DEFECTIVE MATERIAL. CONTRACTOR SHALL PAY ALL FREIGHT CHARGES.
(d) IF PURCHASER IS TO MAKE INSPECTION AT POINT OF PRODUCTION IT SHALL BE SO STATED.

9. TESTS.
(a) TESTS MAY BE MADE AT POINT OF PRODUCTION, OR ON SAMPLES SUBMITTED, AND MAY ALSO BE MADE AT DESTINATION.
(b) CONTRACTOR SHALL GIVE THE PURCHASER SUFFICIENT NOTICE OF TIME WHEN MATERIAL WILL BE READY FOR TESTING.
(c) CONTRACTOR SHALL PROVIDE, AT POINT OF PRODUCTION, APPARATUS AND LABOR FOR MAKING REQUIRED TESTS UNDER SUPERVISION OF THE PURCHASER.
(d) IF TESTS ARE TO BE MADE AT POINT OF PRODUCTION, THE PURCHASER SHALL SO STATE AND ALSO INDICATE WHICH OF THE TESTS HEREIN SPECIFIED ARE TO BE MADE AND WHAT PORTION OF THE MATERIAL SHALL BE TESTED.
(e) THE FOLLOWING TESTS SHALL BE MADE:
1. ABILITY TO RESIST CORROSION.
2. INTEGRITY OF SEALING.
(a) IMMERSION TEST.
(b) HYDRAULIC PRESSURE.
(f) SAMPLING.
1. ONE HUNDRED REFLECTOR UNITS WILL BE SELECTED BY THE PURCHASER AT RANDOM FROM A LOT OF AT LEAST 2500.
2. FROM THE GROUP OF 100 UNITS, 25 WILL BE SELECTED AT RANDOM FOR TESTS.

10. DESCRIPTION OF TESTS.
(a) SALT-WATER SPRAY (CORROSION TEST).
1. THE COMPLETE REFLECTOR UNITS AS USED IN THE SIGN SHALL BE SPRAYED WITH A 20 PER CENT SALT-WATER SOLUTION FOR 48 HOURS. REFLECTOR UNITS SHALL THEN BE EXAMINED FOR EVIDENCE OF CORROSION; IF ANY APPEAR THE LOT REPRESENTED BY THE SAMPLES SHALL BE REJECTED.
(b) IF THE REFLECTOR UNIT IS OF THE DOUBLE REFRACTION TYPE:
1. THE REFLECTOR UNIT SHALL BE ALTERNATELY IMMERSED FOR TEN MINUTES IN TWO BATHS OF COLORED WATER, ONE AT A TEMPERATURE APPROXIMATELY 33 DEG. F., THE OTHER 170 DEG. F. REPEAT THIS ALTERNATE IMMERSION TEN TIMES, AFTER WHICH THE REFLECTOR UNITS SHALL BE EXAMINED FOR LEAKAGE. IF LEAKAGE HAS OCCURRED THE LOT REPRESENTED BY THE SAMPLES SHALL BE REJECTED.
2. THE SEALING BETWEEN THE LENS AND THE CAP OF THE REFLECTOR UNIT SHALL BE SUCH AS TO BE WATER-TIGHT UNDER A HYDRAULIC PRESSURE OF 10 LB. PER SQUARE INCH IN COLORED WATER FOR A PERIOD OF 1 MINUTE. AFTER THE REFLECTOR UNITS HAVE BEEN SUBJECTED TO THIS TEST THEY SHALL BE EXAMINED FOR LEAKAGE. IF LEAKAGE HAS OCCURRED THE LOT REPRESENTED BY THE SAMPLES SHALL BE REJECTED.
(c) IF THE REFLECTOR UNIT IS OF THE SINGLE REFRACTION TYPE:
1. THE BACKING SHALL NOT BE AFFECTED BY EITHER 20 PER CENT SALT-WATER SOLUTION AT ROOM TEMPERATURE, FRESH WATER AT 170 DEG. F., OR A DRY TEMPERATURE OF 170 DEG. F. THE BACKING SHALL BE SUBJECTED TO THE SALT WATER FOR A PERIOD OF 24 HOURS AND TO THE FRESH WATER FOR A PERIOD OF 4 HOURS IMMEDIATELY FOLLOWING THE SALT-WATER IMMERSION AND THEN KEPT AT A DRY TEMPERATURE OF 170 DEG. F. FOR 4 HOURS. THE PROTECTIVE COATING SHALL BE OF SUCH MATERIAL AND SO APPLIED AS NOT TO BE READILY RUBBED OFF AFTER THE ABOVE TESTS HAVE BEEN MADE CONSECUTIVELY. IF GLASS HAS CRACKED DURING THE TEST OR IF REFLECTIVE BACKING HAS BEEN DAMAGED OR IF PROTECTIVE COATING IS READILY RUBBED OFF, THE LOT REPRESENTED BY THE SAMPLES SHALL BE REJECTED.

11. PACKING.
(a) MATERIAL SHALL BE SO PREPARED AS TO PERMIT CONVENIENT HANDLING AND TO PROTECT AGAINST LOSS OR DAMAGE DURING SHIPMENT.

12. MARKING.
(a) PURCHASER'S ORDER, REQUISITION AND PACKAGE NUMBER, NAME OF CONSIGNOR, AND NAME AND ADDRESS OF CONSIGNEE, SHALL BE PLAINLY MARKED ON OUTSIDE OF PACKAGE.

13. WARRANTY.
(a) CONTRACTOR SHALL WARRANT THE MATERIAL COVERED BY THIS SPECIFICATION TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER ORDINARY USE AND SERVICE, HIS OBLIGATION UNDER THIS WARRANTY BEING LIMITED TO MAKING, AT POINT OF PRODUCTION, ANY PART OR PARTS TO REPLACE THOSE WHICH SHALL BE FOUND DEFECTIVE WITHIN TWO YEARS AFTER SHIPMENT TO PURCHASER. THIS WARRANTY SHALL NOT APPLY TO ANY APPARATUS WHICH SHALL HAVE BEEN REPAIRED OR ALTERED IN ANY WAY BY ANYONE OTHER THAN THE MANUFACTURER THEREOF, SO AS TO AFFECT, IN THE CONTRACTOR'S JUDGEMENT, ITS PROPER FUNCTIONING OR RELIABILITY, OR WHICH HAS BEEN SUBJECT TO MISUSE, NEGLIGENCE OR ACCIDENT.

SPECIFICATION FOR REFLECTOR SIGNS.
(A.R.A. SIGNAL SECTION SPECIFICATION 15593)

1. PURPOSE.
(a) THE PURPOSE OF THIS SPECIFICATION IS TO PROVIDE SIGNS OF VARIOUS DESIGNS FOR RAILROAD HIGHWAY GRADE CROSSING PROTECTION.

2. TENDER.
(a) THE TENDER SHALL BE FOR APPARATUS MEETING THE REQUIREMENTS OF THIS SPECIFICATION. IF THE CONTRACTOR WISHES TO VARY FROM THE SPECIFICATION, A TENDER MAY BE SUBMITTED COVERING THE APPARATUS HE DESIRES TO FURNISH. THIS TENDER SHALL BE ACCOMPANIED BY FULL INFORMATION SHOWING WHEREIN THE REQUIREMENTS OF THIS SPECIFICATION ARE NOT MET.

3. MATERIAL AND WORKMANSHIP.
(a) MATERIAL AND WORKMANSHIP SHALL BE FIRST-CLASS IN EVERY RESPECT.

4. SHEET STEEL.
(a) SHEET STEEL SHALL BE CORROSION RESISTING. THE TOTAL AMOUNT OF CARBON, MANGANESE, PHOSPHORUS, SULPHUR AND SILICON SHALL NOT EXCEED 0.70 PER CENT. IF THE TOTAL AMOUNT OF THESE FIVE ELEMENTS EQUALS OR EXCEEDS 0.20 PER CENT THE METAL SHALL CONTAIN NOT LESS THAN 0.17 PER CENT COPPER AND NOT MORE THAN 0.06 PER CENT SULPHUR. IF THE TOTAL OF THESE FIVE ELEMENTS IS LESS THAN 0.20 PER CENT AND SULPHUR IS NOT GREATER THAN 0.04 PER CENT THE PRESENCE OF COPPER IS OPTIONAL.
(b) THE BASE METAL SHALL BE UNIFORMLY COATED WITH A GOOD QUALITY OF ZINC AND THE SURFACE OF THE COATED METAL SHALL BE OF SUCH NATURE THAT THE PRIMER SPECIFIED WILL ADHERE FIRMLY. THE ZINC COATING SHALL BE APPLIED BY THE HOT DIP PROCESS AND HEAT-TREATED AFTER COATING IN SUCH A MANNER AS TO GIVE A TIGHT DULL COAT WHICH WILL NOT PEEL NOR FLAKE ON THE OUTSIDE OF A BEND WHEN BENT DOWN FLAT. THE DULL COATED SURFACE OF THE SHEET SHALL HAVE THE CHARACTERISTICS OF A MATTE AND SHALL BE FREE FROM BRIGHT OR GLOSSY SPANGLE.

5. REFLECTOR UNITS.
(a) REFLECTOR UNITS SHALL CONFORM TO SPECIFICATION SHOWN ON THIS SHEET.
(b) REFLECTOR UNITS, ASSEMBLED IN SIGNS WHICH CARRY A LEGEND, SHALL BE COLORLESS.
(c) REFLECTOR UNITS, ASSEMBLED IN MARKER SIGN WHICH CARRIES NO LEGEND, SHALL BE CANARY YELLOW.
(d) REFLECTOR UNITS HAVING AN EXPOSED DIAMETER OF 0.40 TO 0.50 IN. SHALL BE USED IN LETTERS 4 INCHES IN HEIGHT. REFLECTOR UNITS HAVING AN EXPOSED DIAMETER OF 0.590 TO 0.688 IN. SHALL BE USED IN LETTERS AND NUMERALS 5 1/2 INCHES IN HEIGHT AND ALSO IN MARKER SIGN.
(e) REFLECTOR UNITS SHALL BE HELD IN A FIXED RELATION TO THE APERTURE WITH THEIR AXES NORMAL TO THE FACE OF SIGN.
(f) REFLECTOR UNITS SHALL BE HELD IN POSITION IN FRONT PLATE BY MEANS OF AN INTERMEDIATE PLATE. THE INTERMEDIATE PLATE SHALL BE READILY REMOVABLE AND REPLACEABLE WITHOUT THE USE OF TOOLS AND WHEN REMOVED SHALL RELEASE REFLECTOR UNITS.
(g) REFLECTOR UNITS SHALL PROJECT NOT MORE THAN 1/4 IN. OUTSIDE OF APERTURE.
(h) A DURABLE WATERPROOFING GASKET OF NON-CORROSIVE MATERIAL SHALL BE USED BETWEEN REFLECTOR UNITS AND FRONT PLATE.

6. DESIGN, SHEET STEEL SIGNS.
(a) THE FRONT, BACK, AND INTERMEDIATE PLATES SHALL BE NO. 16 U.S. STANDARD GAUGE (0.0625 IN.).
(b) REINFORCING METAL PARTS OR SUPPORTING PLATES USED IN BACK OF SIGNS SHALL BE 1/4 INCH IN THICKNESS.
(c) THE EDGES OF THE SIGN SHALL BE FLANGED TO A DEPTH OF NOT LESS THAN 3/4 IN.
(d) FLANGES SHALL BE WELDED AT CORNERS.
(e) THE FRONT PLATE SHALL BE SLIGHTLY LARGER THAN THE BACK PLATE SO THAT IT WILL FREELY TELESCOPE OVER THE FLANGES OF THE BACK PLATE.
(f) THE FRONT PLATE SHALL HAVE THE LEGEND OF THE SIGN EMBOSSED UPON IT. THE EMBOSSED NUMERALS AND LETTERS SHALL BE RAISED NOT LESS THAN 0.085 IN. NOR MORE THAN 0.125 IN.
(g) THE DIMENSION, INSIDE, BETWEEN THE FRONT AND BACK PLATES SHALL BE SUCH AS IS NECESSARY TO MEET THE REQUIREMENTS OF THIS SPECIFICATION AND THE PARTICULAR REFLECTOR UNIT ASSEMBLED IN THE SIGN.
(h) THE FRONT PLATE SHALL BE ATTACHED TO THE BACK PLATE BY BRONZE SCREWS OF SPECIAL DESIGN WHICH CANNOT BE REMOVED WITH AN ORDINARY SCREW DRIVER. IF NUTS ARE USED THEY SHALL BE SO DESIGNED THAT THEY CANNOT BE REMOVED WITH ORDINARY PLIERS, WRENCH, OR SCREW DRIVER.

7. ENAMELING, SHEET STEEL SIGNS.
(a) METAL SHALL BE THOROUGHLY CLEANED IN ORDER TO SECURE A PERFECT SURFACE FOR PAINTING.
(b) ONE COAT OF SUITABLE IRON OXIDE PRIMER OF THE LONG OIL TYPE SHALL BE APPLIED TO ALL SURFACES.
(c) SUBSEQUENT TO THE PRIMING COAT ON SIGNS BEARING A LEGEND, ALL SURFACES SHALL BE GIVEN THREE COATS OF BLACK EGGSHELL FINISH HIGH GRADE SYNTHETIC ENAMEL.
(d) SUBSEQUENT TO THE PRIMING COAT ON MARKER SIGN BEARING NO LEGEND, ALL SURFACES SHALL BE GIVEN THREE COATS OF SEMI-GLOSS PERMANENT LEMON YELLOW HIGH GRADE SYNTHETIC ENAMEL.
(e) THREE COATS OF SEMI-GLOSS PERMANENT WHITE HIGH GRADE SYNTHETIC ENAMEL SHALL BE APPLIED TO THE EMBOSSED PORTION OF THE SIGN.
(f) MATERIALS USED IN THE ENAMEL SHALL BE SUCH THAT PREMATURE CHALKING WILL NOT TAKE PLACE. EACH COAT SHALL BE THOROUGHLY DRY BEFORE SUBSEQUENT COAT IS APPLIED.
(g) THE FINISHED DESIGN SHALL BE CLEAR CUT AND SHARP AND THE LINES EVEN AND TRUE.
(h) THE FINISH PRODUCED ON THE SIGNS SHALL BE A TOUGH FLEXIBLE COATING, FREE FROM CRACKS, SHRINKAGE, WRINKLES, BLISTERS, OR OTHER BLEMISHES AND SHALL WITHSTAND THE FOLLOWING TESTS:
1. THE FINISH SHALL NOT CHIP NOR FLAKE WHEN TESTED WITH THE POINT OF A KNIFE.
2. THE FINISH SHALL WITHSTAND A GASOLENE TEST MADE BY RUBBING WITH A CLEAN WHITE RAG SOAKED IN GASOLENE.
3. THE FINISH SHALL POSSESS SUCH ELASTICITY AND ADHERING QUALITIES THAT IT WILL NOT CRACK NOR SEPARATE FROM THE SIGN WHEN STRUCK A LIGHT BLOW WITH A HAMMER.

8. IDENTIFICATION.
(a) INSIDE OF SIGN SHALL BE PLAINLY MARKED WITH NAME OF MANUFACTURER.

9. INSPECTION.
(a) PURCHASER MAY INSPECT MATERIAL AT ALL STAGES OF MANUFACTURE.
(b) PURCHASER MAY INSPECT THE COMPLETED PRODUCT TO DETERMINE THAT THE REQUIREMENTS OF THIS SPECIFICATION HAVE BEEN MET.
(c) IF MATERIAL HAS NOT BEEN ACCEPTED AT POINT OF PRODUCTION AND IF, UPON ARRIVAL AT DESTINATION, IT DOES NOT MEET THE REQUIREMENTS OF THIS SPECIFICATION, IT MAY BE REJECTED, AND THE CONTRACTOR, UPON REQUEST, SHALL ADVISE THE PURCHASER WHAT DISPOSITION IS TO BE MADE OF THE DEFECTIVE MATERIAL. CONTRACTOR SHALL PAY ALL FREIGHT CHARGES.
(d) IF PURCHASER IS TO MAKE INSPECTION AT POINT OF PRODUCTION IT SHALL BE SO STATED.

10. TESTS.
(a) TESTS MAY BE MADE AT POINT OF PRODUCTION, OR ON SAMPLES SUBMITTED, AND MAY ALSO BE MADE AT DESTINATION.
(b) CONTRACTOR SHALL GIVE THE PURCHASER SUFFICIENT NOTICE OF TIME WHEN MATERIAL WILL BE READY FOR TESTING.
(c) CONTRACTOR SHALL PROVIDE, AT POINT OF PRODUCTION, APPARATUS AND LABOR FOR MAKING REQUIRED TESTS UNDER SUPERVISION OF THE PURCHASER.
(d) IF TESTS ARE TO BE MADE AT POINT OF PRODUCTION, THE PURCHASER SHALL SO STATE AND ALSO INDICATE WHICH OF THE TESTS HEREIN SPECIFIED ARE TO BE MADE AND WHAT PORTION OF THE MATERIAL SHALL BE TESTED.

11. PACKING.
(a) MATERIAL SHALL BE SO PREPARED AS TO PERMIT CONVENIENT HANDLING AND TO PROTECT AGAINST LOSS OR DAMAGE DURING SHIPMENT.

12. MARKING.
(a) PURCHASER'S ORDER, REQUISITION AND PACKAGE NUMBER, NAME OF CONSIGNOR, AND NAME AND ADDRESS OF CONSIGNEE, SHALL BE PLAINLY MARKED ON OUTSIDE OF PACKAGE.
(b) DETAIL LIST OF LOOSE PIECES, CONTAINERS AND THEIR CONTENTS SHALL BE FURNISHED FOR EACH SHIPMENT.

13. WARRANTY.
(a) CONTRACTOR SHALL WARRANT THE MATERIAL COVERED BY THIS SPECIFICATION TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER ORDINARY USE AND SERVICE, HIS OBLIGATION UNDER THIS WARRANTY BEING LIMITED TO MAKING, AT POINT OF PRODUCTION, ANY PART OR PARTS TO REPLACE THOSE WHICH SHALL BE FOUND DEFECTIVE WITHIN TWO YEARS AFTER SHIPMENT TO PURCHASER. THIS WARRANTY SHALL NOT APPLY TO ANY APPARATUS WHICH SHALL HAVE BEEN REPAIRED OR ALTERED IN ANY WAY BY ANYONE OTHER THAN THE MANUFACTURER THEREOF, SO AS TO AFFECT, IN THE CONTRACTOR'S JUDGEMENT, ITS PROPER FUNCTIONING OR RELIABILITY, OR WHICH HAS BEEN SUBJECT TO MISUSE, NEGLIGENCE OR ACCIDENT.

A.R.A. MANUAL MAY 1933

REVISIONS

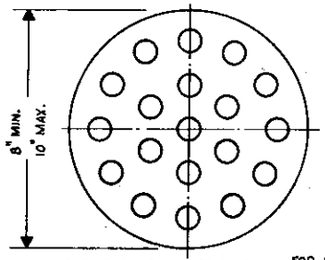
1 SHEET

S-467-A

THE PENNSYLVANIA RAILROAD
STANDARD
SPECIFICATIONS
FOR REFLECTOR SIGNS AND REFLECTOR UNITS.
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., OCTOBER 31, 1933.

Approved
Chief Signal Engineer

Approved
Chief Engineer

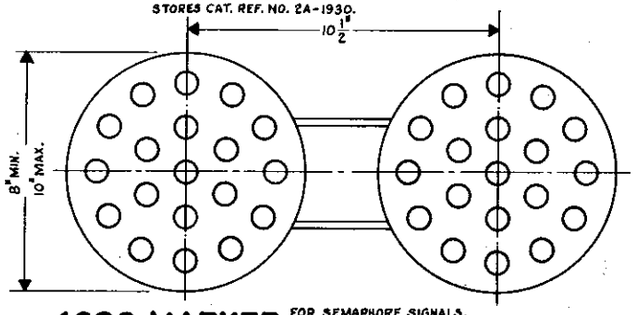


4681 MARKER

FOR SEMAPHORE SIGNALS.
RED REFLECTOR UNITS, RED FACE PLATE.
STORES CAT. REF. NO. 2A-1417

4682 MARKER

FOR SEMAPHORE SIGNALS.
YELLOW REFLECTOR UNITS, YELLOW FACE PLATE.
STORES CAT. REF. NO. 2A-1930.



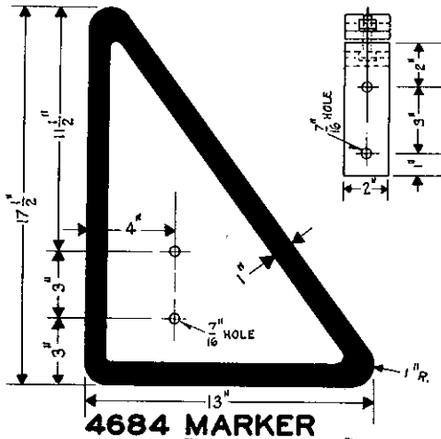
4683 MARKER

FOR SEMAPHORE SIGNALS.
RED REFLECTOR UNITS, RED FACE PLATE.
STORES CAT. REF. NO. 2A-1419.

ATTACHMENT TO LAMP BRACKET SHALL BE SO THAT THE CENTER OF THE LEFT HAND MARKER (4683) WILL BE 11 1/16 INCHES FROM CENTER LINE OF SIGNAL MAST.

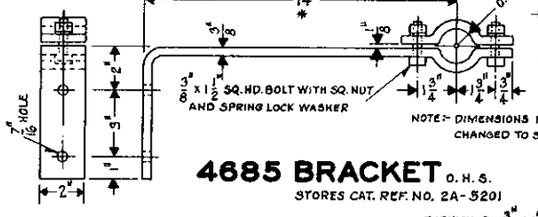
SPECIFICATION FOR MARKERS (SEMAPHORE SIGNALS)

1. PURPOSE:
   (a) THE PURPOSE OF THIS SPECIFICATION IS TO PROVIDE SINGLE AND DOUBLE MARKER UNITS OF THE REFLECTOR TYPE FOR SEMAPHORE SIGNALS.
2. TENDER:
   (a) THE TENDER SHALL BE FOR APPARATUS MEETING THE REQUIREMENTS OF THIS SPECIFICATION. IF THE CONTRACTOR WISHES TO VARY FROM THE SPECIFICATION, A TENDER MAY BE SUBMITTED COVERING THE APPARATUS HE DESIRES TO FURNISH.
3. MATERIAL AND WORKMANSHIP:
   (a) MATERIAL AND WORKMANSHIP SHALL BE FIRST-CLASS IN EVERY RESPECT.
4. GENERAL REQUIREMENTS:
   (a) MARKERS SHALL BE FURNISHED COMPLETE WITH ALL NECESSARY PARTS FOR SECURING TO LAMP BRACKET AS SHOWN ON A.A.R. SIGNAL SECTION DRAWING 1049-A.
   (b) MARKERS SHALL BE CIRCULAR IN SHAPE AND SHALL HAVE NOT LESS THAN 19 REFLECTOR UNITS.
   (c) THE DIAMETER OF EACH MARKER SHALL BE 8 INCHES MINIMUM, 10 INCHES MAXIMUM.
   (d) DOUBLE MARKERS SHALL BE SPACED HORIZONTALLY 10 1/2 INCHES, FROM CENTER TO CENTER.
5. COLOR:
   (a) THE COLOR OF THE REFLECTOR UNITS AND FACE PLATE SHALL BE THE SAME.
   (b) EDGES AND BACK OF THE HOUSING SHALL BE BLACK.
6. REFLECTOR UNIT HOUSING:
   (a) THE REFLECTOR UNIT HOUSING SHALL BE IN ACCORDANCE WITH SIGNAL SECTION SPECIFICATION 155-42 FOR RAILROAD HIGHWAY GRADE CROSSING SIGNS AS FAR AS APPLICABLE. THE FINISH SHALL BE ACID RESISTING VITREOUS ENAMEL.
7. REFLECTOR UNITS:
   (a) THE REFLECTOR UNITS SHALL BE IN ACCORDANCE WITH A.A.R. SIGNAL SECTION SPECIFICATION 156-40 FOR REFLECTOR UNIT. 7/8 INCH DIAMETER REFLECTOR UNITS MAY BE FURNISHED.



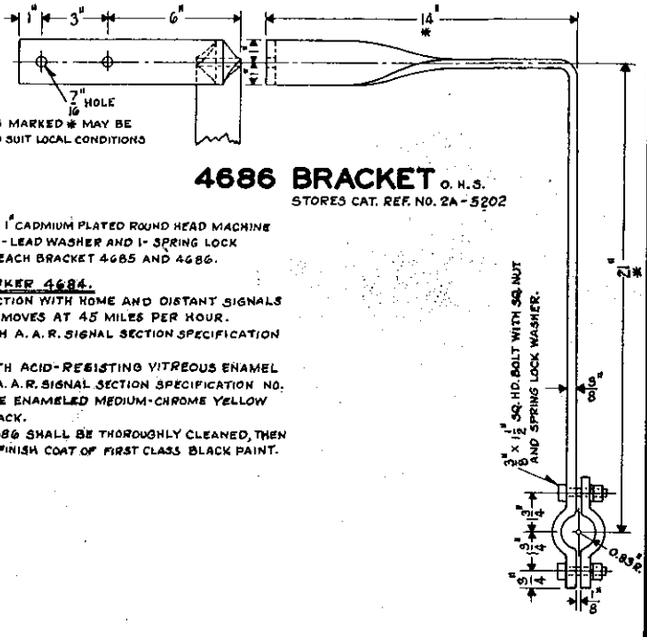
4684 MARKER

*12 U.S. STD. GAUGE (.109") ENAMELING STEEL.
STORES CAT. REF. NO. 2A-5200



4685 BRACKET O.H.S.

STORES CAT. REF. NO. 2A-5201



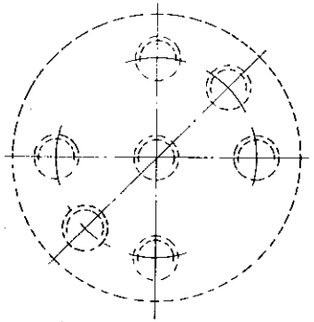
4686 BRACKET O.H.S.

STORES CAT. REF. NO. 2A-5202

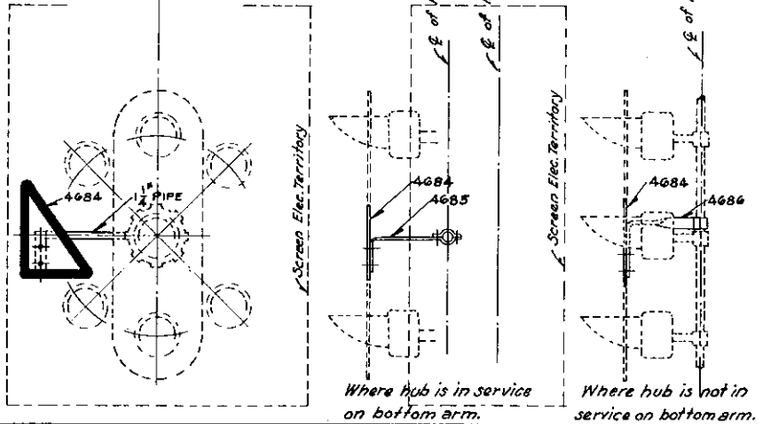
FURNISH 2- 3/8" X 1" CADMIUM PLATED ROUND HEAD MACHINE SCREWS WITH 1- LEAD WASHER AND 1- SPRING LOCK WASHER WITH EACH BRACKET 4685 AND 4686.

SPECIFICATION FOR MARKER 4684.

1. MARKER 4684 IS FOR USE IN CONJUNCTION WITH HOME AND DISTANT SIGNALS PERMITTING TRAINS TO MAKE DIVERTING MOVES AT 45 MILES PER HOUR.
2. MATERIAL SHALL BE IN ACCORDANCE WITH A.A.R. SIGNAL SECTION SPECIFICATION NO. 155-42
3. MARKER 4684 SHALL BE COATED WITH ACID-RESISTING VITREOUS ENAMEL (SEMI-GLOSS FINISH) IN ACCORDANCE WITH A.A.R. SIGNAL SECTION SPECIFICATION NO. 155-42. THE FACE OF THE MARKER SHALL BE ENAMELED MEDIUM-CHROME YELLOW WITH THE EDGES AND BACK ENAMELED BLACK.
4. ALL PARTS OF BRACKETS 4685 AND 4686 SHALL BE THOROUGHLY CLEANED, THEN GIVEN A PRIMARY COAT OF RED LEAD AND A FINISH COAT OF FIRST CLASS BLACK PAINT.



APPLICATIONS OF MARKER 4684.



REVISIONS

REDRAWN FROM APPROVED PLAN S-468-A, DATED SEPT. 28, 1937. MARKER 4684 AND BRACKETS 4685 AND 4686 ADDED.

1 SHEET

S-468-B

THE PENNSYLVANIA RAILROAD

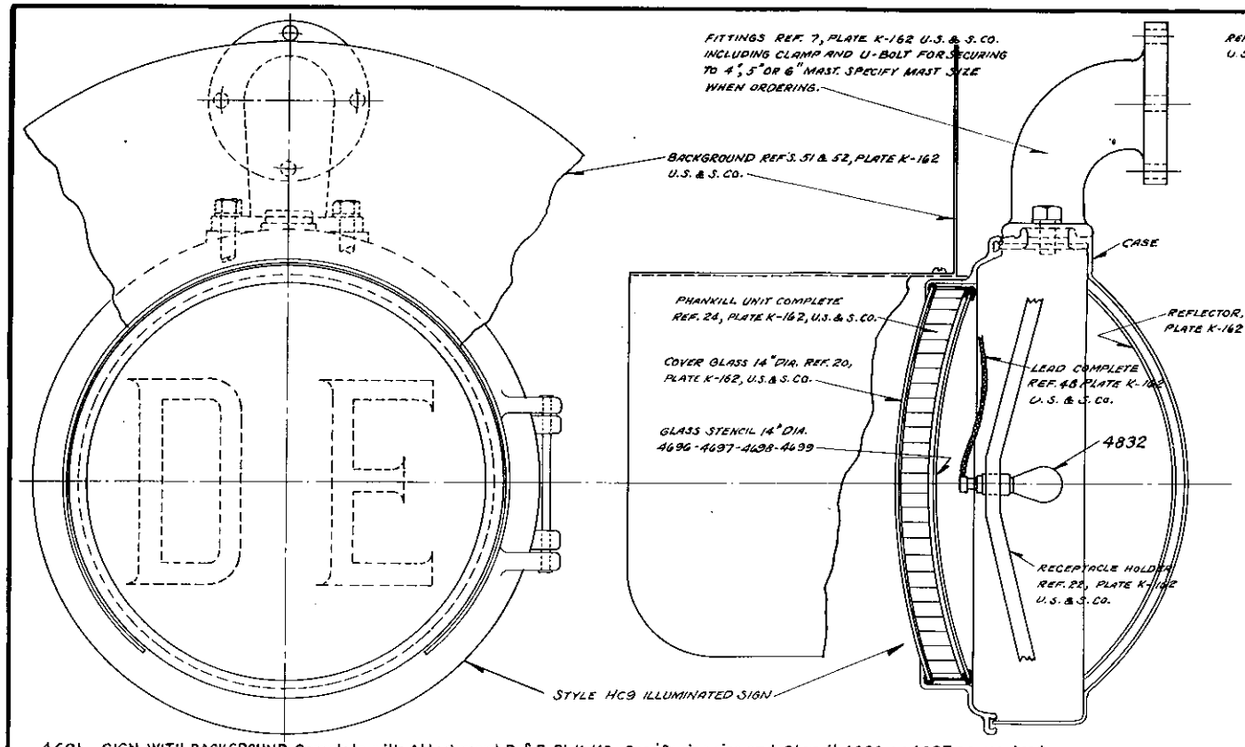
STANDARD

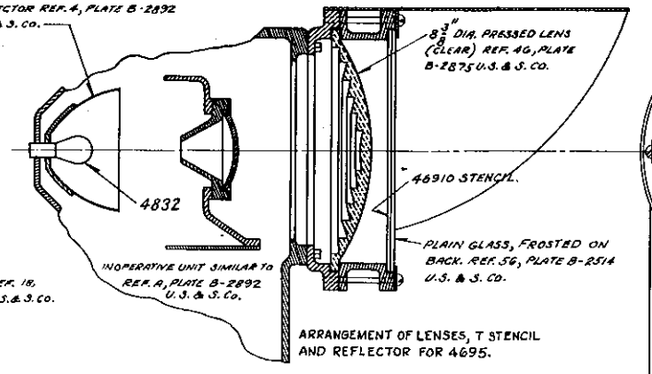
MARKERS

OFFICE OF CHIEF ENGINEER, PHILA., PA. AUG. 25, 1944.

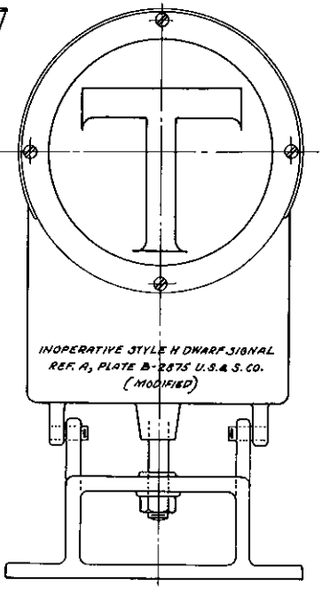
Approved
N. C. Stanton
Assistant Chief Engineer-Signals

Approved
J. T. Wessitt
Chief Engineer





ARRANGEMENT OF LENSES, T STENCIL AND REFLECTOR FOR 4695.



4695 T-SIGN COMPLETE
STORES CAT. REF. NO. 2A-5655

NOTE:-

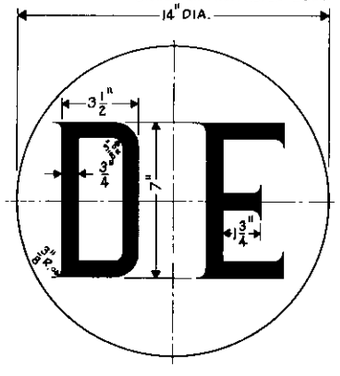
1. OUTER COVER GLASS OF 4691, 4692, 4693 & 4694 IS CLEAR ON OUTSIDE AND SAND BLASTED ON INSIDE.
2. STENCILS 4696, 4697, 4698 & 4699 ARE CLEAR ON CONCAVE SIDE, AND PAINTED BLACK ON CONVEX SIDE, EXCEPT LETTERS WHICH ARE CLEAR.
3. STENCIL 46910 IS CLEAR GLASS, PAINTED BLACK ON SIDE TOWARD LENS, EXCEPT LETTER T WHICH REMAINS CLEAR.
4. STENCIL 4696 IS FOR USE IN CONNECTION WITH DRAGGING EQUIPMENT DETECTOR DEVICE.
5. STENCIL 4697 IS FOR USE AS TRAIN ORDER SIGN.
6. STENCILS 4698 AND 4699 ARE FOR USE IN CONNECTION WITH NO RIGHT TURN AND NO LEFT TURN SIGNS AT HIGHWAY CROSSINGS, WHERE REQUIRED.
7. STENCIL 46910 IS FOR USE IN CONNECTION WITH TORPEDO PLACING MACHINE.
8. THE USE OF PHANKILL UNIT IS OPTIONAL, DEPENDING UPON LOCAL CONDITIONS. IF IT IS NOT DESIRED, REQUISITION SHOULD STATE "WITHOUT PHANKILL UNIT".
9. "DE" STENCIL 4696 TO BE USED AS INDICATOR, IN ACCORDANCE WITH ADJUNCT AS RECOMMENDED BY S.T.R.C. DOCKET 38-2, REVISED.
10. WHERE THE HC9 ILLUMINATED SIGN IS LOCATED UPON A PLATFORM, IT MAY BE APPLIED IN ACCORDANCE WITH U.S. & S. CO. DRAWING NO. B 8912 SHEET 198.

4691 SIGN WITH BACKGROUND Complete with Attachment Ref. 7, Pl. K-162. Specify pipe size and Stencil 4696 or 4697 as required.
STORES CAT. REF. NO. 2A-5651

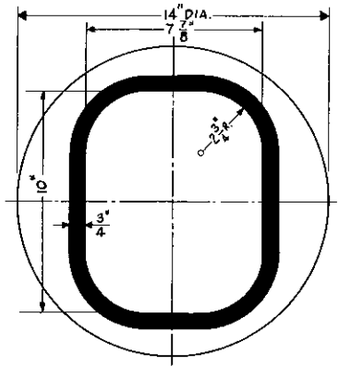
4692 SIGN WITH BACKGROUND and without Attachment Ref. 7, Pl. K-162 but with Stencil 4696 or 4697 as required.
STORES CAT. REF. NO. 2A-5652

4693 SIGN WITHOUT BACKGROUND Complete with Attachment Ref. 7, Pl. K-162. Specify pipe size and Stencil 4698 or 4699 as required.
STORES CAT. REF. NO. 2A-5653

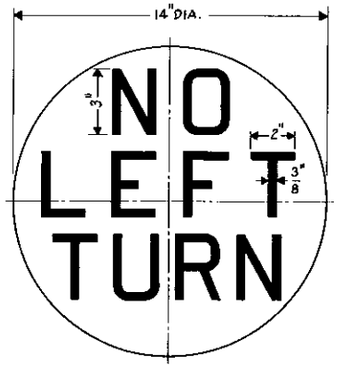
4694 SIGN WITHOUT BACKGROUND and without Attachment Ref. 7, Pl. K-162 but with Stencil 4698 or 4699 as required.
STORES CAT. REF. NO. 2A-5654



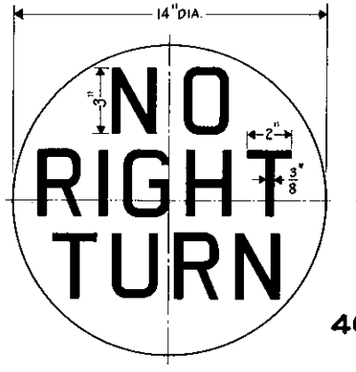
4696 STENCIL
GLASS
STORES CAT. REF. NO. 2A-5656



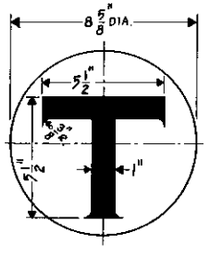
4697 STENCIL
GLASS
STORES CAT. REF. NO. 2A-5657



4698 STENCIL
GLASS
STORES CAT. REF. NO. 2A-5658



4699 STENCIL
GLASS
STORES CAT. REF. NO. 2A-5659



46910 STENCIL
GLASS
STORES CAT. REF. NO. 2A-5640

REVISIONS

1 SHEET

S-469-A

THE PENNSYLVANIA RAILROAD

STANDARD

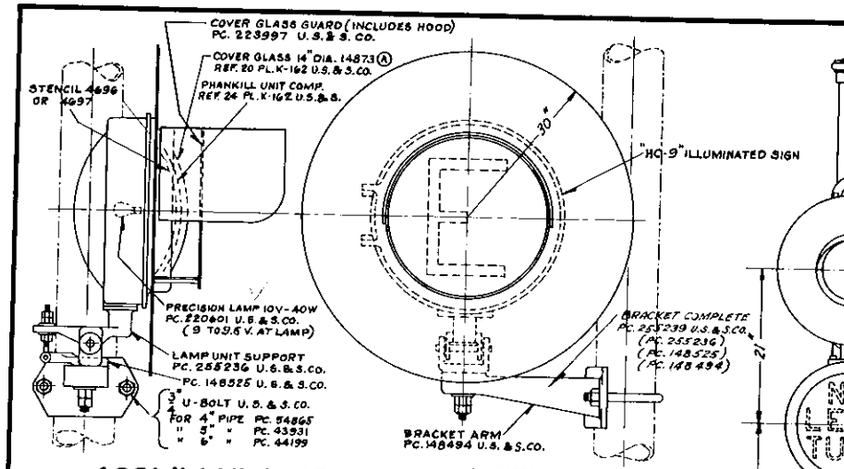
SIGNS

ILLUMINATED

OFFICE OF CHIEF ENGINEER, PHILA., PA. JANUARY 21, 1948.

Approved
A.C. Griffith
Assistant Chief Engineer - T. C. & S.

Approved
J. Rhett
Chief Engineer



4691 ILLUMINATED SIGN

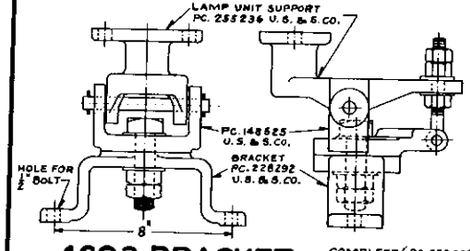
STORES CAT. REF. NO. 2A-5691

COMPLETE AS SHOWN FOR POLE MOUNTING. (SEE NOTE 10)

4692 ILLUMINATED SIGN

STORES CAT. REF. NO. 2A-5692

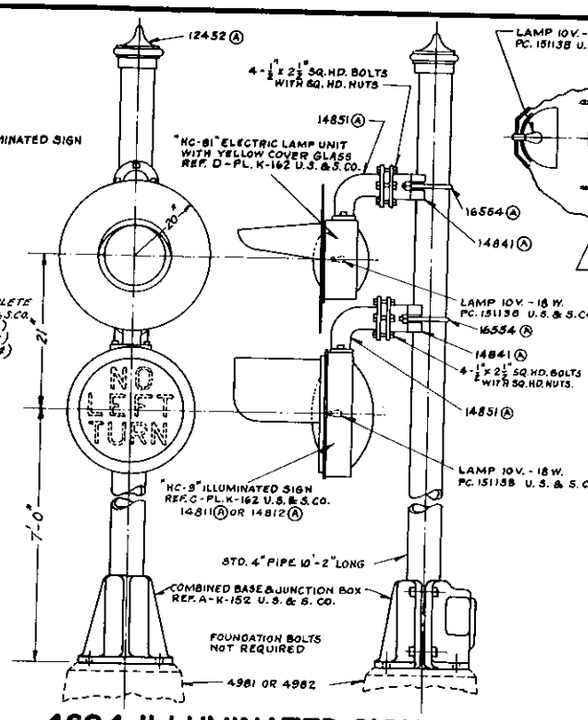
WITH BRACKET 4693 FOR PLATFORM MOUNTING, (SEE NOTE 10)



4693 BRACKET

COMPLETE (PC. 282882 U.S.&S.CO.) FOR PLATFORM MOUNTING

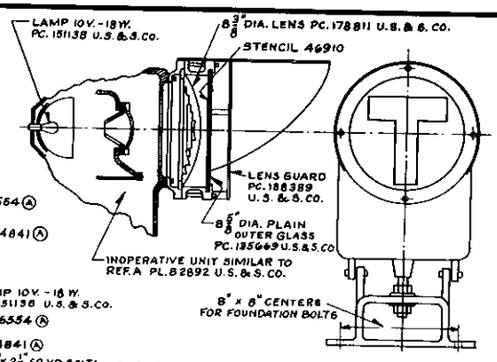
STORES CAT. REF. NO. 2A-5693



4694 ILLUMINATED SIGN

STORES CAT. REF. NO. 2A-2375

COMPLETE AS SHOWN. (SEE NOTE 11)



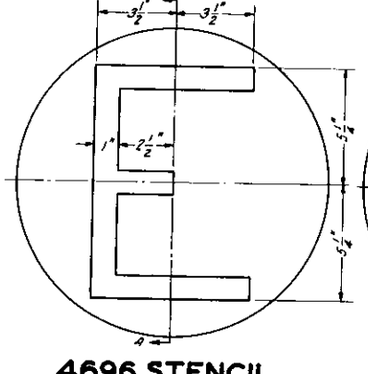
4695 T-SIGN

COMPLETE AS SHOWN

STORES CAT. REF. NO. 2A-5665

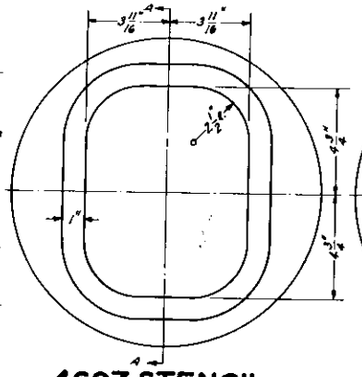
NOTES:-

1. OUTER COVER GLASS OF 4691, 4692 AND 4695 IS CLEAR ON OUTSIDE AND SAND-BLASTED ON INSIDE.
2. STENCIL 4696 IS FOR USE IN CONNECTION WITH DRAGGING EQUIPMENT DETECTOR DEVICE IN ACCORDANCE WITH ADJUNCT AS RECOMMENDED BY S.T.R.C. DOCKET 38-2, REVISED.
3. STENCIL 4697 IS FOR USE AS TRAIN ORDER SIGNAL.
4. STENCILS 4698 AND 4699 ARE FOR USE IN CONNECTION WITH "NO LEFT TURN" AND "NO RIGHT TURN" SIGNS AT HIGHWAY CROSSINGS WHERE REQUIRED.
5. STENCIL 46910 IS FOR USE IN CONNECTION WITH TORPEDO PLACING MACHINE.
6. ITEM NUMBERS SHOWN WITH (A) REFER TO A.A.R. SIG. SEC. DRAWINGS.
7. WHERE LOCAL CONDITIONS REQUIRE PHANKILL UNIT FOR "HC-81" UNIT, REQUISITION SHOULD SPECIFY WITH PHANKILL UNIT PC. 207075 U.S.&S.CO.
8. SIGNS 4691 AND 4692 SHALL BE LOCATED TO THE LEFT OF THE SIGNAL GOVERNING MOVEMENTS ON TRACK INVOLVED.
   (a) WHERE SIGN 4691 IS LOCATED ON GROUND MAST 7'-6" FROM GAGE LINE OF RIGHT HAND RAIL, BRACKET ARMS SHALL BE ARRANGED TO POSITION THE "HC-9" UNIT WITH FRONT FACING TRAFFIC SO THAT THE EDGE OF THE BACKGROUND WILL BE NOT MORE THAN 21" NEARER THE GAGE LINE THAN THE CENTER LINE OF MAST. IF MAST IS LOCATED 10'-0" FROM GAGE LINE AS INDICATED BY P.R.R. CLEARANCE DIAGRAM 70050-A, BRACKET SHOULD BE MOUNTED TOWARDS TRACK WITH "HC-9" UNIT POSITIONED ON BRACKET PARALLEL WITH SIGNAL UNIT.
   (b) 1. WHERE LOCATED ON SIGNAL BRIDGE:- SIGN 4692, WHEN USED AS A TRAIN ORDER SIGNAL SHALL BE LOCATED IN SO FAR AS PRACTICABLE ON A LINE HORIZONTALLY BELOW THE BOTTOM LIGHT OF THE BOTTOM ARM SIGNAL.
   (b) 2. SIGN 4692, WHEN USED AS AN INDICATOR LIGHT FOR A DRAGGING EQUIPMENT DETECTOR, SHALL BE LOCATED ABOVE THE TOP CHORD OF BRIDGE TRUSS, FLUSH WITH THE FACE OF TRUSS AND MOUNTED TO SUIT THE PARTICULAR REQUIREMENTS OF INSTALLATION AND WIRING CONDITIONS.
9. "NO LEFT TURN" AND "NO RIGHT TURN" SIGNS SHALL BE LOCATED TO BEST MEET THE PHYSICAL CHARACTERISTICS AND VISIBILITY CONDITIONS IN THE FIELD.
10. WHEN ORDERING 4691 SPECIFY PIPE SIZE, STENCIL 4696 OR 4697, AND COVER GUARD IF REQUIRED. WHEN ORDERING 4692 SPECIFY STENCIL 4696 OR 4697, AND COVER GLASS GUARD IF REQUIRED.
11. WHEN ORDERING 4694 OR "HC-9" UNIT FOR 4694, SPECIFY WITH STENCIL 4698 OR 4699 AS REQUIRED.
12. 10 V.-18 W. LAMPS INDICATED IN 4694 AND 4695 SHALL BE BURNED 9.0 TO 9.6 VOLTS AT LAMPS.



4696 STENCIL

STORES CAT. REF. NO. 2A-5696



4697 STENCIL

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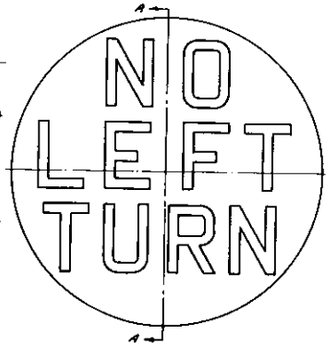
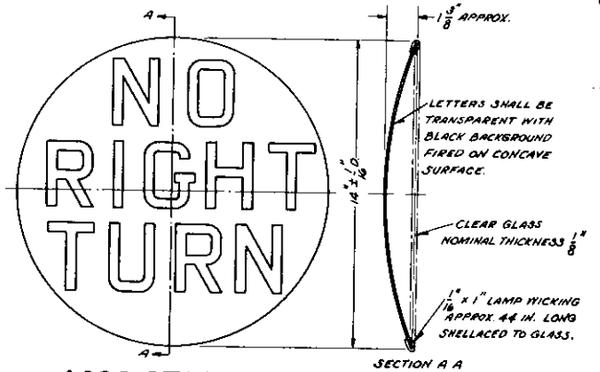


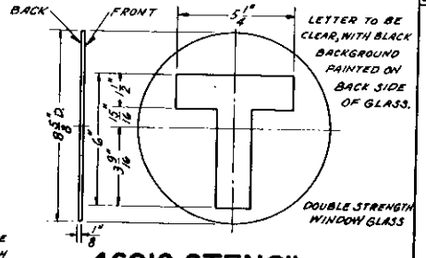
4698 STENCIL

STORES CAT. REF. NO. 2A-5698 14872 (A)



4699 STENCIL

STORES CAT. REF. NO. 2A-5699 14871 (A)



46910 STENCIL

STORES CAT. REF. NO. 2A-5660

REVISIONS
8 REDRAWN FROM APPROVED PLAN S-469-A, DATED 1-21-48 AND REVISED.

1 SHEET

S-469-B

THE PENNSYLVANIA RAILROAD

STANDARD

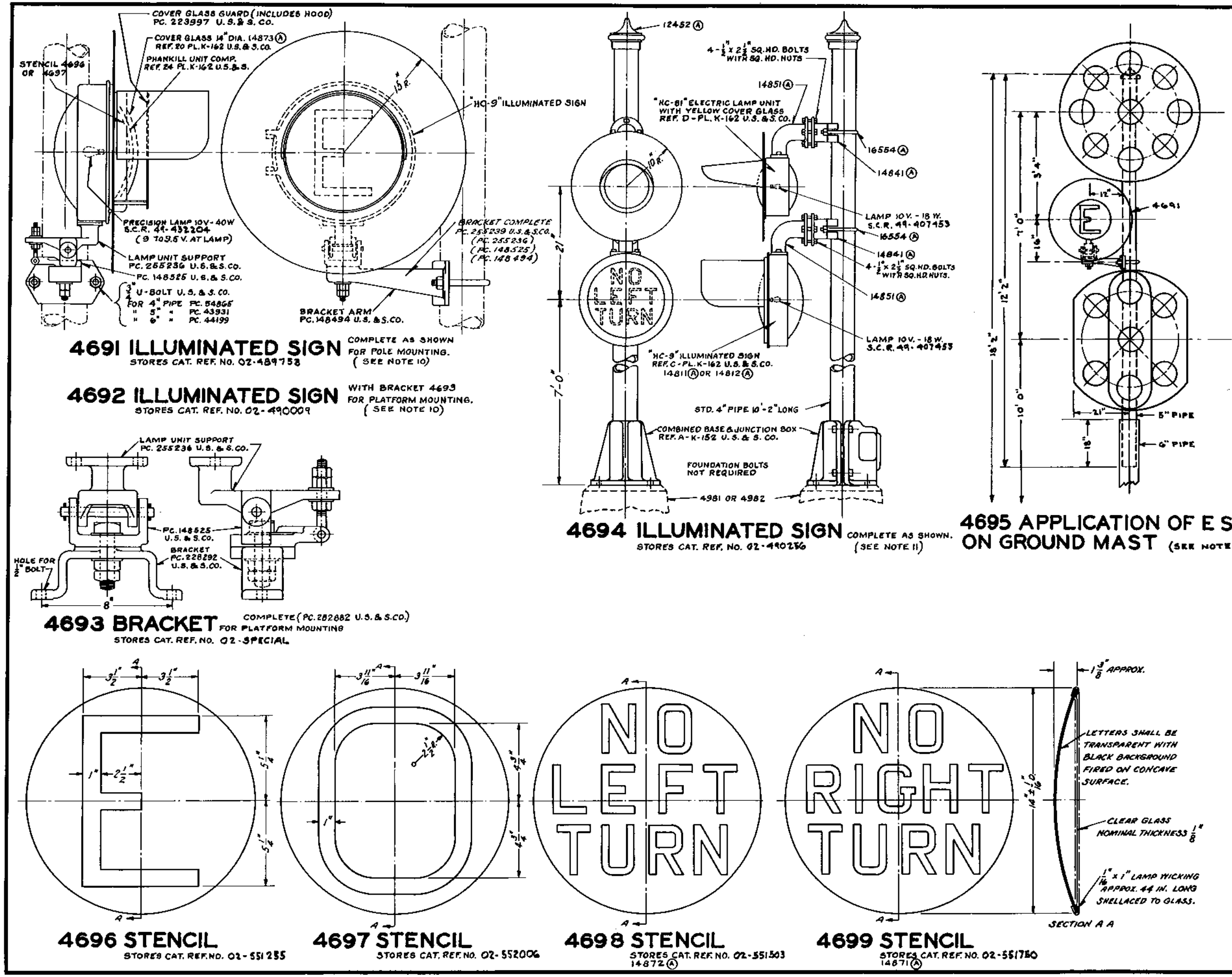
SIGNS

ILLUMINATED

OFFICE OF CHIEF ENGINEER, PHILA., PA., AUGUST 9, 1949.

Approved H. G. Salmonson
Assistant Chief Engineer-Signals

Approved J. J. Pinnett
Chief Engineer



NOTES:-

1. OUTER COVER GLASS OF 4691 AND 4692 IS CLEAR ON OUTSIDE AND SAND-BLASTED ON INSIDE.
2. STENCIL 4696 IS FOR USE IN CONNECTION WITH DRAGGING EQUIPMENT DETECTOR DEVICE IN ACCORDANCE WITH ADJUNCT AS RECOMMENDED BY S.T.R.C. DOCKET 38-2, REVISED.
3. STENCIL 4697 IS FOR USE AS TRAIN ORDER SIGNAL.
4. STENCILS 4698 AND 4699 ARE FOR USE IN CONNECTION WITH "NO LEFT TURN" AND "NO RIGHT TURN" SIGNS AT HIGHWAY CROSSINGS WHERE REQUIRED.
6. ITEM NUMBERS SHOWN WITH Ⓐ REFER TO A.A.R. SIG. SEC. DRAWINGS.
7. WHERE LOCAL CONDITIONS REQUIRE PHANKILL UNIT FOR "HC-81" UNIT, REQUISITION SHOULD SPECIFY "WITH PHANKILL UNIT PC. 207075 U.S.& S. CO.
8. SIGNS 4691 AND 4692 SHALL BE LOCATED TO THE LEFT OF THE SIGNAL GOVERNING MOVEMENTS ON TRACK INVOLVED.
   (a) WHERE SIGN 4691 IS LOCATED ON GROUND MAST 7'-6" FROM GAGE LINE OF RIGHT HAND RAIL, BRACKET ARMS SHALL BE ARRANGED TO POSITION THE "HC-9" UNIT WITH FRONT FACING TRAFFIC SO THAT THE EDGE OF THE BACKGROUND WILL BE NOT MORE THAN 21" NEARER THE GAGE LINE THAN THE CENTER LINE OF MAST. IF MAST IS LOCATED 16'-0" FROM ℄ TRACK AS INDICATED BY P.R.R. CLEARANCE DIAGRAM 70050-(1), BRACKET SHOULD BE MOUNTED TOWARDS TRACK WITH "HC-9" UNIT POSITIONED ON BRACKET PARALLEL WITH SIGNAL UNIT.
   (b) 1. WHERE LOCATED ON SIGNAL BRIDGE:- SIGN 4692, WHEN USED AS A TRAIN ORDER SIGNAL SHALL BE LOCATED IN SO FAR AS PRACTICABLE ON A LINE HORIZONTALLY BELOW THE BOTTOM LIGHT OF THE BOTTOM ARM SIGNAL.
   (b) 2. SIGN 4692, WHEN USED AS AN INDICATOR LIGHT FOR A DRAGGING EQUIPMENT DETECTOR, SHALL BE LOCATED NEAR THE TOP CHORD OF BRIDGE TRUSS, FLUSH WITH THE FACE OF TRUSS AND MOUNTED TO SUIT THE PARTICULAR REQUIREMENTS OF INSTALLATION AND WIRING CONDITIONS.
9. "NO LEFT TURN" AND "NO RIGHT TURN" SIGNS SHALL BE LOCATED TO BEST MEET THE PHYSICAL CHARACTERISTICS AND VISIBILITY CONDITIONS IN THE FIELD.
10. WHEN ORDERING 4691 SPECIFY PIPE SIZE, STENCIL 4696 OR 4697, AND COVER GUARD IF REQUIRED. WHEN ORDERING 4692 SPECIFY STENCIL 4696 OR 4697, AND COVER GLASS GUARD IF REQUIRED.
11. WHEN ORDERING 4694 OR "HC-9" UNIT FOR 4694, SPECIFY WITH STENCIL 4698 OR 4699 AS REQUIRED.
12. 10 V.-18 W. LAMPS INDICATED IN 4694 SHALL BE BURNED 9.0 TO 9.5 VOLTS AT LAMPS.

REVISIONS

B REDRAWN FROM APPROVED PLAN S-469-A, DATED 1-21-48 AND REVISED

D 10-14-63 H.L.G. 9.C.6

T SIGN REMOVED. DETAIL 4695 FOR APPLICATION OF E SIGN ON GROUND MASTS ADDED. S.C.R.'S. CHANGED.

APPROVED: [signature]

1 SHEET

S-469-D

THE PENNSYLVANIA RAILROAD

STANDARD

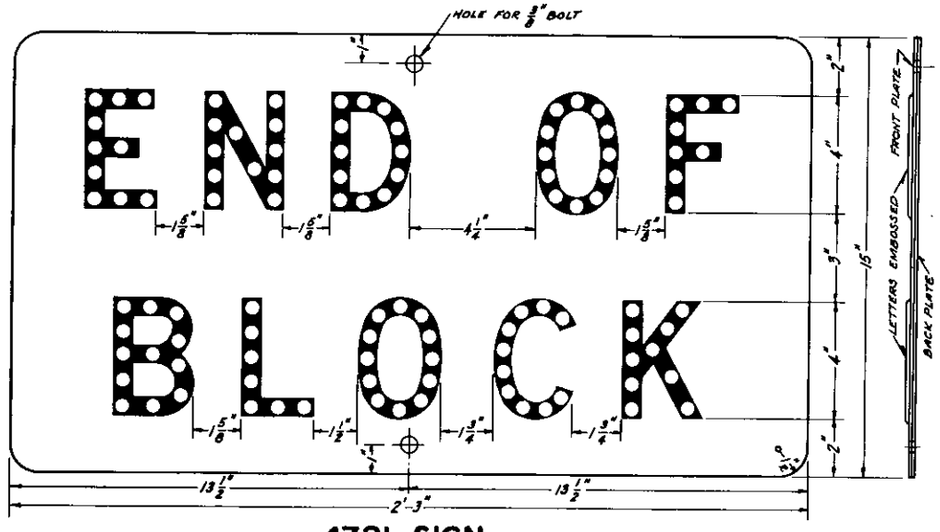
SIGNS

ILLUMINATED

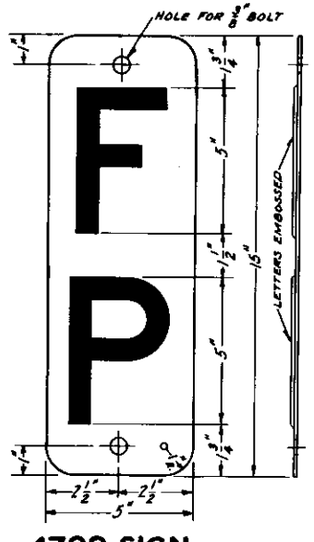
OFFICE OF CHIEF ENGINEER, PHILA., PA., AUGUST 9, 1949.

Approved H. G. Salmonson — Assistant Chief Engineer-Signals

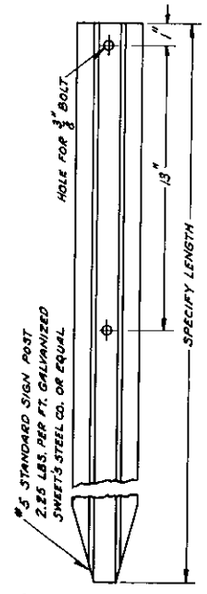
Approved [signature] — Chief Engineer



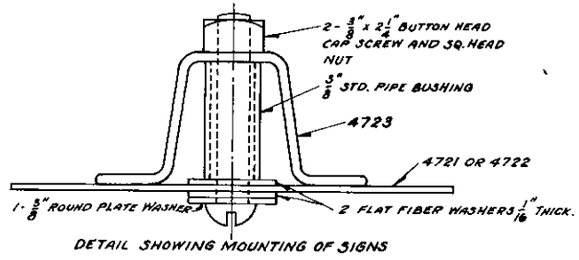
4721 SIGN COMPLETE WITH BACK PLATE.
STORES CAT. REF. NO. 2A-5597



4722 SIGN
STORES CAT. REF. NO. 2A-5598



4723 SIGN POST HIGH CARBON RAIL STEEL.
STORES CAT. REF. NO. 2A-5599



DETAIL SHOWING MOUNTING OF SIGNS

LOCATION DIAGRAM FOR SIGNS

NOTES:-

1. MATERIAL FOR FRONT PLATE AND BACK PLATE OF SIGN 4721 AND SIGN PLATE OF SIGN 4722 SHALL BE #16 GAGE GALVANNEALED STEEL, OR STEEL PARKERIZED AFTER FABRICATION. LETTERS ON BOTH SIGNS SHALL BE EMBOSSED.
2. FOR SIGN 4721, THE COLOR OF BACKGROUND AND BACK OF FRONT PLATE SHALL BE BLACK BAKED-ON ENAMEL. COLOR OF LETTERS SHALL BE WHITE BAKED-ON ENAMEL. FRONT AND BACK OF BACK PLATE SHALL BE BLACK BAKED-ON ENAMEL.
3. FOR SIGN 4722, THE COLOR OF BACKGROUND AND BACK OF SIGN SHALL BE WHITE BAKED-ON ENAMEL. COLOR OF LETTERS SHALL BE BLACK BAKED-ON ENAMEL.
4. REFLECTOR BUTTONS FOR SIGN 4721 SHALL BE ROUND, OF THE PRISMATIC TYPE 1/2 INCH IN DIAMETER, #5 CLEAR FLAT STIMSONITE, ALL PLASTIC, MOUNTED BETWEEN FRONT AND BACK PLATES. NUMBER OF BUTTONS AS INDICATED.
5. MANUFACTURER OF SIGNS SHALL FURNISH SIGN 4721 OR SIGN 4722 ONLY.
6. LETTERS OF SIGNS SHALL BE PROPORTIONED IN ACCORDANCE WITH UNITED STATES PUBLIC ROADS ADMINISTRATION, FEDERAL WORKS AGENCY DESIGN, SERIES D, BOOKLET P-3378
7. SIGN 4722 SHALL BE LOCATED, LONGITUDINALLY, 10 FEET BACK OF A POINT, WHERE TRACK CENTERS BETWEEN MAIN TRACK AND TRACK TO WHICH SIGN APPLIES ARE SEPARATED AT LEAST 12 FEET-2 INCHES.
8. SIGNS SHALL BE ATTACHED TO SIGN POST 4723 ONLY.
9. SIGN POST 4723 SHALL BE DRIVEN INTO GROUND AT LOCATION SELECTED, AFTER WHICH SIGN 4721 OR SIGN 4722 SHALL BE MOUNTED THEREON AS SHOWN IN DETAIL ON THIS DRAWING.
10. THE 3/8" BUSHING INDICATED IN DETAIL OF MOUNTING, SHALL BE OF SUCH LENGTH THAT SIGN WILL BEAR FIRMLY AGAINST POST, BUT NOT TO BEND SIGN.
11. FRONT AND BACK PLATES OF SIGN 4721 SHALL BE FIRMLY HELD TOGETHER WITH TWELVE 19/24 x 5/16" ALUMINUM ASSEMBLY BOLTS WITH VANDAL RESISTING NUTS.

REVISIONS

1 SHEET

S-472-A

THE PENNSYLVANIA RAILROAD

STANDARD

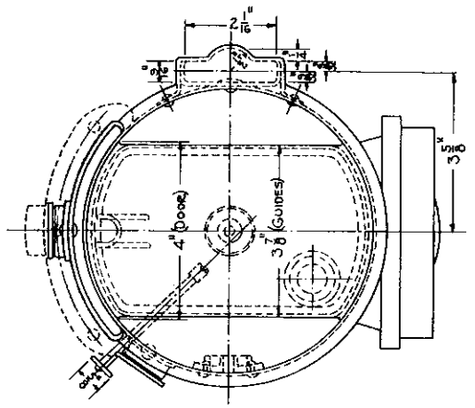
SIGNS

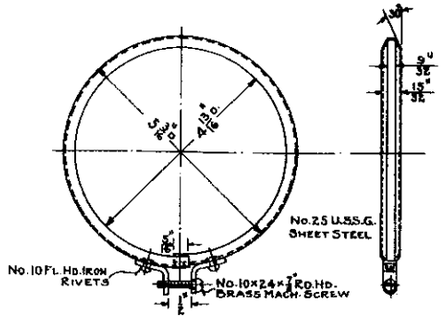
END OF BLOCK AND FOULING POINT

OFFICE OF CHIEF ENGINEER, PHILA., PA., SEPTEMBER 27, 1949.

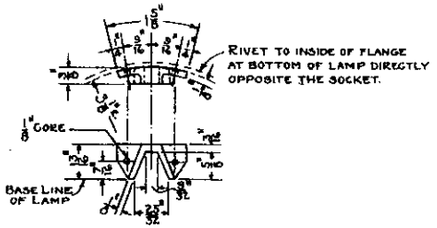
Approved W. G. Johnson
Assistant Chief Engineer-Signals

Approved J. Jarrett
Chief Engineer

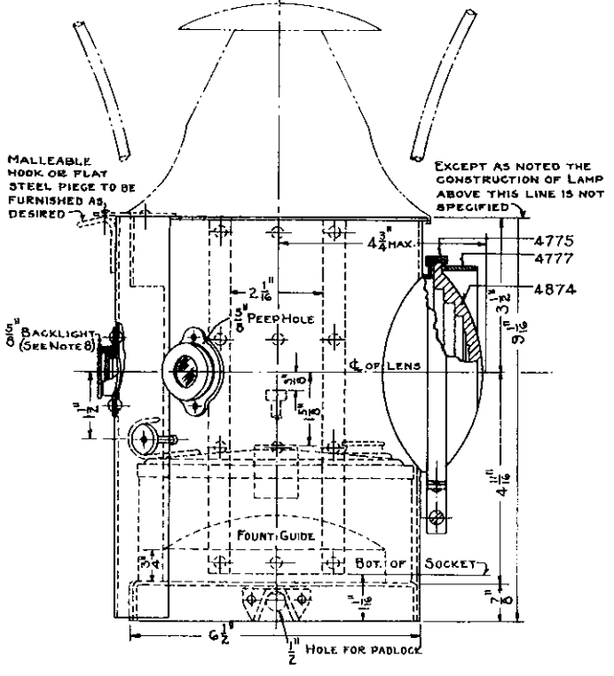




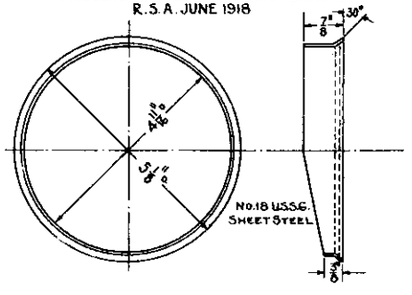
477S - LENS COUPLING RING
R.S.A. MAR. 1920



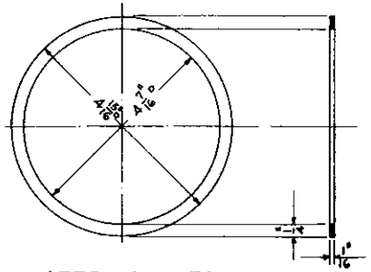
4776 - MALLEABLE POCKET
To Receive Pointed Lug of Lamp Bracket
R.S.A. JUNE 1918



4771 - LAMP COMPLETE WITH WHITE LENS
4772 - LAMP COMPLETE WITH RED LENS
4773 - LAMP COMPLETE WITH YELLOW LENS
4774 - LAMP BODY WITHOUT LENS



4777 - LENS HOOD
R.S.A. MAR. 1920



4778 - GASKET
RED SHEET PACKING

SPECIFICATION.

1. Body of Lamp shall be made of No. 18 sheet steel, tinned.
2. Rivets shall be used in the construction of the body of the Lamp for holding the parts together.
3. Handle of Lamp shall be No. 4 B. W. G. steel wire.
4. Door shall have water-shed so arranged as to prevent rain entering the Lamp, and door shall raise high enough to make the opening six and five-eighths (6⅝) inches.
5. Lamp shall have top draft ventilation. (Ventilation will be tested, when required, at the factory as follows: (A) Wind velocity equivalent to eighty (80) m. p. h., for two (2) minutes: (B) Still air temperature, one hundred and ten (110) degrees Fahr. for two (2) hours. If either of the above tests extinguishes flame, Lamp will be rejected.)
6. Lens shall be five (5) inches in diameter, with three and one-half (3½) inch focus.
7. Lens Coupling Ring shall be arranged so that Lens can be easily removed and shall completely encircle the Lens.
8. Back-light and peep-hole glasses shall be held in place by screw retaining rings. Back-light glass shall be covered with a metal disc placed between the glass and retaining ring.

REVISIONS
Redrawn from Approved Plan S-477-A dated Aug. 2, 1920 and Revised.

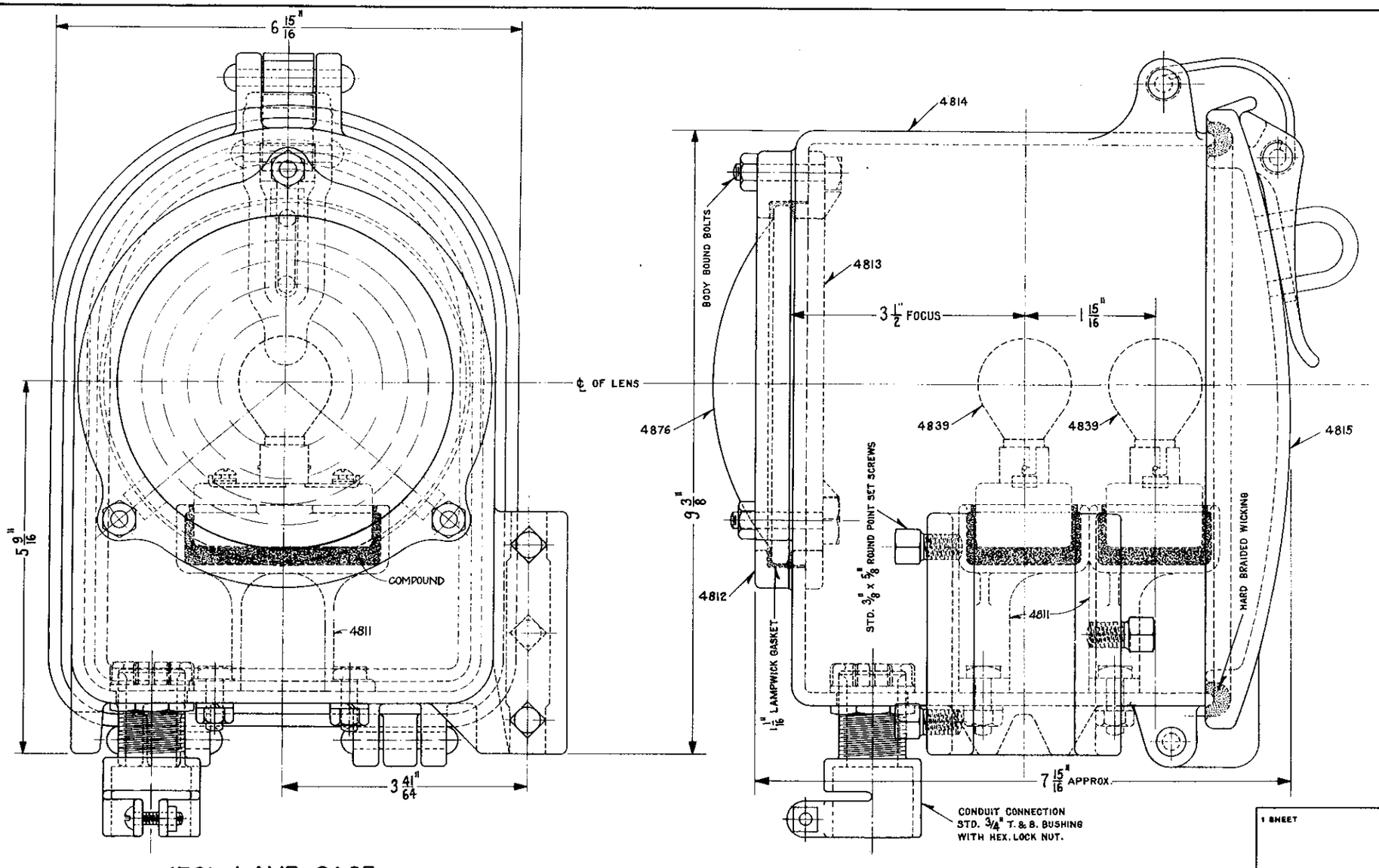
1 SHEET **S-477-B**

PENNSYLVANIA RAILROAD SYSTEM
STANDARD
LAMP
OIL LIGHTED SIGNAL

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., OCT. 17, 1923.

Approved
Chief Signal Engineer

Approved
Chief Engineer



4781 LAMP CASE COMPLETE WITH CLEAR LENS.
4782 " " " " RED " .
4783 " " " " YELLOW " .
4784 " " WITHOUT LENS.

NOTE:-
LAMPS 4839 SHALL BE FURNISHED SEPARATELY.
PAINT OUTSIDE BLACK, INSIDE WHITE ENAMEL.

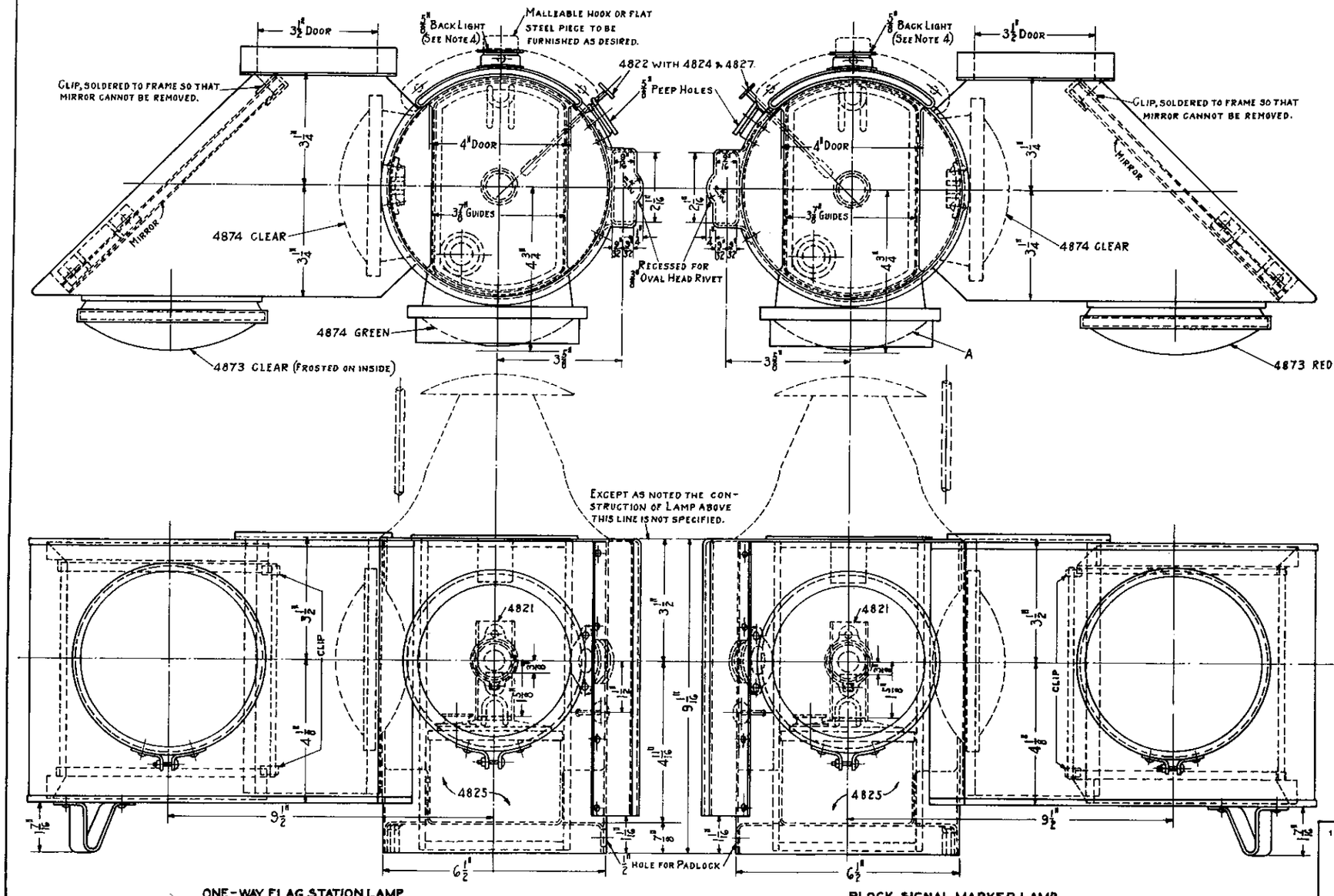
REVISIONS
SUPERSEDES APPROVED PLAN NO. S-478-B, DATED AUGUST 2, 1920, LAST REVISED JANUARY 24, 1925.

1 SHEET S-478-C

THE PENNSYLVANIA RAILROAD
STANDARD
ELECTRIC LAMP
FOR SEMAPHORE SIGNALS
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., SEPTEMBER 7, 1926

Approved A. H. Rudd
Chief Signal Engineer

Approved J. Williamson
Chief Engineer



Note:-

1. Lenses and Roundels shall be in accordance with Pennsylvania Railroad System Plan and Specifications for Lenses and Roundels.
2. When no detail Plan reference is shown, the Manufacturer's Standard Apparatus, if approved by the Purchaser, shall be furnished.
3. Lamp top must open parallel to Signal Casting.
4. Back-light and peep-hole glasses shall be held in place by screw retaining rings. Back-light glass shall be covered with a metal disc placed between the glass and the retaining ring.

ONE-WAY FLAG STATION LAMP

Ordering Reference

Order No.	Name	Required
4791	Lamp Complete	As shown
4792	Lamp Only	Without 4821-4822-4824-4825-4827

BLOCK SIGNAL MARKER LAMP

Order Reference

Order No.	Name	Required	
4793	Lamp Complete	As shown	A= 4874 (Clear)
4794	Lamp Only	Without 4821-4822-4824-4825-4827	
4795	Lamp Complete	As shown	A= 4874 (Red)
4796	Lamp Only	Without 4821-4822-4824-4825-4827	

REVISIONS.

Redrawn from Approved Plan S-479-B dated 2-7-21, last revised 4-2-21, and revised.

1 Sheet

S-479-C

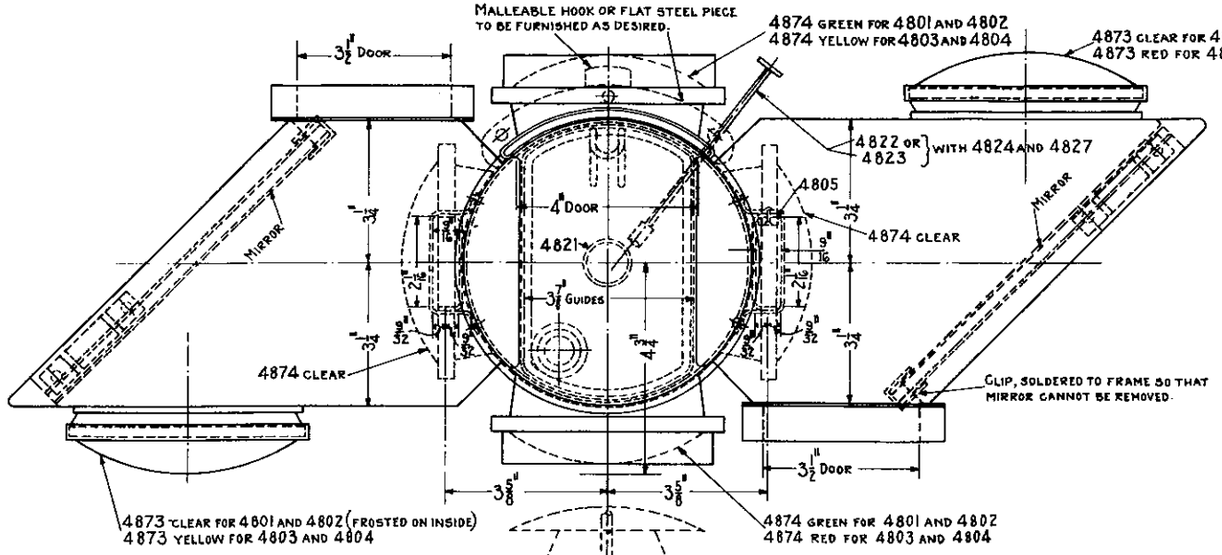
PENNSYLVANIA RAILROAD SYSTEM
STANDARD

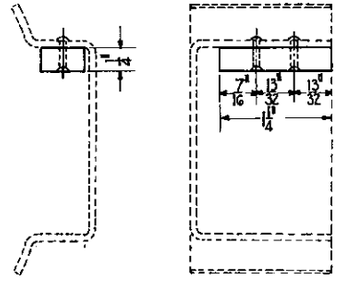
LAMPS

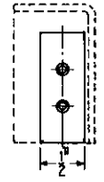
Office of Chief Signal Engineer, Phila., Pa., Jan. 29, 1925.

Approved
Chief Signal Engineer

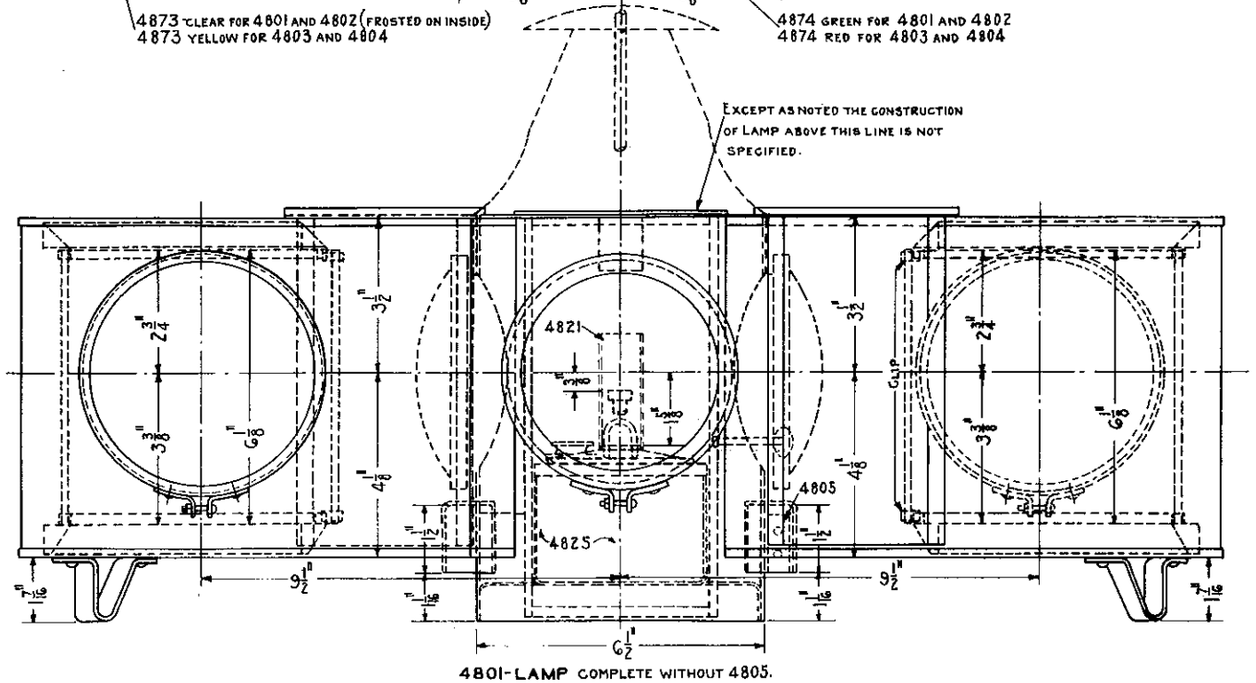
Approved
Chief Engineer







4805-FILLER
O.H.S.



4801-LAMP COMPLETE WITHOUT 4805.
4802- " ONLY " 4805.
4803- " COMPLETE WITH 4805.
4804- " ONLY " 4805.

NOTE:- FURNISH BURNER, FOUNT AND CHIMNEY WITH 4801 AND 4803.

NOTE:-
LENSES AND ROUNDELS SHALL BE IN ACCORDANCE WITH PENNSYLVANIA RAILROAD SYSTEM PLAN AND SPECIFICATIONS FOR LENSES AND ROUNDELS.
WHEN NO DETAIL PLAN REFERENCE IS SHOWN, THE MANUFACTURER'S STANDARD APPARATUS, IF APPROVED BY THE PURCHASER, SHALL BE FURNISHED.
LAMP TOP MUST OPEN PARALLEL TO SIGNAL CASTING.
4801 AND 4802 FOR TWO-WAY FLAG STATION SIGNAL.
4803 AND 4804 FOR UNATTENDED BLOCK STATION SIGNAL.

REVISIONS

REDRAWN FROM APPROVED PLAN S-4808 DATED 2-7-21, LAST REVISED 4-2-21, AND REVISED.

1 SHEET

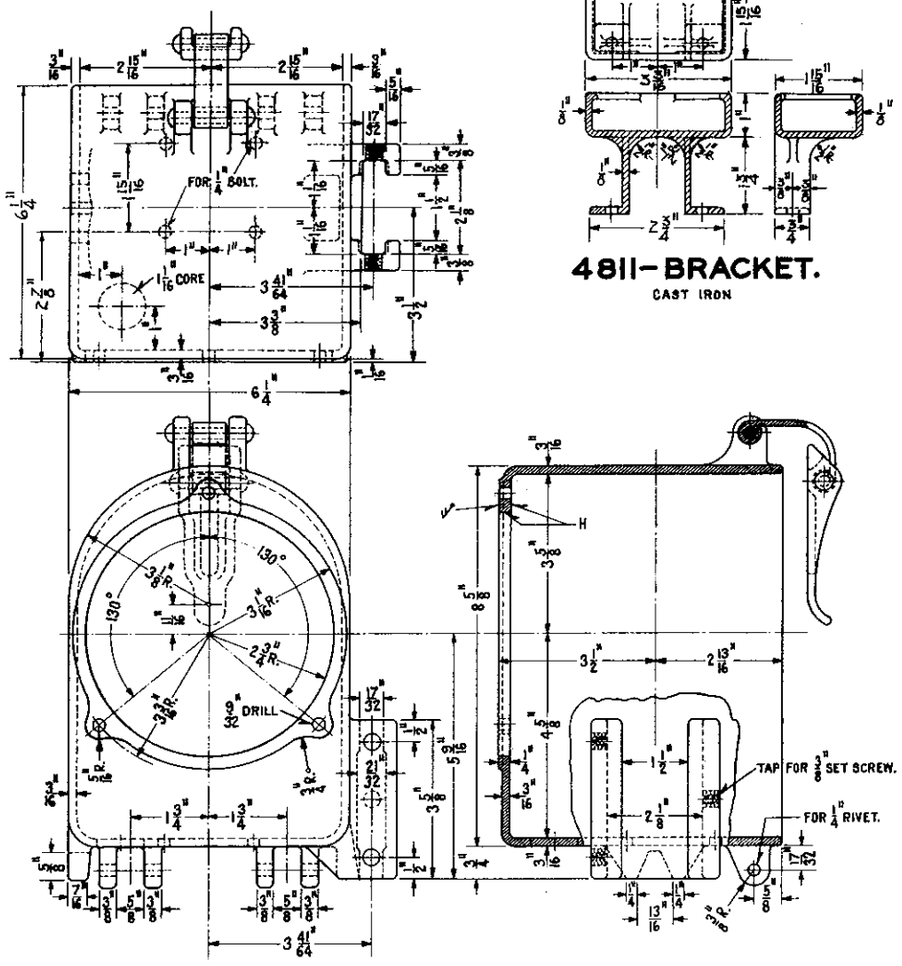
S-480-C

PENNSYLVANIA RAILROAD SYSTEM
STANDARD
LAMP
FOR FLAG STATION AND UNATTENDED BLOCK STATION SIGNALS

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA. PA., JULY 25, 1924.

Approved
Chief Signal Engineer

Approved
Chief Engineer

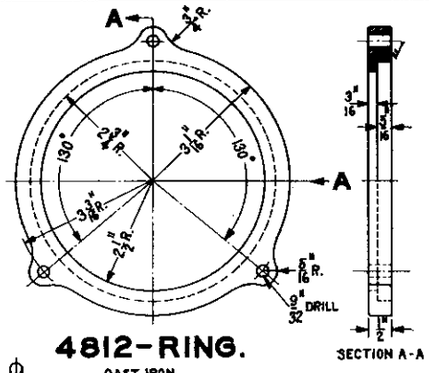


4814-CASE.

CAST IRON

4811-BRACKET.

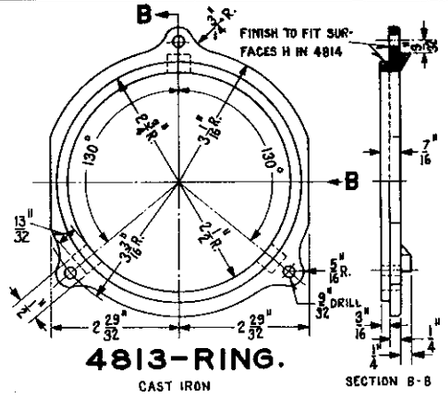
CAST IRON



4812-RING.

CAST IRON

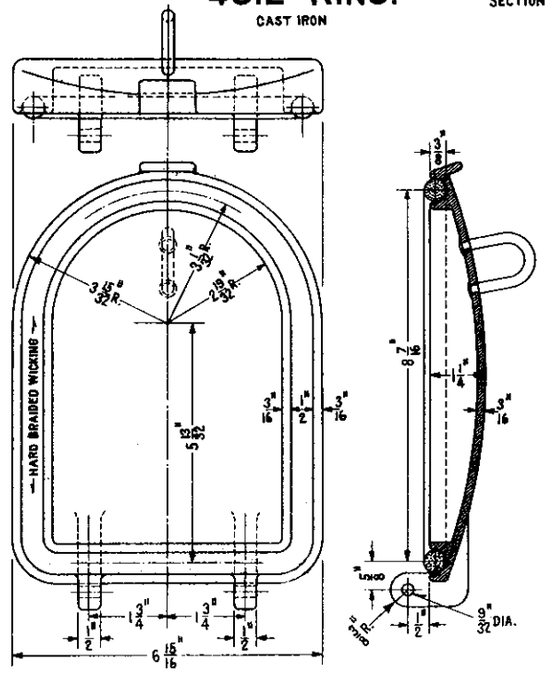
SECTION A-A



4813-RING.

CAST IRON

SECTION B-B



4815-DOOR.

CAST IRON

REVISIONS

1 SHEET

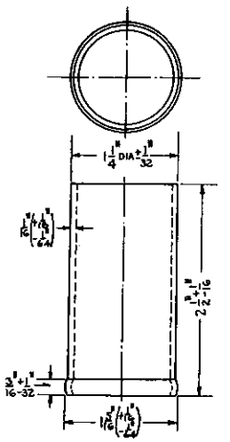
S-481-A

THE PENNSYLVANIA RAILROAD
STANDARD
ELECTRIC LAMP PARTS

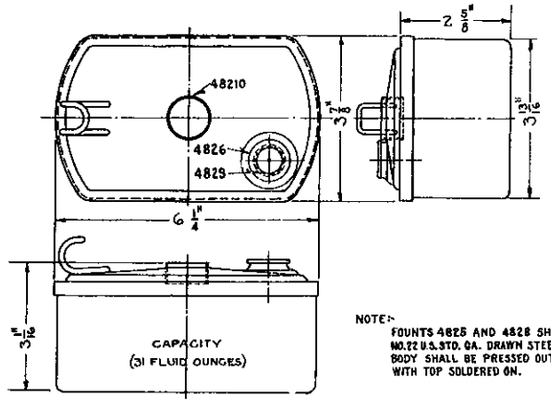
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., SEPTEMBER 7, 1926

Approved
Chief Signal Engineer

Approved
Chief Engineer

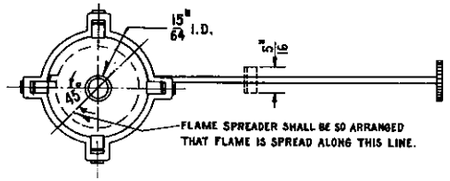


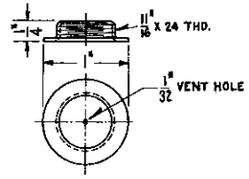
4821-CHIMNEY



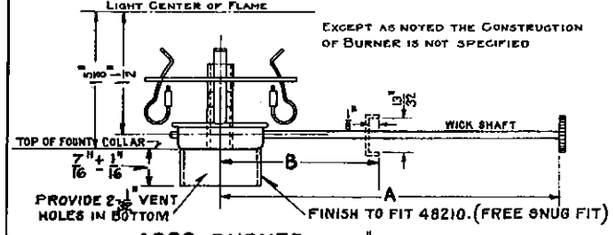
4825-FOUNT
R.S.A. APR. 1914

NOTE:
FOUNTS 4825 AND 4828 SHALL BE MADE OF NO.22 U.S.STD. GA. DRAWN STEEL, TINNED. BODY SHALL BE PRESSED OUT OF ONE PIECE, WITH TOP SOLDERED ON.



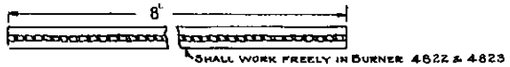


4826-FEEDER CAP
NO. 20 A.W.G. BRASS

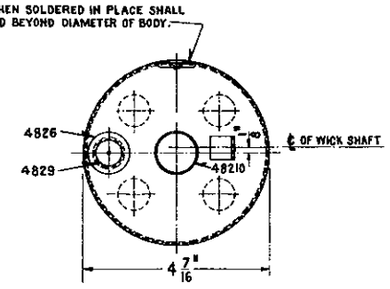


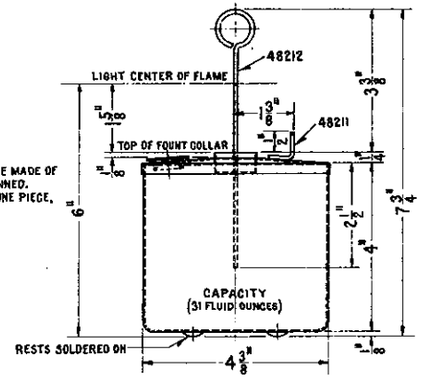
4822-BURNER A-4"

4823-BURNER B-1 7/8"

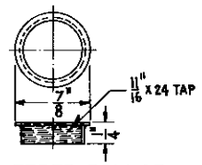


4824-WICK
(CENTER CORE FELT)

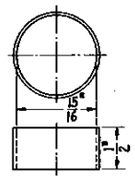




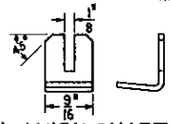
4828-FOUNT



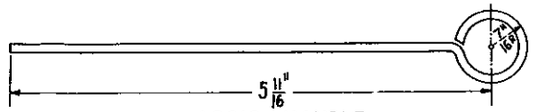
4829-FEEDER COLLAR
NO. 20 A.W.G. BRASS



48210-FOUNT COLLAR
NO. 20 A.W.G. BRASS TUBING



48211-WICK SHAFT LOCK



48212-HANDLE
NO. 12 B.W.G. STEEL WIRE

SPECIFICATIONS FOR CHIMNEYS

1. GENERAL DESCRIPTION:
   This specification covers Long Time Burner Chimneys.
2. KIND OF GLASS:
   Chimneys shall be made of LOW EXPANSION HEAT RESISTING GLASS.
3. ORDERING:
   As far as possible Chimneys shall be ordered in multiples of standard package quantities.
4. BOILING WATER TESTS:
   Chimneys shall stand immersion in boiling water (distilled) for two (2) hours without showing any disintegration.
5. CHILLING TESTS:
   (a) In making this test the Chimney is placed on a suitable Burner and the flame is turned up as far as possible without smoking. The lamp is then tilted to an angle of forty-five (45) degrees, in a direction parallel to the slot in the Burner, and allowed to remain in this position for five (5) minutes. During this period the flame shall be regulated, if necessary, so that a strip not to exceed three-eighths (⅜) of an inch wide running the length of the Chimney and parallel to its axis is smoked. The Chimney is then removed from the Burner, and immediately dropped, top downward, into a vessel of Ice water, maintained at a temperature of between forty-three (43) and fifty (50) degrees Fahr., care being taken that the Chimney does not strike the Ice.
   (b) Chimneys tested as described in 5a shall not show breakage in excess of three (3) in twenty-four (24) tested.
   (c) If the first twenty-four (24) samples fail to pass the Chilling test, an additional twenty-four (24) samples shall be taken for a second test, and if the average of breakage of the two (2) tests does not exceed twelve and one-half (12½) per cent. the material is acceptable.
6. PERMISSIVE VARIATIONS:
   Chimneys shall conform to approved drawings.
7. MARKING:
   Chimneys shall show the Manufacturer's Trade Mark.
8. PACKING:
   Chimneys shall be carefully packed, each package containing twelve (12) dozen Chimneys, in suitable containers, marked to show quantity, requisition number, order number, and, name and address of Consignee.
9. WORKMANSHIP:
   Chimneys shall be clear, of smooth surface, and have both ends finished without sharp edges.
10. REHEARING:
    When tests are made at the Purchaser's laboratory, samples of rejected material will be held for one month from the date of test report. In case the Manufacturer is dissatisfied with results of test, he may make claim for rehearing within that time. Failure to raise a question within one month, will be construed as evidence of satisfaction with results of test. The samples will be scrapped and claim for a rehearing will not be considered.
11. FREIGHT CHARGES:
    Rejected material will be returned to the Manufacturer, who shall pay freight charges both ways.

REVISIONS
B - JANUARY 7, 1926.
APPROVED: A.H. Rudd
C - JUNE 23, 1937. C.D.
APPROVED: W.C. Hunter

1 SHEET S-482-C

THE PENNSYLVANIA RAILROAD SYSTEM
STANDARD
LAMP DETAILS
FOR OIL LIGHTED SWITCH AND SIGNAL LAMPS
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., OCT. 4, 1923.

Approved: A.H. Rudd, Chief Signal Engineer
Approved: W.C. Hunter, Engr. of Standards
Approved: [illegible], Engineer

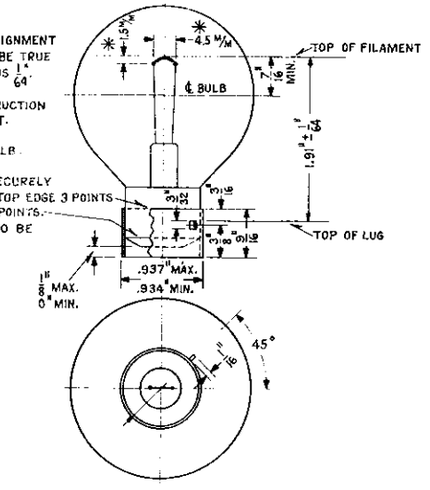
NOTE:- THE AXIAL ALIGNMENT OF FILAMENT MUST BE TRUE WITHIN PLUS OR MINUS $\frac{1}{64}$".

ROUNDED C-2 CONSTRUCTION TUNGSTEN FILAMENT.

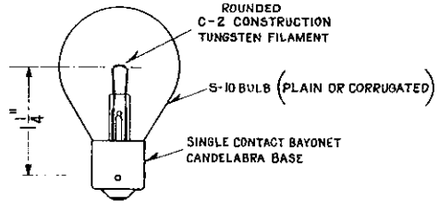
G-16$\frac{1}{2}$ GAS FILLED BULB.

COLLAR SHALL BE SECURELY SOLDERED TO BASE. TOP EDGE 3 POINTS AND BOTTOM EDGE 2 POINTS. OUTSIDE OF COLLAR TO BE PERFECTLY CLEAN.

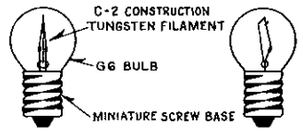
✳ APPROXIMATE.



4831 LAMP 12 V. 9 W.

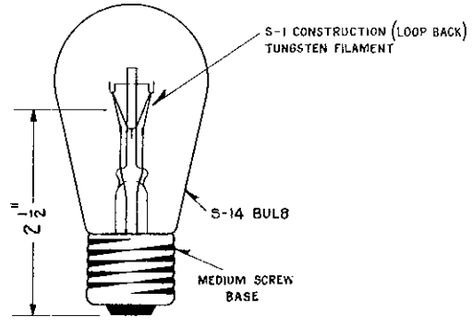


4832 LAMP 12-16 V. 21 C.P.

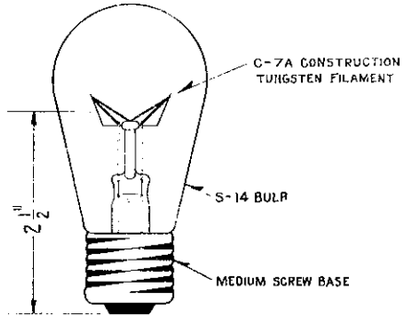


4833 LAMP 18-24 V. 3 C.P.

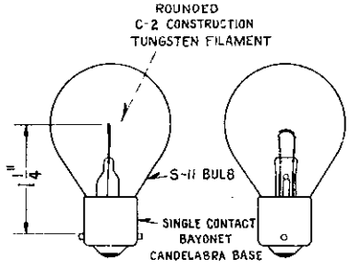
4835 ADAPTER
(MINIATURE BASE TO CANDELABRA BASE)



4836 LAMP 12 V. 2.5 W.



4837 LAMP 115 V. 15 W.



4839 LAMP 12 V. .25 A.
48310 " 3.5 V. .120 A.

REVISIONS
REDRAWN FROM APPROVED PLAN NO. S-483-B DATED MAY 4, 1921, LAST REVISED AUG. 9, 1923 AND REVISED.
D JULY 14, 1930.
APPROVED: C. H. Rudd

NOTE:-

USE 4831 FOR POSITION LIGHT HIGH, SCALE AND FLAG STATION SIGNALS.
USE 4832 FOR POSITION LIGHT DWARF AND HIGHWAY CROSSING SIGNALS.
" 4833 " INDICATION AND MODEL BOARD LIGHTS.
" 4835 " LAMP 4833 WHEN APPLIED TO CANDELABRA RECEPTACLE.
" 4836 " SEMAPHORE SIGNALS.
" 4837 " " "
" 4839 " " " (FOR APPROACH LIGHTING)
" 48310 " " " (FOR CONTINUOUS LIGHTING) PRIMARY BAT.

LAMPS SHOWN HEREON SHALL BE CONSTRUCTED IN ACCORDANCE WITH AND SHALL BE SUBJECT TO THE INSPECTIONS AND TESTS AS REQUIRED BY PENNSYLVANIA RAILROAD STANDARD SPECIFICATIONS BASIC NO. M.P. 54.

SHEET S-483-D

THE PENNSYLVANIA RAILROAD
STANDARD
LAMPS
INCANDESCENT ELECTRIC

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., NOV 9, 1926

Approved C. H. Rudd
Chief Signal Engineer

Approved W. W. Atterbury
Chief Engineer

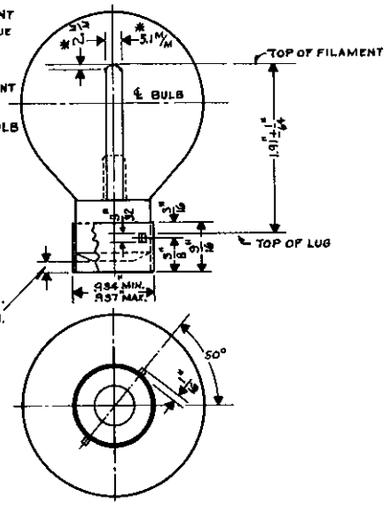
NOTE:- THE AXIAL ALIGNMENT OF LIGHT CENTER MUST BE TRUE WITHIN PLUS OR MINUS 1/64"

C-2R TUNGSTEN FILAMENT

G-16 1/2 GAS FILLED BULB

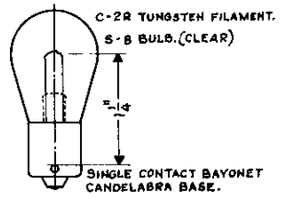
* APPROXIMATE

SLEEVE SOLDERED TO BASE AT TOP 3 POINTS 120° BOTTOM 2 POINTS 180° OUTSIDE OF SLEEVE TO BE PERFECTLY CLEAN.



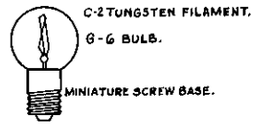
4831 LAMP 12 VOLTS 9 WATTS

STORES CAT. REF. NO. 25E-4209.



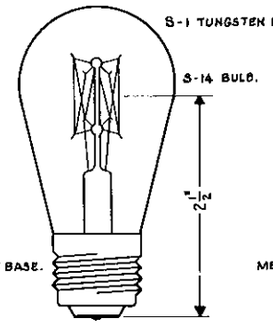
4832 LAMP 12-16 VOLTS 21 C.P.

STORES CAT. REF. NO. 25E-4211.



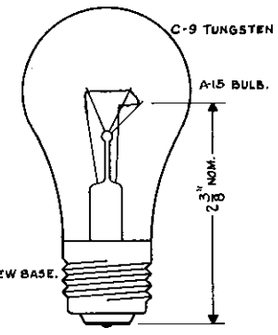
4833 LAMP 18-24 VOLTS 3 C.P.

STORES CAT. REF. NO. 25E-4207.



4836 LAMP 12 VOLTS 2.5 WATTS.

STORES CAT. REF. NO. 25E-1596.



4837 LAMP 115 VOLTS 15 WATTS.

STORES CAT. REF. NO. 25E-4322.

4835 ADAPTER

(MINIATURE BASE TO CANDELABRA BASE)

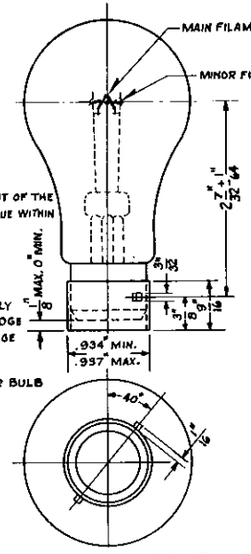
STORES CAT. REF. NO. 2A-12.

NOTE:- THE AXIAL ALIGNMENT OF THE FILAMENT MUST BE TRUE WITHIN PLUS OR MINUS 1/64".

MAIN FILAMENT C-2V

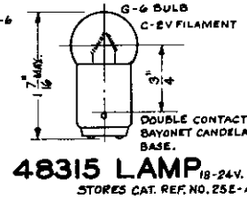
MINOR FILAMENT CC-6

COLLAR SHALL BE SECURELY SOLDERED TO BASE; TOP EDGE 3 POINTS AND BOTTOM EDGE 2 POINTS.



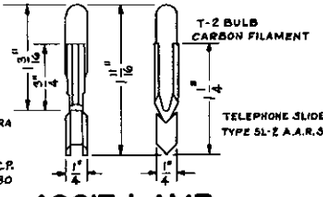
48314 LAMP 10V. 18+3.5 W.

STORES CAT. REF. NO. 25E-4140



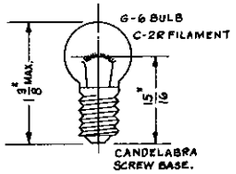
48315 LAMP 18-24V. 3 C.P.

STORES CAT. REF. NO. 25E-4180



48317 LAMP .09-.12A 18V.

STORES CAT. REF. NO. 25E-7609



48316 LAMP 12-16V. 6 C.P.

STORES CAT. REF. NO. 25E-7870

NOTE:- LAMPS SHOWN HEREON SHALL BE CONSTRUCTED IN ACCORDANCE WITH AND SHALL BE SUBJECT TO THE INSPECTIONS AND TESTS AS REQUIRED BY PENNSYLVANIA RAILROAD STANDARD SPECIFICATIONS BASIC NO. M.P. 54.

CT-7 CLEAR GAS FILLED BULB.

NOTE 1:- C-2V CENTER SUPPORTED TUNGSTEN FILAMENT.

NOTE 2:- WIDTH OF LIGHT SOURCE AT OPEN END 0.080" MAX.

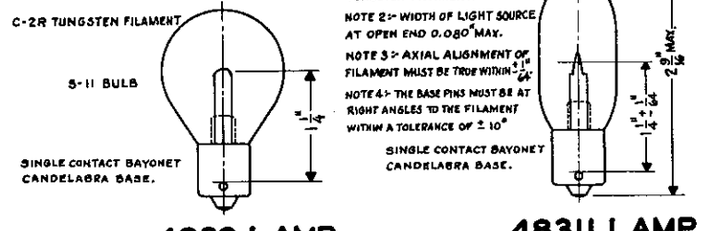
NOTE 3:- AXIAL ALIGNMENT OF FILAMENT MUST BE TRUE WITHIN ± 1/64"

NOTE 4:- THE BASE PINS MUST BE AT RIGHT ANGLES TO THE FILAMENT WITHIN A TOLERANCE OF ± 10°

C-2R TUNGSTEN FILAMENT

S-11 BULB

SINGLE CONTACT BAYONET CANDELABRA BASE.



4839 LAMP 12 VOLTS 0.25 AMPS.

STORES CAT. REF. NO. 25E-4263.

48313 LAMP 2.5 VOLTS .150 AMPS.

STORES CAT. REF. NO. 25E-4131.

48311 LAMP 12 VOLTS 9 WATTS SIGNAL PRECISION.

(FOR USE IN A.C. OR STORAGE BATTERY TERRITORY.)

STORES CAT. REF. NO. 25E-4367.

48312 LAMP 12 VOLTS 6 WATTS SIGNAL PRECISION.

(FOR USE IN PRIMARY BATTERY TERRITORY.)

STORES CAT. REF. NO. 25E-4738.

TABLE

LAMP	FOR USE WITH
4831	POSITION LIGHT HIGH, SCALE AND FLAG STATION SIGNALS.
4832	POSITION LIGHT DWARF, PEDESTAL AND HIGHWAY CROSSING SIGNALS.
4833	INDICATION AND MODEL BOARD LIGHTS.
4836	SEMAPHORE SIGNALS.
4837	SEMAPHORE SIGNALS. PILOT LIGHTS AT HIGHWAYS.
4839	SEMAPHORE SIGNALS (APPROACH LIGHTING).
48311	POSITION LIGHT HIGH SIGNALS (STYLE PL-3).
48312	POSITION LIGHT HIGH SIGNALS (STYLE PL-3).
48313	SEMAPHORE SIGNALS AND SWITCH LAMPS. (CONTINUOUS LIGHTING) PRIMARY BATTERY.
48314	STYLE "R" AND STYLE "P" COLOR LIGHT SIGNALS.
48315	INDICATOR LIGHTS IN INTERLOCKING MACH'S. & TRACK MODELS
48316	INDICATOR LIGHTS IN INTERLOCKING MACH'S. & TRACK MODELS
48317	INDICATOR LIGHTS IN C.T.C. MACHINES

REVISIONS

REDRAWN FROM APPROVED PLAN S-483-D, DATED NOV. 8, 1926, LAST REVISED JULY 16, 1930 AND THE FOLLOWING CHANGES MADE. VERTICAL BEND OF FILAMENT AND OTHER MINOR CHANGES MADE IN 4831. DESIGN OF FILAMENT IN 4837 CHANGED LAMP 4830 REMOVED. LAMPS 48311 TO 48316 INCL. ADDED. BULB OF 4837 FORMERLY S-14. TABLE CHANGED & STORES CAT. REF. NO's. ADDED.

1 SHEET

S-483-E

THE PENNSYLVANIA RAILROAD

STANDARD

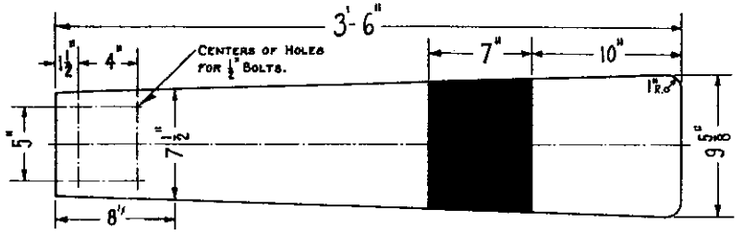
LAMPS

INCANDESCENT ELECTRIC

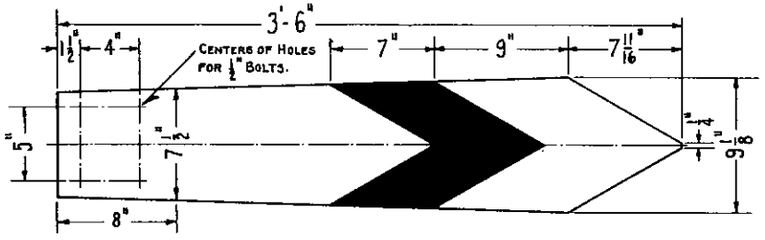
OFFICE OF CHIEF ENGINEER PHILA., PA., DECEMBER 4, 1945.

Approved H.C. Griffith
Assistant Chief Engineer-T.C.&S.

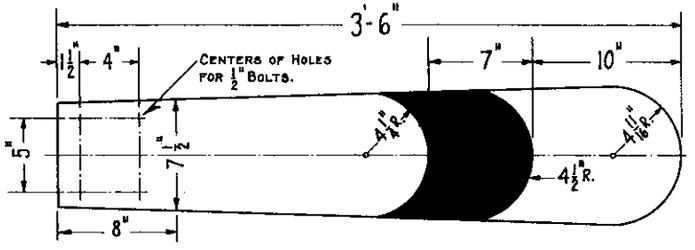
Approved J. Rhoads
Chief Engineer



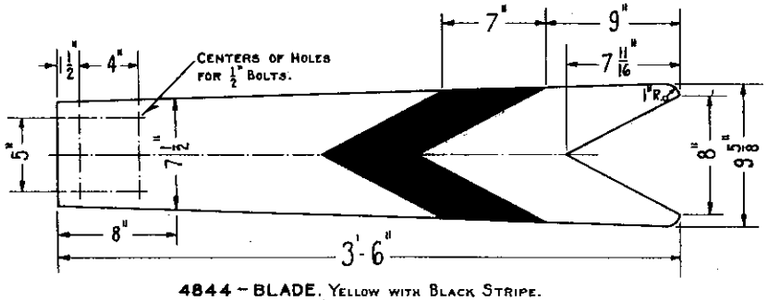
4841 – BLADE. Yellow with Black Stripe.
A.R.A. Manual 1924.



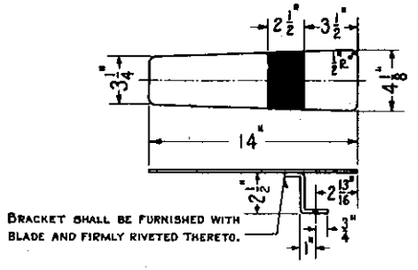
4842 – BLADE. Yellow with Black Stripe.
A.R.A. Manual 1924.

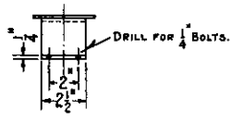


4843 – BLADE. Yellow with Black Stripe.

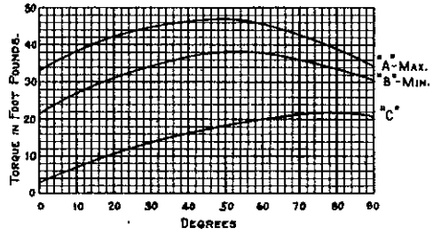


4844 – BLADE. Yellow with Black Stripe.





4845 – BLADE. Yellow with Black Stripe.



Curves "A" and "B" for Blade, Spectacle and Roundels, 0° to 90°.
Curve "C" for Spectacle and Roundels (without Blade and Fastenings) 0° to 90°.

Note:-

1. Blades shall be made of Open Hearth Enameling Steel and Enameled with not less than Three (3) coats of Vitreous Enamel.
2. Enamel back of Blades Black.
3. Yellow shall be Medium Chrome.
4. Unless otherwise specified, Blades shall be furnished with Fastenings to fit A.R.A. Standard Semaphore Spectacle.
5. Torque Curves and Wind Pressure Test not applicable to Blade 4845.

Wind Pressure Test.

Attach the Blade to A.R.A. Standard Semaphore Spectacle; with surfaces of Blade, first the front and then the back, parallel to and towards the floor. Apply a load of 60 pounds at the geometric center of that portion of the Blade extending beyond the fastenings. During either of the above tests, the Blade shall not take a permanent set.

Revisions
Redrawn from Approved Plan S-484-B Dated Nov. 28, 1922 and Revised.

1 Sheet

S-484-C

PENNSYLVANIA RAILROAD SYSTEM
STANDARD
BLADES
FOR SEMAPHORE SIGNALS

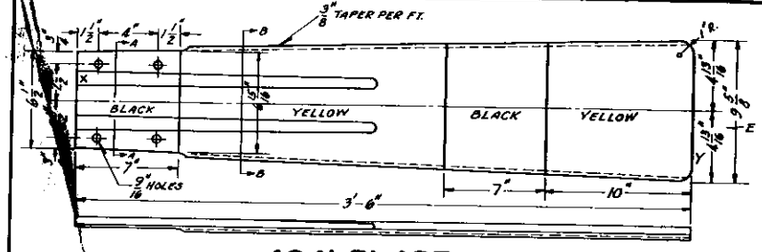
Office of Chief Signal Engineer, Phila., Pa., June 2, 1924.

Approved

Chief Signal Engineer

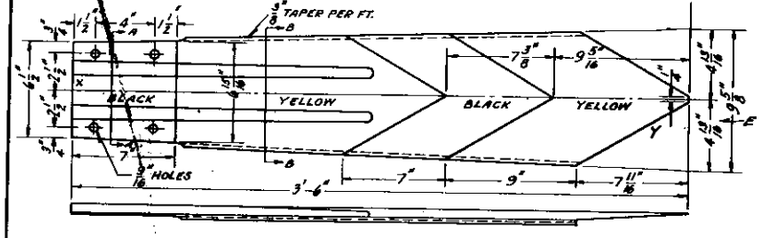
Approved

Chief Engineer



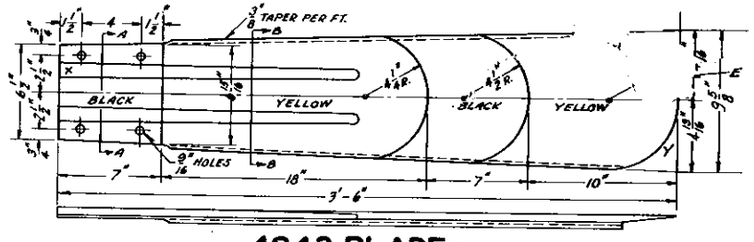
4841 BLADE #15 U.S. STD. GAGE

STORES CAT. REF. NO. 2A-197



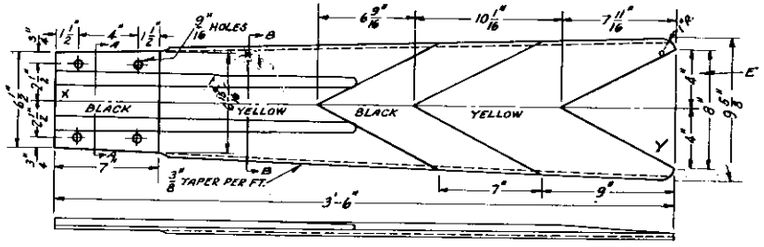
4842 BLADE #15 U.S. STD. GAGE

STORES CAT. REF. NO. 2A-194



4843 BLADE #15 U.S. STD. GAGE

STORES CAT. REF. NO. 2A-198



4844 BLADE #15 U.S. STD. GAGE

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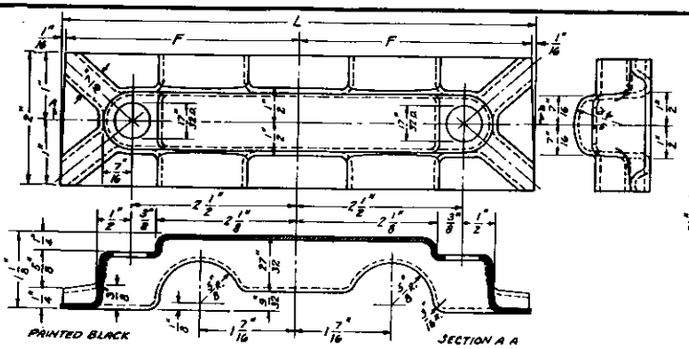
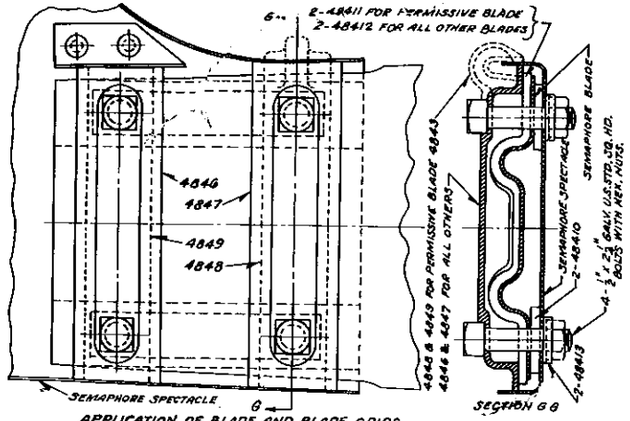
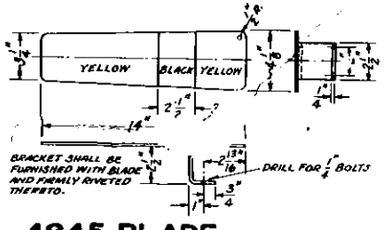


4846 BLADE GRIP REAR - PRESSED STEEL - L = 7 1/8", F = 3 1/2"

4847 BLADE GRIP FRONT - PRESSED STEEL - L = 7 3/8", F = 3 5/8"

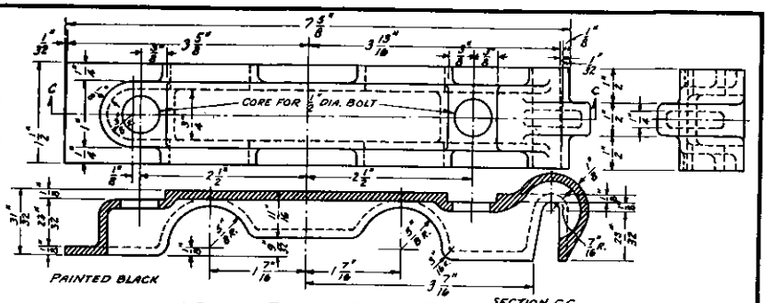


APPLICATION OF BLADE AND BLADE GRIPS TO SEMAPHORE SPECTACLE.

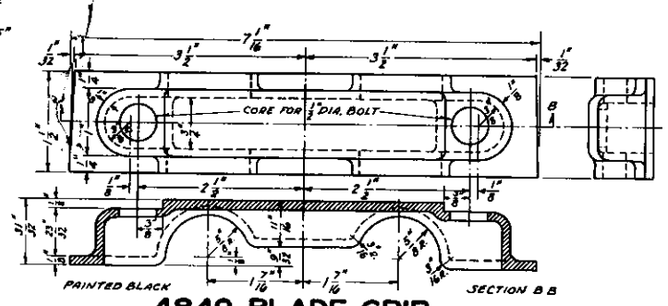


4845 BLADE #12 U.S. STD. GAGE

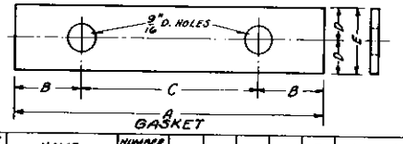
STORES CAT. REF. NO. 2A-196



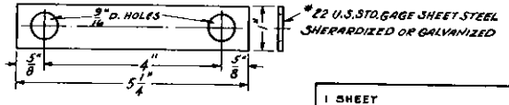
4848 BLADE GRIP FRONT - MALLEABLE IRON



4849 BLADE GRIP REAR - MALLEABLE IRON



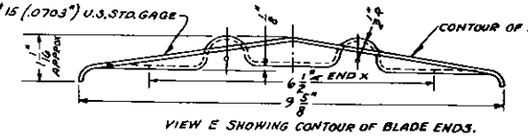
ORDER NUMBER	NAME	NUMBER REQ'D.	A	B	C	D	E	MATERIAL
48410	PLAIN GASKET	2	7"	1 1/2"	4"	3/4"	1 1/2"	3 PLY COW-HAIR
48411	CORRUGATED GASKET	2	8 1/4"	1"	6 1/4"	3/4"	1 1/2"	3 PLY COW-HAIR
48412	CORRUGATED GASKET	2	8 1/2"	1"	6 1/2"	1"	2"	3 PLY COW-HAIR



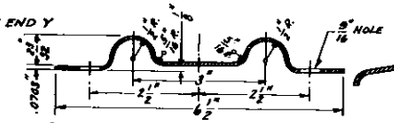
48413 NUT LOCK

REVISIONS

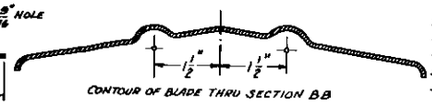
REDRAWN FROM APPROVED PLAN S-484-C, DATED JUNE 2, 1924 AND REVISED TO SHOW FORMING OF BLADE GRIPS ADDED TO PLAN.



VIEW E SHOWING CONTOUR OF BLADE ENDS.



CONTOUR OF END X OF BLADE & THRU SECTION AA



CONTOUR OF BLADE THRU SECTION BB

NOTES :-

1. BLADES SHALL BE MADE OF OPEN-HEARTH ENAMELING STEEL & ENAMELED WITH NOT LESS THAN 3 COATS OF ACID RESISTING VITREOUS ENAMEL, COLORS AS INDICATED.
2. ENAMEL BACK OF ALL BLADES BLACK.
3. YELLOW ENAMEL SHALL BE MEDIUM CHROME.
4. GRIPS, BOLTS, AND GASKETS SHALL BE ORDERED SEPARATELY FROM BLADES, INDICATING ORDER NUMBER.
5. WIND PRESSURE TEST SHALL BE AS PER AAR 36, SEC. DWG. 1548.

1 SHEET

S-484-D

THE PENNSYLVANIA RAILROAD

STANDARD

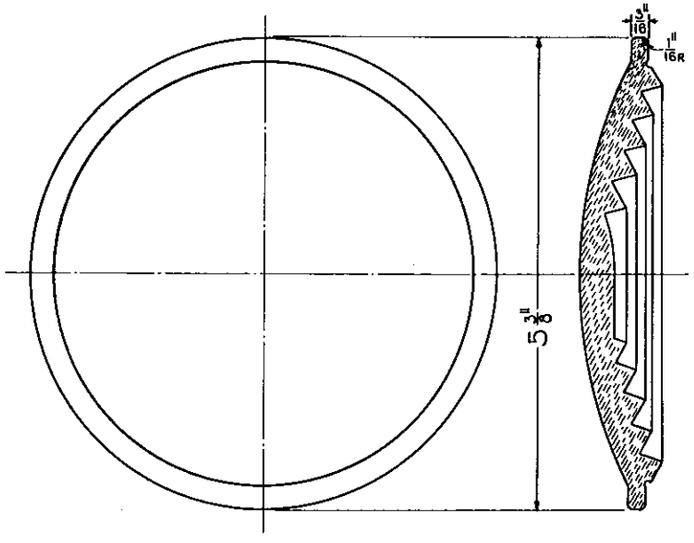
BLADES

FOR SEMAPHORE SIGNALS

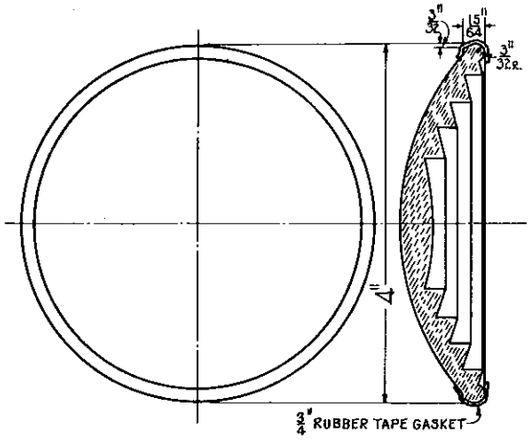
OFFICE OF CHIEF ENGINEER, PHILA., PA., MAY 9, 1949.

Approved W. G. Solmonson
Assistant Chief Engineer - Signals

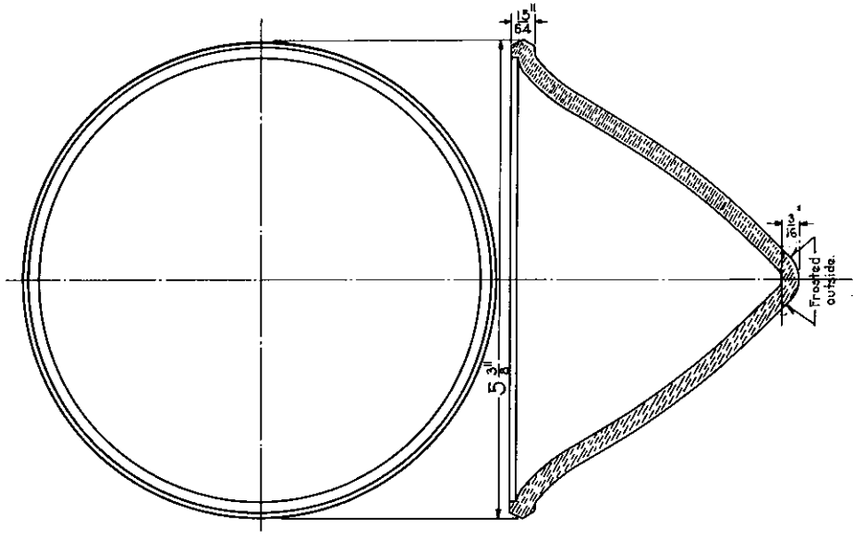
Approved J. T. Wallis
Chief Engineer



4861–LENS INVERTED HALF TORIC.(CLEAR)
4861I–LENS INVERTED SPREDLITE(CLEAR)



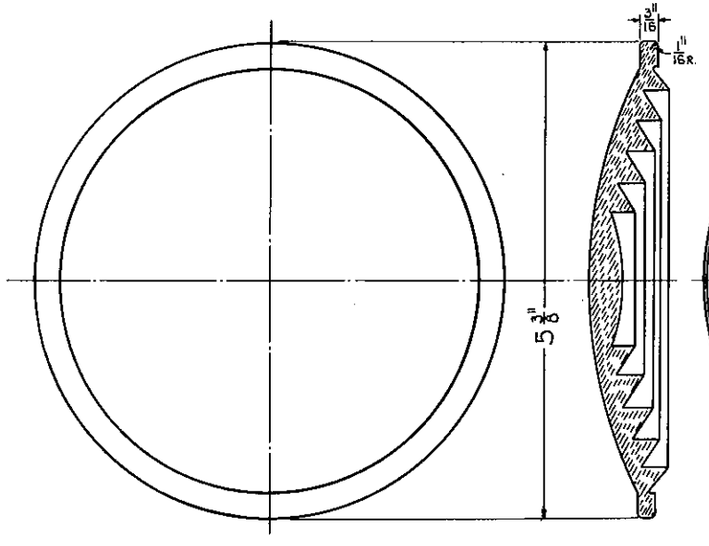
4864–LENS OPTICAL.(CLEAR)



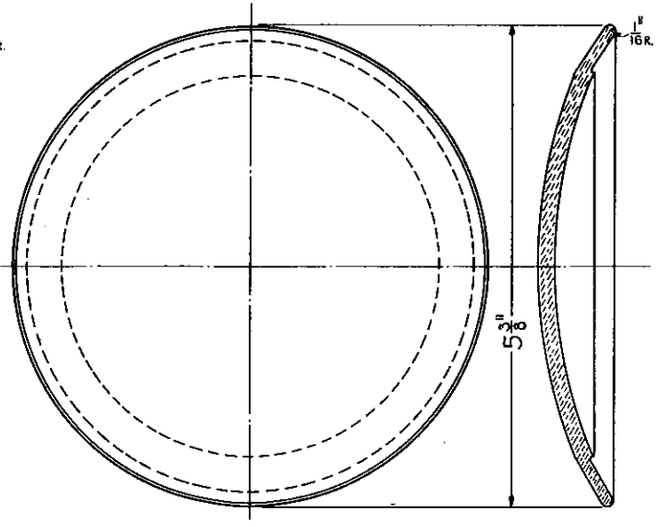
4866–COVER GLASS(NOGLARE) Transmission value shall fall within the light and dark limits of samples held by Corning Glass Works and Chief Signal Engineer Penna. System.

48612– " " (GREEN) Trans: Lt. 175- Std. 150- Dk. 125.
48613– " " (YELLOW) " " 154 " 130- " 110.

Note: Bottom of Lens 4861 shall be marked "Bottom".
Focal Length of Lenses 4861, 4862 and 4864 shall be 2 1/4", and shall be pressed on the outer zone, together with the name or trade mark of the Manufacturer.
4861I- For use on curves.



4862–LENS INVERTED PLAIN.(CLEAR)



4869–COVER GLASS(GREEN) Transmission Lt. 175 - Std. 150 - Dk. 125.
48610– " " (CLEAR)

FIG.	USE.
4861	High Position Light Signals.
4862	Flag Station and Scale Signals.
4864	Dwarf & Pedestal Position Light Signals.
4866	High Position Light Signals.
4869	Flag Station and Scale Signals.
48610	Flag Station.
48612	Distant Switch Indicator
48613	" " "

REVISIONS.
B-Mar. 6, 1924. Approved: A.H. Rudd
C- Feb. 27, 1929. Approved:- A.H. Rudd
D- FEB. 5, 1934. APPROVED:- A.H. Rudd

1 SHEET

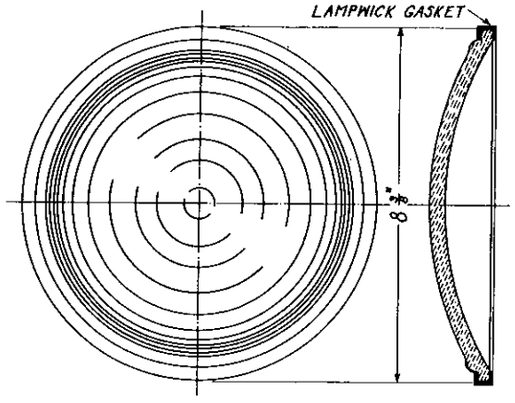
S-486-D

THE PENNSYLVANIA RAILROAD
STANDARD
COVER GLASSES AND LENSES
FOR POSITION AND OTHER LIGHT SIGNALS
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., MARCH 18, 1921

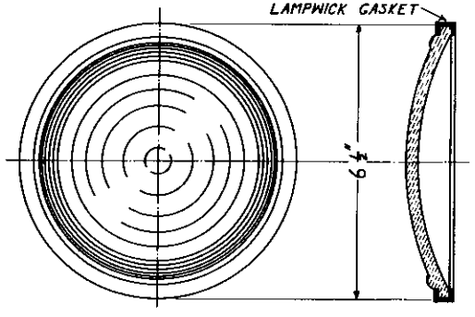
Correct A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer

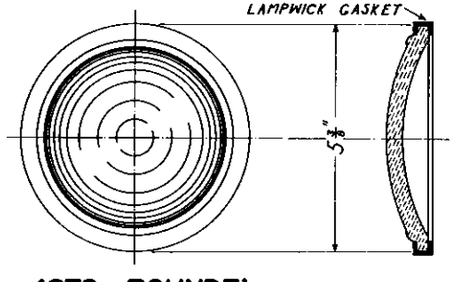
E.K.P. 4-20 H.E.H.



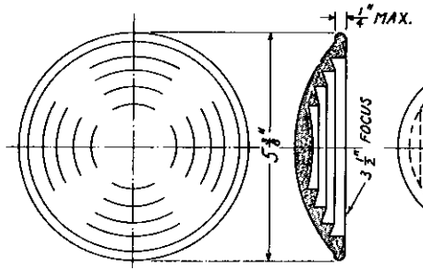
4871 – ROUNDEL



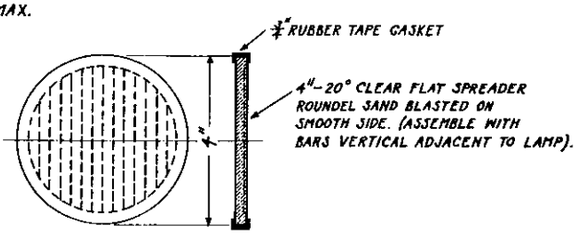
4872 – ROUNDEL



4873 – ROUNDEL

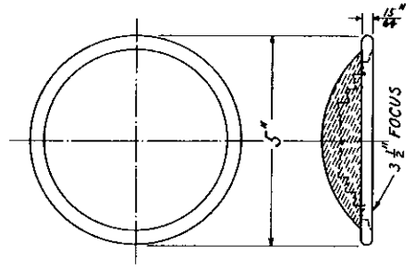


4876 – LENS



4877 – ROUNDEL

FURNISHED BY U.S. & S. Co.



4874 – LENS

4875 – " SPREDLITE

4875 USED IN CONNECTION WITH PURPLE ROUNDEL.

NOTE:–
SPECIFY COLOR WHEN ORDERING ROUNDELS AND LENSES.
FURNISH GASKET WITH EACH ROUNDEL.

SIGNAL ROUNDELS AND LENSES SHALL BE IN ACCORDANCE WITH A.A.R. SIGNAL SECTION SPECIFICATION 69–35.

REVISIONS
REDRAWN FROM APPROVED PLAN S-487-D DATED 11-3-26, AND REVISED.

1 SHEET

S-487-E

THE PENNSYLVANIA RAILROAD
STANDARD

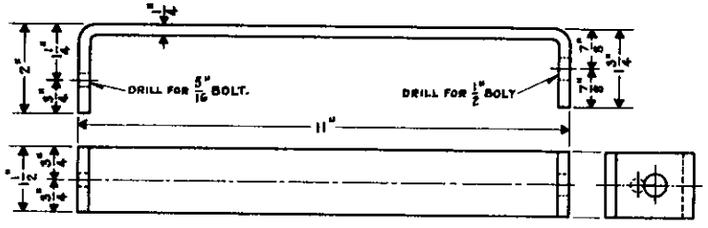
ROUNDELS & LENSES

OFFICE OF ASST. CHIEF ENGINEER–SIGNALS, PHILA., PA. JULY 24, 1937.

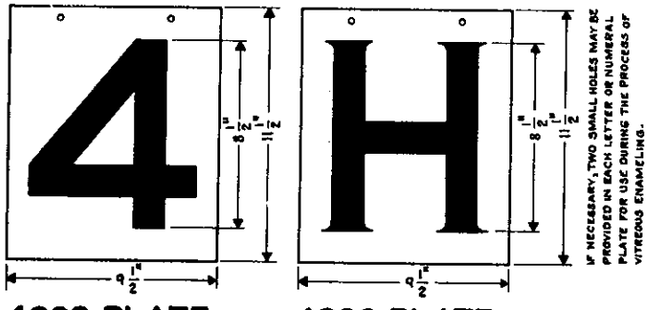
APPROVED: N. L. Stanton
ASST. CHIEF ENGINEER–SIGS.

APPROVED: W. W. Wiggin
CHIEF ENGINEER

P.L.S.

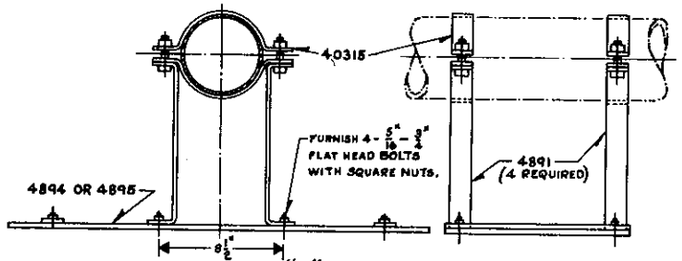


4891 SUPPORT
O. H. STEEL

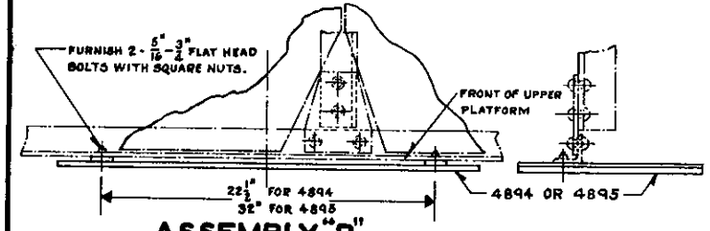


4892 PLATE
#16 U.S.STD. GAUGE ENAMELING STEEL.

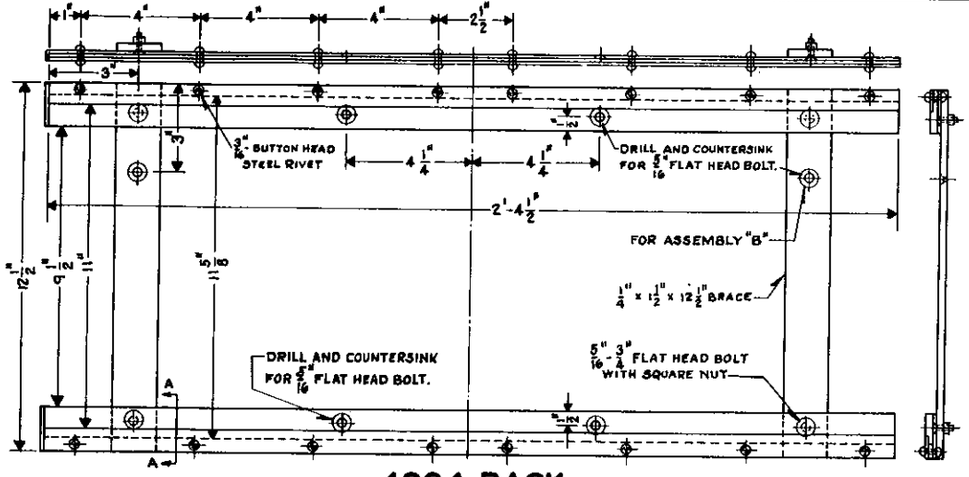
4893 PLATE
#16 U.S.STD. GAUGE ENAMELING STEEL.



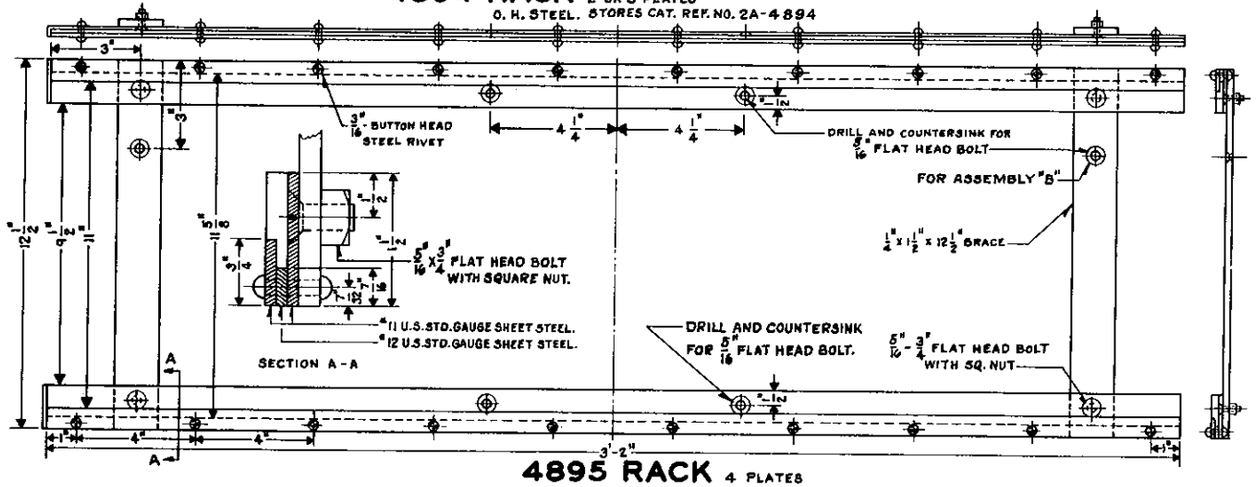
ASSEMBLY "A" FOR DIAGRAMS B & C.



ASSEMBLY "B" FOR DIAGRAM A.



4894 RACK 2 OR 3 PLATES
O. H. STEEL. STORES CAT. REF. NO. 2A-4894



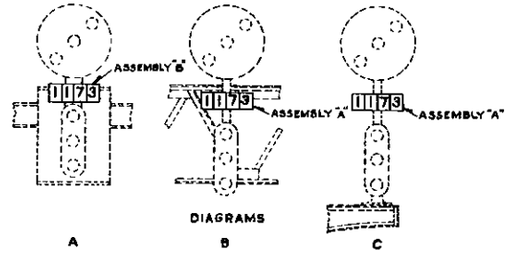
4895 RACK 4 PLATES
O. H. STEEL
STORES CAT. REF. NO. 2A-4895

NOTE :-

1. FRONT AND BACK OF ALL PLATES SHALL BE BLACK ACID RESISTING VITREOUS ENAMELED WITH NUMERALS AND LETTERS WHITE ACID RESISTING VITREOUS ENAMELED.
2. NUMERALS AND LETTERS SHALL BE PROPORTIONED IN ACCORDANCE WITH STANDARD M.W. PLAN BASIC NUMBER 78000.
3. WHEN ORDERING SPECIFY NUMERALS OR LETTERS DESIRED.
4. POSITION LIGHT SIGNALS WHOSE MOST RESTRICTIVE INDICATION IS MORE FAVORABLE THAN STOP, SHALL BE NUMBERED.
5. ALL PARTS OF RACKS AND CLAMPS SHALL BE THOROUGHLY CLEANED, GIVEN A PRIMARY COAT OF RED LEAD AND A FINISHING COAT OF FIRST CLASS BLACK PAINT.
6. IN ACCORDANCE WITH C.E. 58-A, A LETTER MAY BE PREFIXED TO THE SIGNAL NUMBER FOR DESIGNATING BRANCH LINE SIGNALS.
7. FOR NUMERALS AND LETTERS APPLIED TO GROUND MASTS, SEE PLAN NO. S-490.

ORDERING REFERENCE FOR BRACKETS COMPLETE

ORDER NUMBER	STORES CAT. REF. NUMBER	BRACKET ONLY FOR	ASSEMBLY
4896	2A-4896	2 OR 3 PLATES	"A" DIAGRAM B OR C
4897	2A-4897	4 PLATES	"A" DIAGRAM B OR C
4898	2A-4898	2 OR 3 PLATES	"B" DIAGRAM A
4899	2A-4899	4 PLATES	"B" DIAGRAM A



APPLIED TO SIGNAL ON BEAM TYPE SIGNAL BRIDGE.

APPLIED TO SIGNAL ON STANDARD TYPE SIGNAL BRIDGE.

APPLIED TO SIGNAL ON CANTILEVER.

REVISIONS

REDRAWN FROM APPROVED PLAN S-489-E, DATED JUNE 27, 1924, LAST REVISED FEB. 18, 1935 AND REVISED AS FOLLOWS:- VERTICAL NUMBER RACK ELIMINATED. ENAMELING OF PLATES MADE VITREOUS ENAMEL. NOTE 7 & STORES CAT. REF. NUMBERS ADDED. CLAMP CHANGED AND SUPPORT 4891 added.

G REVISED JANUARY 23, 1944. ALL 5/16" BOLTS FORMERLY 3/16. NOTE 1 CHANGED.

APPROVED: N. C. Stanton

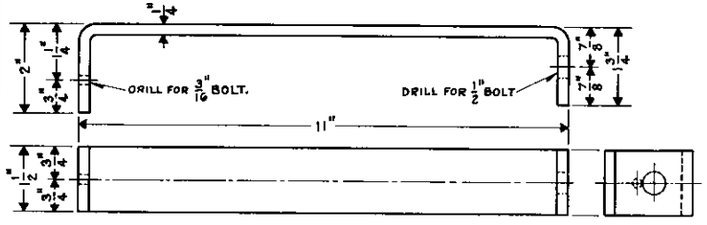
1 SHEET

S-489-G

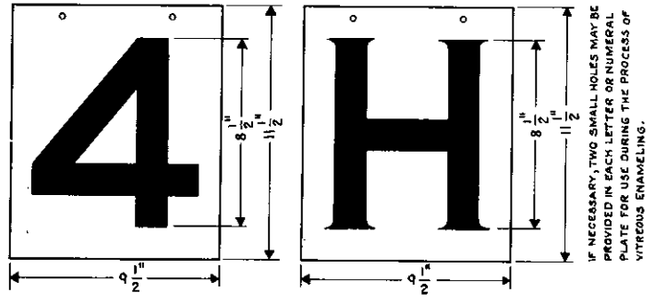
THE PENNSYLVANIA RAILROAD
STANDARD
NUMERALS & LETTERS
ENAMELED
FOR SIGNAL NUMBERING
OFFICE OF CHIEF ENGINEER, PHILA., PA., NOV. 27, 1942.

Approved
N. C. Stanton
Assistant Chief Engineer-Signals

Approved
W. W. Gregg
Chief Engineer

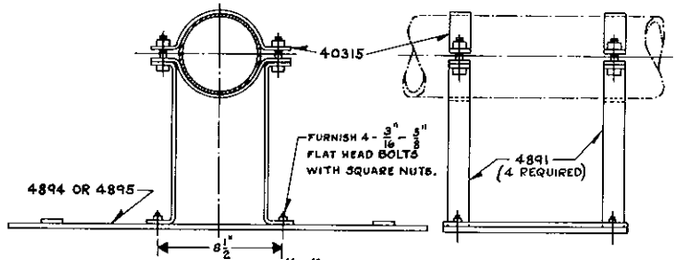


4891 SUPPORT
O. H. STEEL

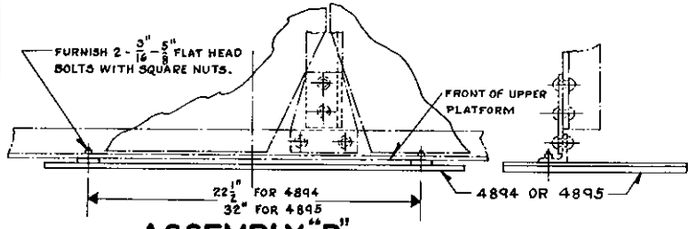


4892 PLATE
#16 U.S.STD. GAUGE ENAMELING STEEL.

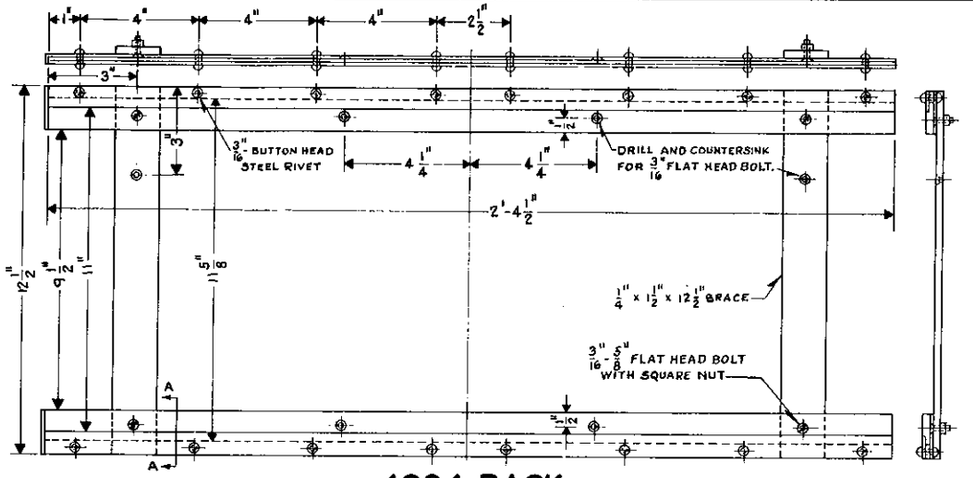
4893 PLATE
#16 U.S.STD. GAUGE ENAMELING STEEL.



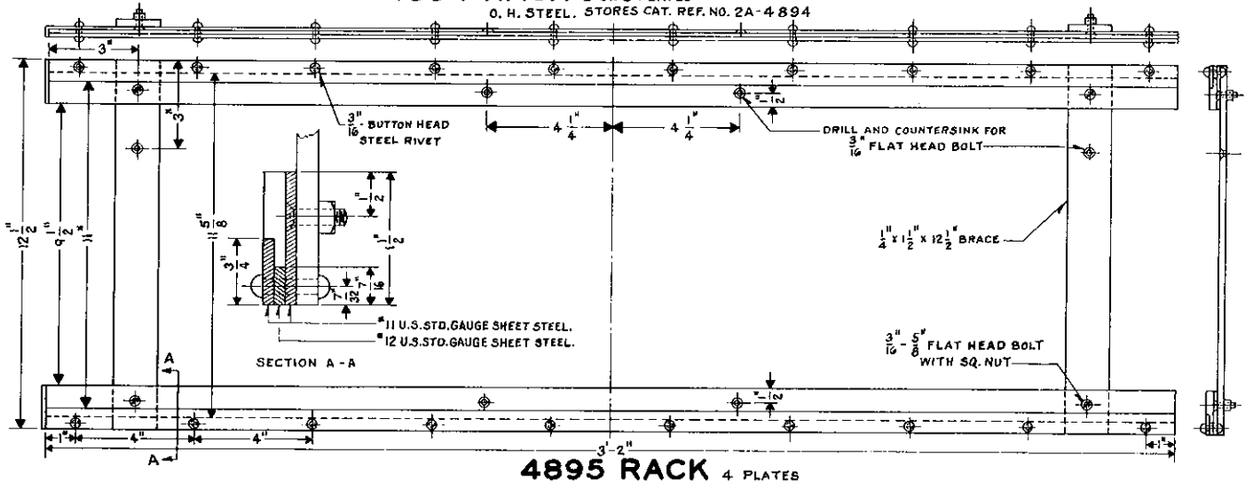
ASSEMBLY "A" FOR DIAGRAMS B & C.



ASSEMBLY "B" FOR DIAGRAM A.



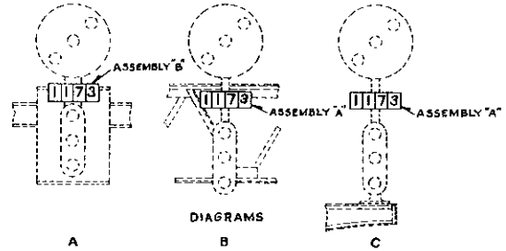
4894 RACK 2 OR 3 PLATES
O. H. STEEL. STORES CAT. REF. NO. 2A-4894



4895 RACK 4 PLATES
O. H. STEEL
STORES CAT. REF. NO. 2A-4895

ORDERING REFERENCE FOR BRACKETS COMPLETE

ORDER NUMBER	STORES CAT. REF. NUMBER	BRACKET ONLY FOR	ASSEMBLY
4896	2A-4896	2 OR 3 PLATES	"A" DIAGRAM B OR C
4897	2A-4897	4 PLATES	"A" DIAGRAM B OR C
4898	2A-4898	2 OR 3 PLATES	"B" DIAGRAM A
4899	2A-4899	4 PLATES	"B" DIAGRAM A



DIAGRAMS

A — APPLIED TO SIGNAL ON BEAM TYPE SIGNAL BRIDGE.

B — APPLIED TO SIGNAL ON STANDARD TYPE SIGNAL BRIDGE.

C — APPLIED TO SIGNAL ON CANTILEVER.

NOTE :-

1. FRONT AND BACK OF ALL PLATES SHALL BE BLACK VITREOUS ENAMELED WITH NUMERALS AND LETTERS WHITE VITREOUS ENAMELED.
2. NUMERALS AND LETTERS SHALL BE PROPORTIONED IN ACCORDANCE WITH STANDARD M.W. PLAN BASIC NUMBER 78000.
3. WHEN ORDERING SPECIFY NUMERALS OR LETTERS DESIRED.
4. POSITION LIGHT SIGNALS WHOSE MOST RESTRICTIVE INDICATION IS MORE FAVORABLE THAN STOP, SHALL BE NUMBERED.
5. ALL PARTS OF RACKS AND CLAMPS SHALL BE THOROUGHLY CLEANED, GIVEN A PRIMARY COAT OF RED LEAD AND A FINISHING COAT OF FIRST CLASS BLACK PAINT.
6. IN ACCORDANCE WITH C.E. 58-A, A LETTER MAY BE PREFIXED TO THE SIGNAL NUMBER FOR DESIGNATING BRANCH LINE SIGNALS.
7. FOR NUMERALS AND LETTERS APPLIED TO GROUND MASTS, SEE PLAN NO. S-490.

REVISIONS
REDRAWN FROM APPROVED PLAN S-489-E, DATED JUNE 27, 1924, LAST REVISED FEB. 18, 1935 AND REVISED AS FOLLOWS:- VERTICAL NUMBER RACK ELIMINATED. ENAMELING OF PLATES MADE VITREOUS ENAMEL. NOTE 7 & STORES CAT. REF. NUMBERS ADDED. CLAMP CHANGED AND SUPPORT 4891 added.

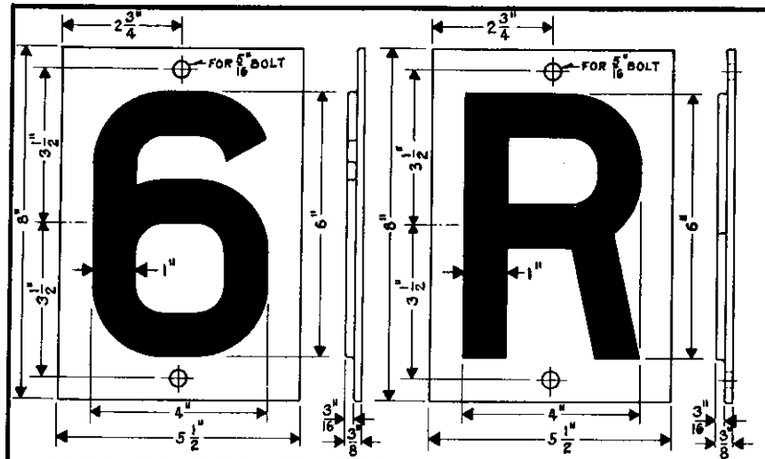
1 SHEET

S-489-F

THE PENNSYLVANIA RAILROAD
STANDARD
NUMERALS & LETTERS
ENAMELED
FOR SIGNAL NUMBERING
OFFICE OF CHIEF ENGINEER, PHILA., PA., NOV. 27, 1942.

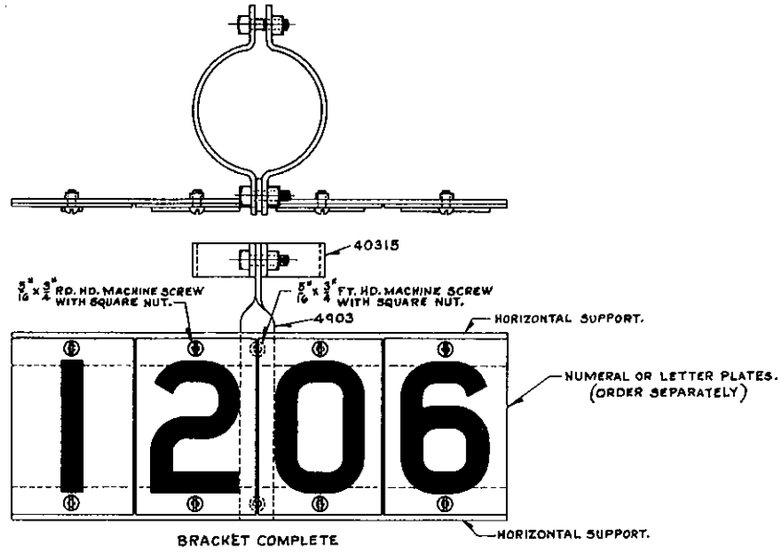
Approved
N. C. Stanton
Assistant Chief Engineer - Signals

Approved
W. W. Wiggin
Chief Engineer



4901 NUMERAL PLATE. CAST IRON

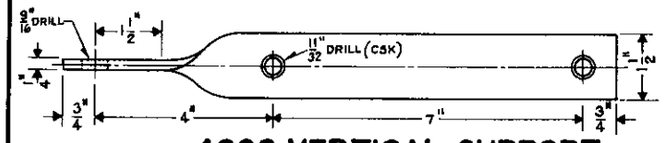
4902 LETTER PLATE. CAST IRON



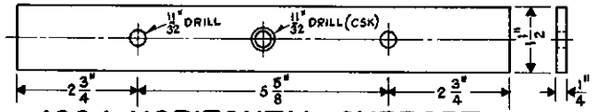
BRACKET COMPLETE

NOTE :-

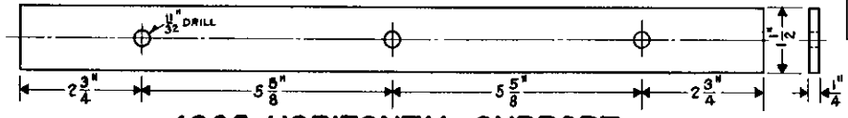
1. FRONT, BACK AND EDGES OF PLATES 4901 & 4902 SHALL BE PAINTED BLACK. PAINT LETTER OR NUMERAL WHITE.
2. PLATES 4901 AND 4902 SHALL BE ORDERED SEPARATELY, SPECIFYING NUMERALS OR LETTERS DESIRED.
3. ALL PARTS OF BRACKETS SHALL BE THOROUGHLY CLEANED, THEN GIVEN A PRIMARY COAT OF RED LEAD AND A FINISHING COAT OF FIRST CLASS BLACK PAINT.
4. PLATES 4901 AND 4902 SHALL BE IN ACCORDANCE WITH A.A.R. SPECIFICATION FOR GRAY IRON CASTINGS.
5. POSITION LIGHT SIGNALS WHOSE MOST RESTRICTIVE INDICATION IS MORE FAVORABLE THAN STOP, SHALL BE NUMBERED.
6. IN ACCORDANCE WITH C.E. 58-A, A LETTER MAY BE PREFIXED TO THE SIGNAL NUMBER FOR DESIGNATING BRANCH LINE SIGNALS.
7. FOR NUMERALS AND LETTERS APPLIED TO BRIDGE MASTS, SEE PLAN NO. S-489.



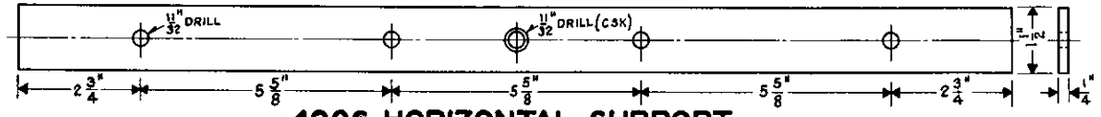
4903 VERTICAL SUPPORT.
O. H. STEEL



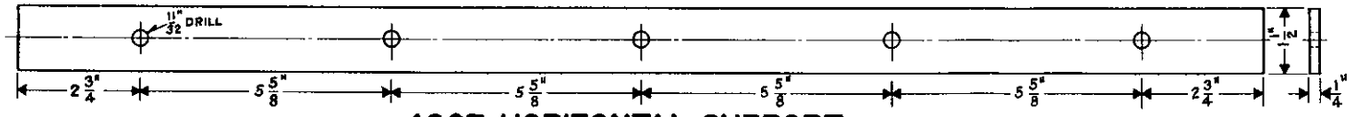
4904 HORIZONTAL SUPPORT. (FOR 2 PLATES)
O. H. STEEL



4905 HORIZONTAL SUPPORT. (FOR 3 PLATES)
O. H. STEEL



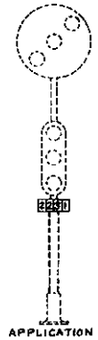
4906 HORIZONTAL SUPPORT. (FOR 4 PLATES)
O. H. STEEL



4907 HORIZONTAL SUPPORT. (FOR 5 PLATES)
O. H. STEEL

ORDERING REFERENCE FOR BRACKETS COMPLETE.

ORDER NUMBER	STORES CAT. REF. NUMBER	BRACKET ONLY FOR	FURNISH
4908	2A-4908	2 PLATES	1-40315, 1-4903, 2-4904, 2-5/16" x 3/4" FT. HD. MACH. SCREWS WITH SQ. NUTS AND 4-5/16" x 3/4" RD. HD. MACH. SCREWS WITH SQ. NUTS.
4909	2A-4909	3 PLATES	1-40315, 1-4903, 2-4905, AND 6-5/16" x 3/4" RD. HD. MACH. SCREWS WITH SQ. NUTS.
49010	2A-49010	4 PLATES	1-40315, 1-4903, 2-4906, 2-5/16" x 3/4" FT. HD. MACH. SCREWS WITH SQ. NUTS AND 8-5/16" x 3/4" RD. HD. MACH. SCREWS WITH SQ. NUTS.
49011	2A-49011	5 PLATES	1-40315, 1-4903, 2-4907, AND 10-5/16" x 3/4" RD. HD. MACH. SCREWS WITH SQ. NUTS.



APPLICATION TO STANDARD POSITION LIGHT GROUND SIGNAL.

A. A. R. SIG. SEC. MAN.-1926

REVISIONS

REDRAWN FROM APPROVED PLAN S-490-A, DATED MAY 2, 1927, AND REVISED AS FOLLOWS:- VERTICAL NUMBER RACK ELIMINATED. MINOR CHANGES MADE TO AGREE WITH A.A.R. PLAN. NOTES 4, 6, 7 & STORES CAT. REF. NUMBERS ADDED.

1 SHEET

S-490-B

THE PENNSYLVANIA RAILROAD

STANDARD

NUMERALS & LETTERS

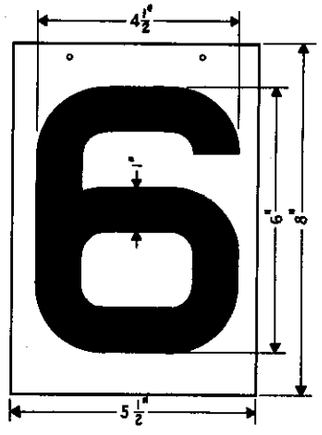
CAST IRON

FOR SIGNAL NUMBERING

OFFICE OF CHIEF ENGINEER, PHILA., PA., NOV. 27, 1942.

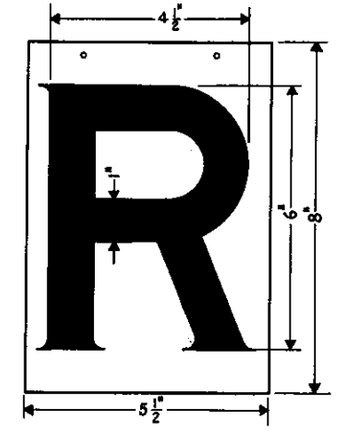
Approved
N. L. Stanton
Assistant Chief Engineer-Signals

Approved
Chief Engineer



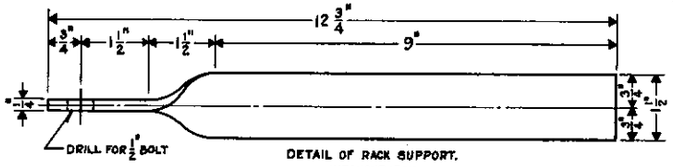
4901 NUMERAL PLATE

*16 U.S.STD.GAUGE ENAMELING STEEL.
STORES CAT. REF. NO. 2A-5591

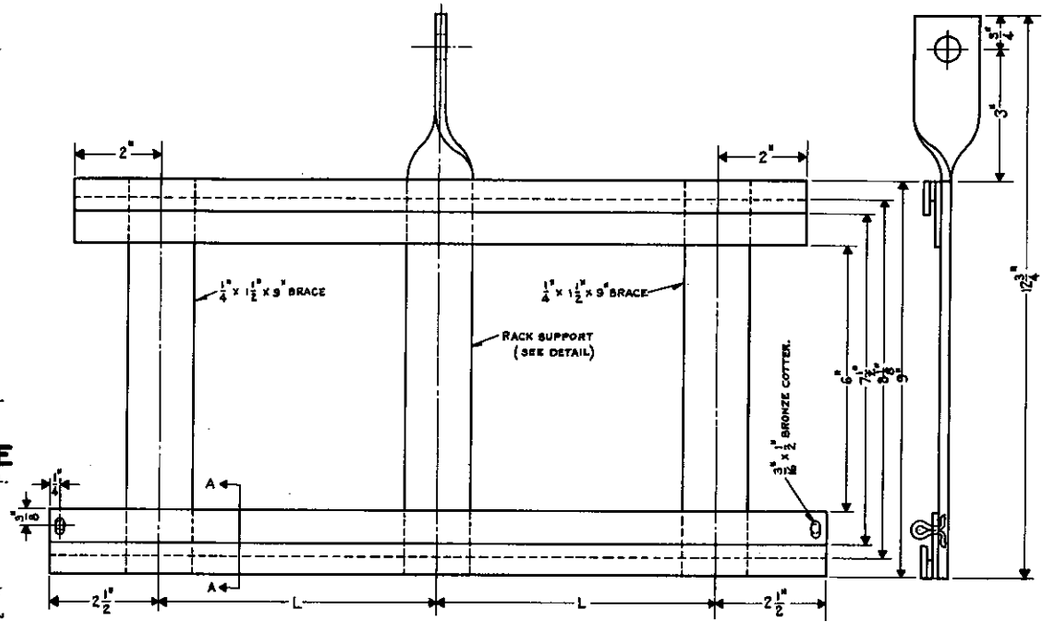


4902 LETTER PLATE

*16 U.S.STD.GAUGE ENAMELING STEEL.
STORES CAT. REF. NO. 2A-5592



DETAIL OF RACK SUPPORT.
WROUGHT IRON



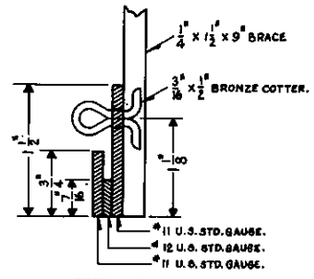
4903 RACK
COMPLETE FOR 2 PLATES. L = 3½".
STORES CAT. REF. NO. 2A-5593

4904 RACK
COMPLETE FOR 3 PLATES. L = 6¼".
STORES CAT. REF. NO. 2A-5594

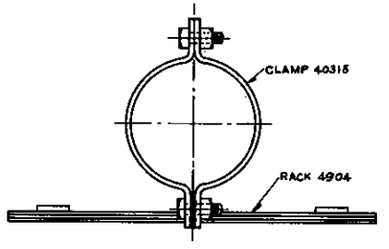
4905 RACK
COMPLETE FOR 4 PLATES. L = 9".
STORES CAT. REF. NO. 2A-5595

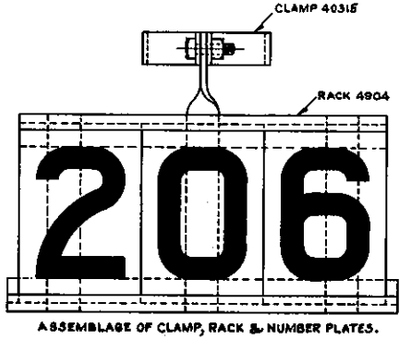
4906 RACK
COMPLETE FOR 5 PLATES. L = 11¾".
STORES CAT. REF. NO. 2A-5596

WROUGHT IRON

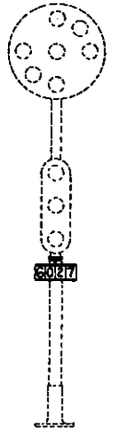


SECTION A-A





ASSEMBLAGE OF CLAMP, RACK & NUMBER PLATES.



APPLICATION TO STANDARD POSITION LIGHT GROUND SIGNAL.

NOTE:-

1. FRONT AND BACK OF NUMERAL AND LETTER PLATES SHALL BE BLACK ACID RESISTING VITREOUS ENAMELED WITH NUMERALS AND LETTERS WHITE ACID RESISTING VITREOUS ENAMELED.
2. WHEN ORDERING, SPECIFY NUMERALS AND LETTERS DESIRED. ORDER RACKS AND CLAMPS SEPARATELY.
3. ALL PARTS OF RACKS AFTER WELDING, AND CLAMPS, SHALL BE THOROUGHLY CLEANED, GIVEN A PRIMARY COAT OF RED LEAD AND A FINISHING COAT OF FIRST CLASS BLACK PAINT.
4. POSITION LIGHT SIGNALS WHOSE MOST RESTRICTIVE INDICATION IS MORE FAVORABLE THAN STOP, SHALL BE NUMBERED.
5. IN ACCORDANCE WITH C.E. 58-A, A LETTER MAY BE PREFIXED TO THE SIGNAL NUMBER FOR DESIGNATING BRANCH LINE SIGNALS.
6. FOR NUMBERING OF SIGNALS LOCATED ON BRIDGES SEE CURRENT ISSUE OF PLAN S-489.
7. NUMERALS AND LETTERS SHALL BE PROPORTIONED IN ACCORDANCE WITH STANDARD M. OF W. PLAN BASIC NUMBER 78000.

REVISIONS

REDRAWN FROM APPROVED PLAN S-490-B, DATED NOV. 27, 1942 AND REVISED AS FOLLOWS:- FORMERLY A.A.R. SIG. SER. STANDARD. NUMERAL AND LETTER PLATES WERE CAST IRON, PAINTED. RACKS REDESIGNED AND ALL PARTS WERE BOLTED TOGETHER. ORDERING REFERENCES AND STORES CAT. REF. NUMBERS CHANGED.

1 SHEET

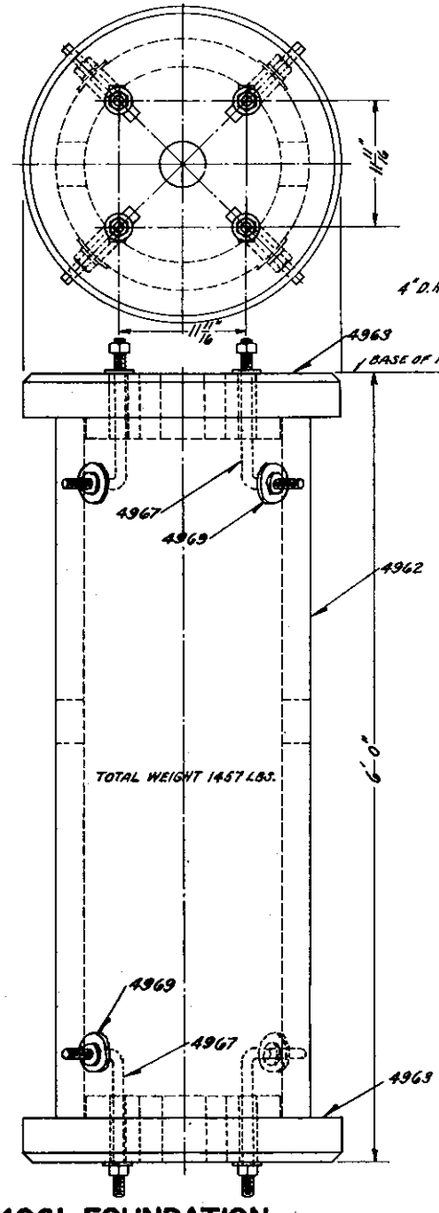
S-490-C

THE PENNSYLVANIA RAILROAD
STANDARD
NUMERALS AND LETTERS
ENAMELED
FOR SIGNAL NUMBERING

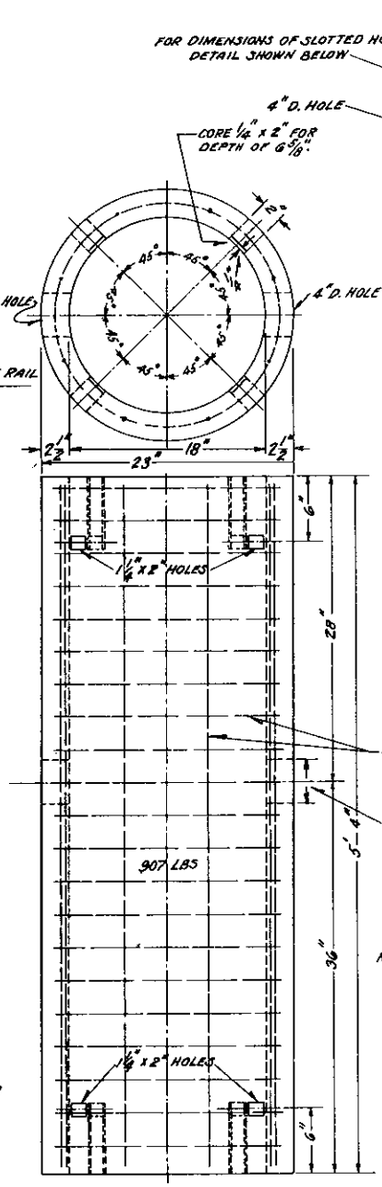
OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 25, 1947.

Approved
Assistant Chief Engineer-T.C.&S.

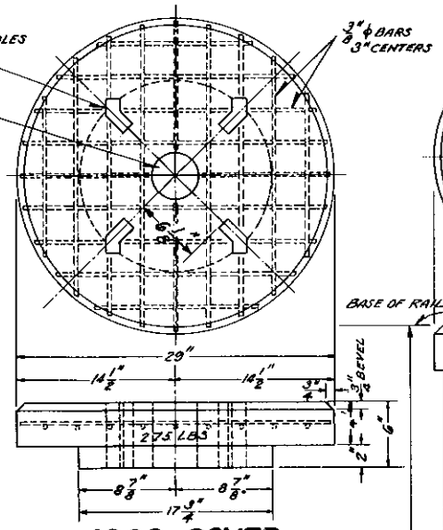
Approved
Chief Engineer



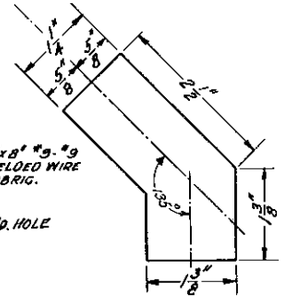
4961-FOUNDATION COMPLETE.



4962-BODY.
REINFORCED CONCRETE.

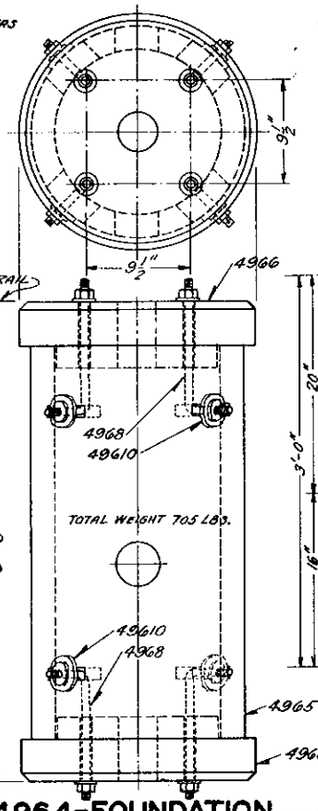


4963-COVER.
REINFORCED CONCRETE.

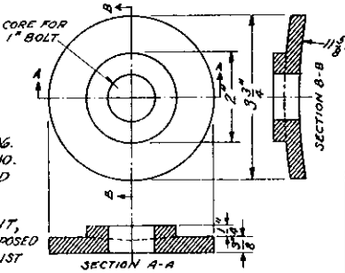


DETAIL OF BOLT SLOT IN COVER 4963

NOTE :-
1. FOUNDATIONS SHALL BE SHIPPED KNOCKED-DOWN WITH ALL BOLTS AND OTHER PARTS FOR ASSEMBLING IN THE FIELD.
2. FOUNDATION 4961 IS FOR USE WITH SIGNAL 4061 PLAN S-406.
3. FOUNDATION 4964 IS FOR USE WITH SIGNAL 4102 PLAN S-410.
4. CENTER OF FOUNDATIONS 4961 AND 4964 SHALL BE LOCATED 7 FEET 6 INCHES MINIMUM FROM GAUGE LINE OF RIGHT HAND RAIL OF TRACK GOVERNED.
5. CONCRETE MIXTURE SHALL BE MADE WITH PORTLAND CEMENT, A.S.T.M. SERIAL DESIGNATION C9-30. MIXTURE SHALL BE COMPOSED OF AGGREGATES SUITABLE FOR THE USE INTENDED AND TO RESIST BREAKAGE DUE TO HIGH WINDS AND OTHER UNUSUAL SHOCKS.
6. ALL BOLTS, NUTS AND WASHERS TO BE GALVANIZED.
7. PRE-CAST CONCRETE SIGNAL FOUNDATIONS SHALL BE AS SHOWN ON THIS PLAN, OR SIMILAR IN CONSTRUCTION IF APPROVED BY THE ASSISTANT CHIEF ENGINEER-SIGNALS.

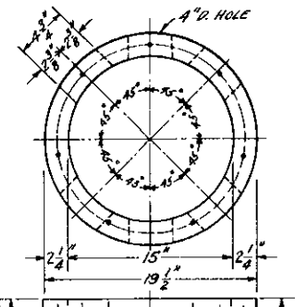


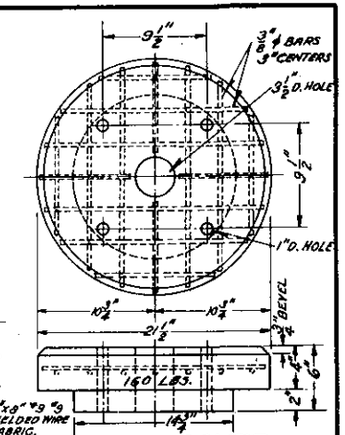
4964-FOUNDATION COMPLETE.



SECTION A-A

4969-WASHER
CAST IRON
(FURNISH G)

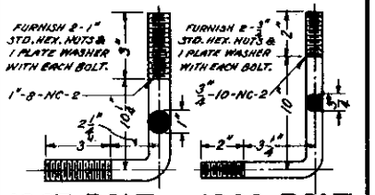




4966-COVER.
REINFORCED CONCRETE.

3'x8' #9-#9 WELDED WIRE FABRIC.

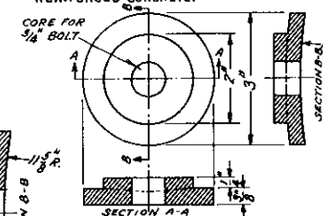
4" D. CABLE HOLES



4967-BOLT.
O.H.S.
(FURNISH G)

4968-BOLT.
O.H.S.
(FURNISH G)

4965-BODY.
REINFORCED CONCRETE.



SECTION A-A

49610-WASHER
CAST IRON
(FURNISH G)

REVISIONS

B FEBRUARY 28, 1941. C.P. CORRECT DIMENSIONS OF BOLT 4967 SHOWN.

C APRIL 29, 1943. PLAN MADE STANDARD. NUMBER FORMERLY 3R-496-B

1 SHEET

S-496-C

THE PENNSYLVANIA RAILROAD

STANDARD

FOUNDATIONS

PRE-CAST CONCRETE

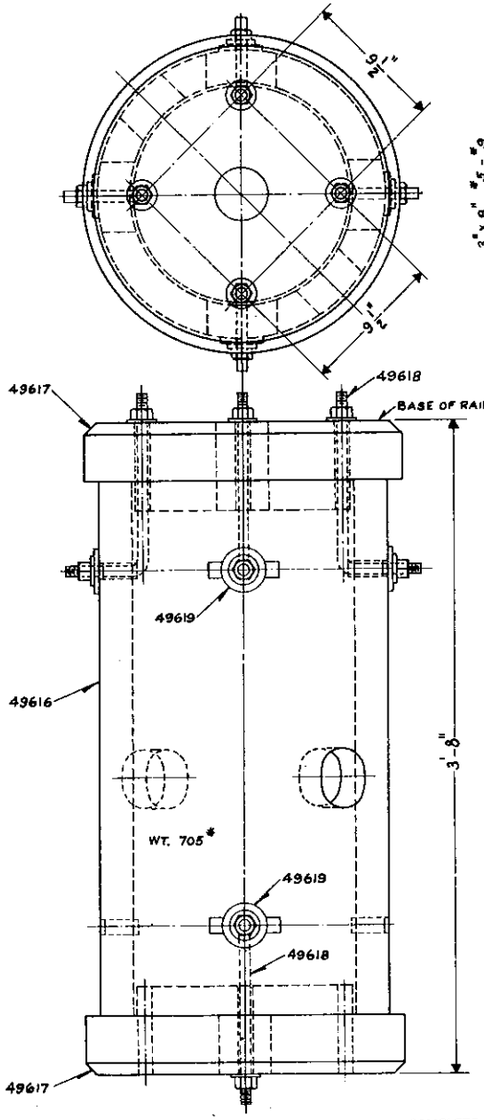
FOR POSITION LIGHT SIGNALS

OFFICE OF CHIEF ENGINEER, PHILA., PA., SEPTEMBER 6, 1940.

Approved
N. L. Stanton
Assistant Chief Engineer-Signals

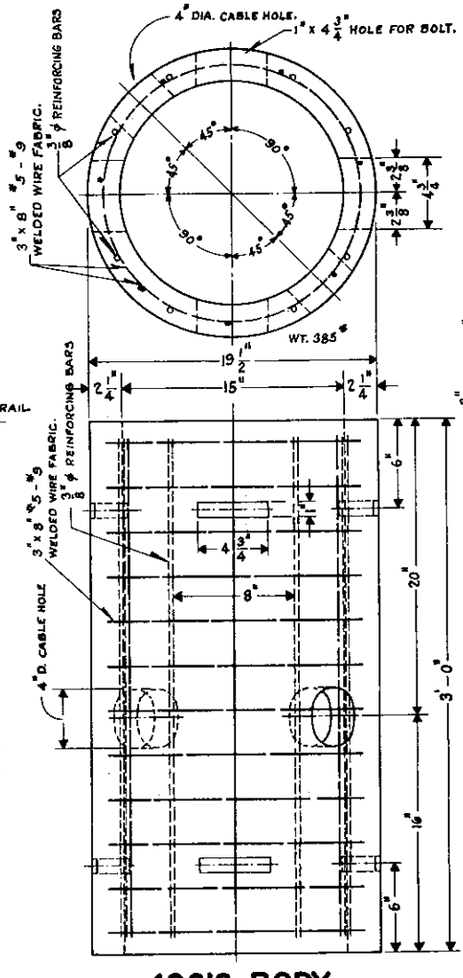
Approved
Chief Engineer

C.G.R.
C.P.



49615 FOUNDATION COMPLETE AS SHOWN.

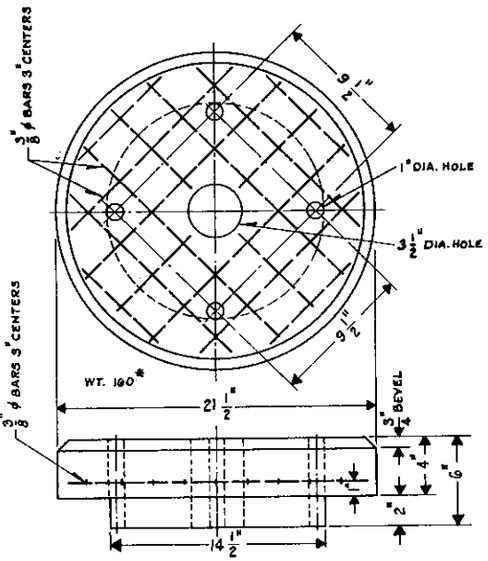
STORES CAT. REF. NO. 2A-4529



49616 BODY

REINFORCED CONCRETE

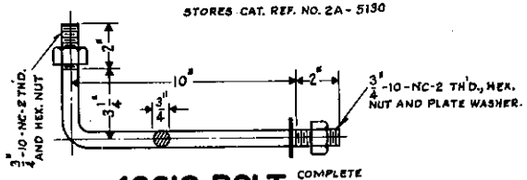
STORES CAT. REF. NO. 2A-5129



49617 COVER

REINFORCED CONCRETE.

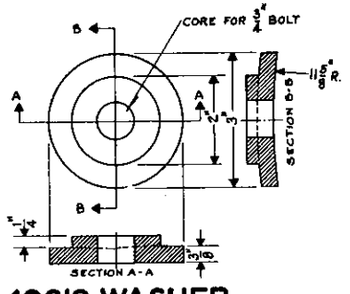
STORES CAT. REF. NO. 2A-5130



49618 BOLT COMPLETE AS SHOWN, O. H. B.

STORES CAT. REF. NO. 2A-5131

(FURNISH 6)



49619 WASHER CAST IRON

STORES CAT. REF. NO. 2A-5132

(FURNISH 6)

NOTES:-

1. FOUNDATIONS SHOWN ON SHEETS 1 AND 2 OF THIS DRAWING, S-496 (CURRENT ISSUE), SHALL BE MANUFACTURED IN ACCORDWITH A. S. T. M. SPECIFICATIONS C76-41. CONCRETE SHALL TEST 4500 POUNDS PER SQUARE INCH IN 28 DAYS, AND EACH UNIT SHALL BE PLAINLY MARKED WITH THE MANUFACTURER'S NAME.
2. ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED.
3. THE REINFORCING IN BODIES 4964, 4965, 4963 AND 49616 SHALL BE 3" x 8", #5 GAUGE x #8 GAUGE WELDED WIRE FABRIC FORMED INTO A CAGE, WITH THE #5 GAUGE WIRES PLACED IN THE ANNULAR POSITION, THE #5 WIRES LAPPED AT LEAST 6" AND SECURELY TIED TOGETHER. IN ADDITION ⅜" ϕ LONGITUDINAL BARS, & ⅜" ϕ ANNULAR BARS IN 4964, SHALL BE IMBEDDED AS SHOWN.
4. THE REINFORCING IN COVERS 4967 AND 49617 SHALL BE ⅜" ϕ BARS, SPACED 3" CENTERS EACH WAY AND SECURELY TIED TOGETHER.
5. FOUNDATIONS 4961, 4962, 4963 AND 49615 SHALL BE SHIPPED KNOCKED-DOWN, WITH ALL BOLTS, WASHERS, ETC. FOR ASSEMBLING IN THE FIELD.
6. FOUNDATION 49615 IS FOR USE WITH SIGNAL 4102 DRAWING S-410. FOR APPLICATION OF FOUNDATIONS 4961, 4962, & 4963 SEE DIAGRAM "D" SHEET NO. 1 LOCATING CENTER OF MAST 10'-0" FROM GAUGE LINE OF NEAREST RAIL OF TRACK GOVERNED. LOCATION OF FOUNDATION 49615 FROM GAUGE LINE SHALL BE GOVERNED BY LOCAL CONDITIONS. IN ALL CASES DRAINAGE SHALL NOT BE OBSTRUCTED.
7. PRE-CAST CONCRETE FOUNDATIONS SHALL BE AS SHOWN ON DRAWING, SHEETS 1 & 2, OR SIMILAR IN CONSTRUCTION IF APPROVED BY THE ASSISTANT CHIEF ENGINEER-SIGNALS.
8. INSPECTION OF PRE-CAST CONCRETE FOUNDATIONS SHALL COVER THE MANUFACTURER'S PLANT TO DETERMINE IF PROPER FACILITIES ARE AVAILABLE TO MANUFACTURE THE PRODUCTS IN ACCORDANCE WITH THE DRAWING AND THAT HE UNDERSTANDS WHAT IS REQUIRED. THIS INSPECTION SHALL BE MADE DURING THE PROCESS OF CONSTRUCTION TO INSURE THAT THE PROPER QUALITY AND QUANTITY OF CONCRETE IS BEING USED, AND THAT THE LOCATIONS AND DETAILS OF THE REINFORCEMENT ETC. ARE IN ACCORDANCE WITH THE DRAWING.

FOR REVISION NOTES SEE SHEET NO. 1.

SHEET 2 OF 2 SHEETS

S-496-D

THE PENNSYLVANIA RAILROAD

STANDARD

FOUNDATIONS

PRE-CAST CONCRETE

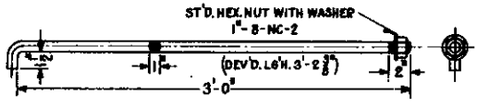
FOR POSITION LIGHT SIGNALS

OFFICE OF CHIEF ENGINEER, PHILA., PA. JUNE 26, 1944.

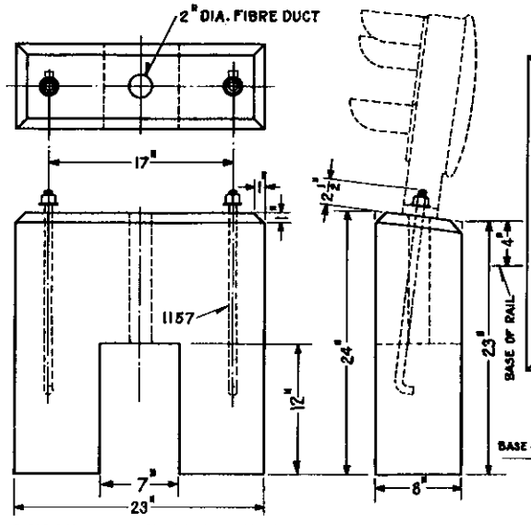
Approved
N. F. Brunton
Assistant Chief Engineer-Signals

Approved
J. T. Simpson
Chief Engineer

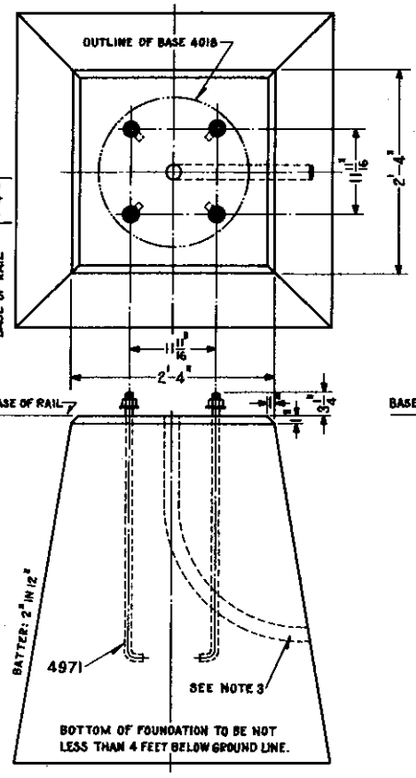
C.D.



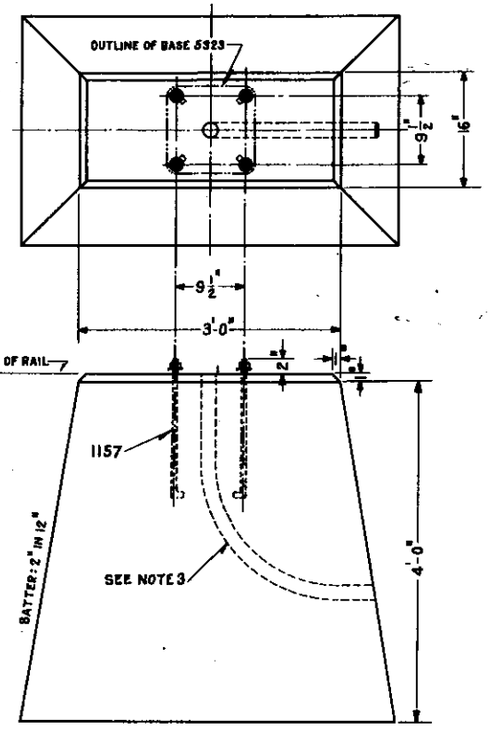
4971 HOOK BOLT O.H.S.
A.R.A.MAN. 1924



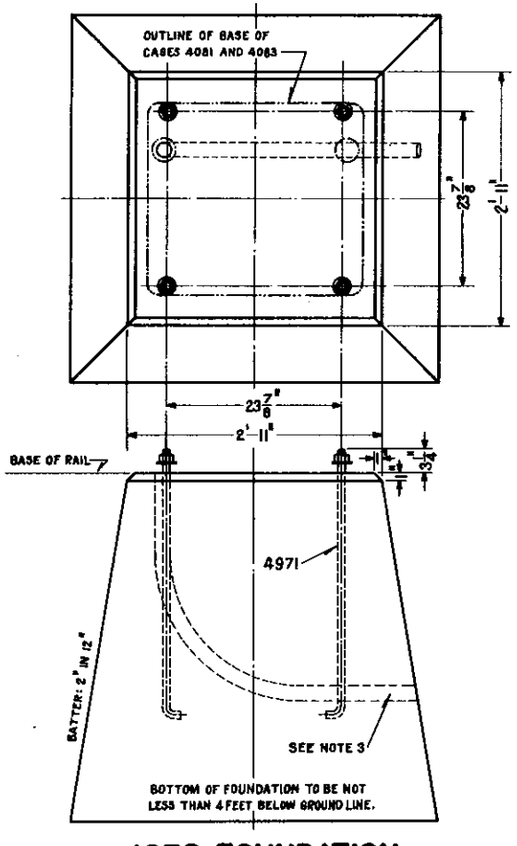
4973 FOUNDATION



4974 FOUNDATION



4975 FOUNDATION



4972 FOUNDATION

FOUNDATION	FOR USE WITH
4972	SIGNALS 4062, 4063 INSTRUMENT CASES 4081, 4083
4973	SIGNAL 4101
4974	SIGNALS 4001, 4061
4975	SIGNAL 4102

NOTE:-
1. CENTER OF FOUNDATIONS 4972, 4974 AND 4975 SHALL BE 7 FEET 6 INCHES MIN. FROM GAUGE LINE OF RIGHT HAND RAIL OF TRACK GOVERNED.
2. CENTER OF FOUNDATION 4973, WHEN BETWEEN TRACKS, SHALL BE LOCATED ON THE CENTER-LINE OF INTER-TRACK SPACE; WHEN OUTSIDE OF TRACK NOT LESS THAN 4 FEET 3 INCHES FROM GAUGE LINE OF RIGHT HAND RAIL OF TRACK GOVERNED.
3. 2 INCH DIA. FIBRE DUCT WITH 18 INCH RAD. BEND. THE LOCATION OF DUCT MAY BE CHANGED TO SUIT LOCAL CONDITIONS.
4. CONCRETE SHALL BE IN ACCORDANCE WITH A.R.A. SIGNAL SECTION SPECIFICATION NO. 1111.

REVISIONS
REDRAWN FROM APPROVED PLAN S-497-C, DATED JAN. 28, 1927 AND REVISED.
E JULY 20, 1934. APPROVED A.H. Rudd

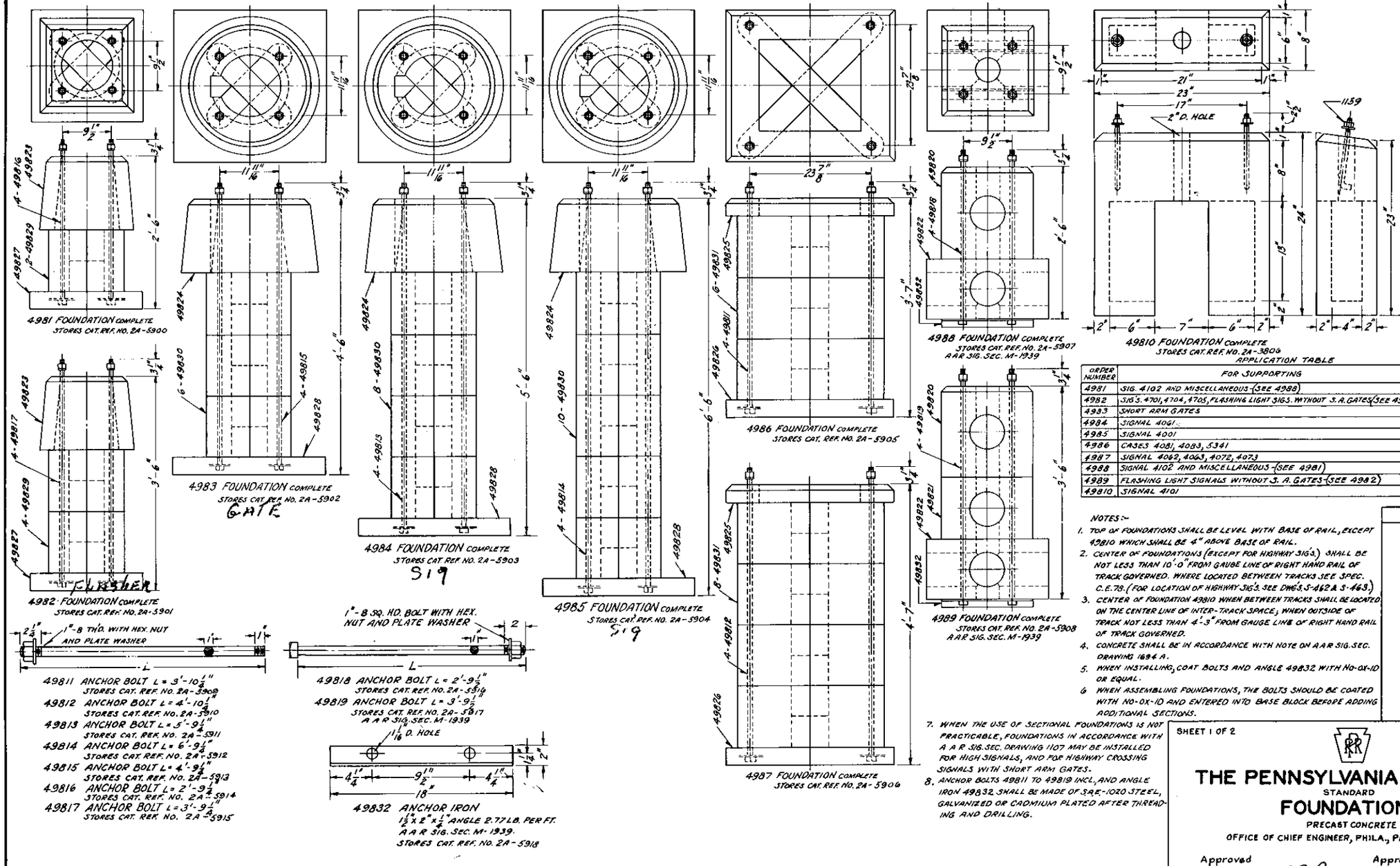
1 SHEET

S-497-E

THE PENNSYLVANIA RAILROAD
STANDARD
FOUNDATIONS
FOR POSITION LIGHT SIGNALS AND INSTRUMENT CASES
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., FEB. 16, 1934

Approved A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer



APPLICATION TABLE

ORDER NUMBER	FOR SUPPORTING	BOLT CENTERS	HEIGHT
4981	SIG. 4102 AND MISCELLANEOUS (SEE 4988)	9 1/2"	2'-6"
4982	SIGS. 4701, 4704, 4705, FLASHING LIGHT SIGS. WITHOUT S.A. GATES (SEE 4988)	9 1/2"	3'-6"
4983	SHORT ARM GATES	11 11/16"	4'-6"
4984	SIGNAL 4061	11 11/16"	5'-6"
4985	SIGNAL 4001	11 11/16"	6'-6"
4986	CASES 4081, 4083, 5341	23 7/8"	3'-7"
4987	SIGNAL 4062, 4063, 4072, 4073	23 7/8"	4'-7"
4988	SIGNAL 4102 AND MISCELLANEOUS (SEE 4981)	9 1/2"	2'-6"
4989	FLASHING LIGHT SIGNALS WITHOUT S. A. GATES (SEE 4982)	9 1/2"	3'-6"
49810	SIGNAL 4101	17	-

NOTES:-

1. TOP OF FOUNDATIONS SHALL BE LEVEL WITH BASE OF RAIL, EXCEPT 49810 WHICH SHALL BE 4" ABOVE BASE OF RAIL.
2. CENTER OF FOUNDATIONS (EXCEPT FOR HIGHWAY SIG'S.) SHALL BE NOT LESS THAN 10'-0" FROM GAUGE LINE OF RIGHT HAND RAIL OF TRACK GOVERNED. WHERE LOCATED BETWEEN TRACKS SEE SPEC. C.E.78. (FOR LOCATION OF HIGHWAY SIG'S. SEE DWG'S. S-462 & S-463.)
3. CENTER OF FOUNDATION 49810 WHEN BETWEEN TRACKS SHALL BE LOCATED ON THE CENTER LINE OF INTER-TRACK SPACE, WHEN OUTSIDE OF TRACK NOT LESS THAN 4'-3" FROM GAUGE LINE OF RIGHT HAND RAIL OF TRACK GOVERNED.
4. CONCRETE SHALL BE IN ACCORDANCE WITH NOTE ON AAR SIG. SEC. DRAWING 1694 A.
5. WHEN INSTALLING, COAT BOLTS AND ANGLE 49832 WITH No-OX-ID OR EQUAL.
6. WHEN ASSEMBLING FOUNDATIONS, THE BOLTS SHOULD BE COATED WITH No-OX-ID AND ENTERED INTO BASE BLOCK BEFORE ADDING ADDITIONAL SECTIONS.
7. WHEN THE USE OF SECTIONAL FOUNDATIONS IS NOT PRACTICABLE, FOUNDATIONS IN ACCORDANCE WITH A A R SIG. SEC. DRAWING 1107 MAY BE INSTALLED FOR HIGH SIGNALS, AND FOR HIGHWAY CROSSING SIGNALS WITH SHORT ARM GATES.
8. ANCHOR BOLTS 49811 TO 49819 INCL. AND ANGLE IRON 49832 SHALL BE MADE OF SAE-1020 STEEL, GALVANIZED OR CADMIUM PLATED AFTER THREADING AND DRILLING.

REVISIONS

SHEET 1 OF 2

S-498-A

THE PENNSYLVANIA RAILROAD

STANDARD

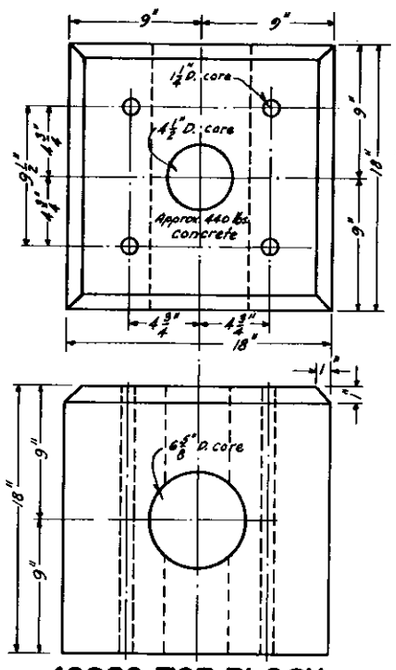
FOUNDATIONS

PRECAST CONCRETE

OFFICE OF CHIEF ENGINEER, PHILA., PA., SEPT. 14, 1948

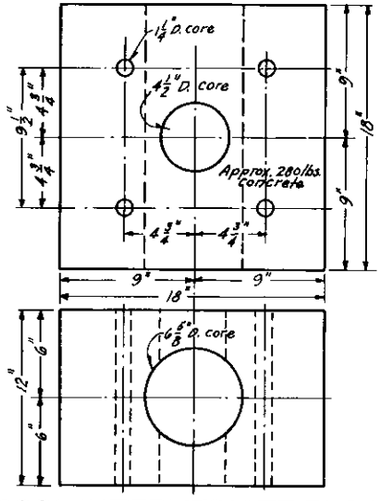
Approved
H. C. Griffith
Assistant Chief Engineer-T.C.&S.

Approved
J. Schmitt
Chief Engineer



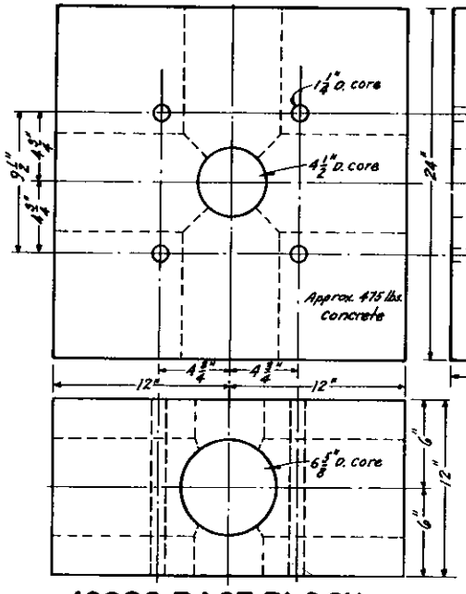
49820 TOP BLOCK

AAR SIG. SEC. M-1939
STORES CAT. REF. NO. 2A-5919



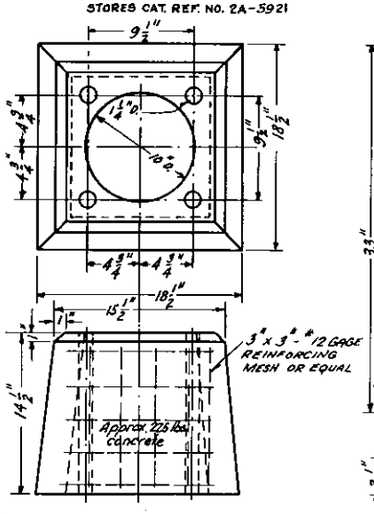
49821 INTERMEDIATE BLOCK

AAR SIG. SEC. M-1939
STORES CAT. REF. NO. 2A-5920



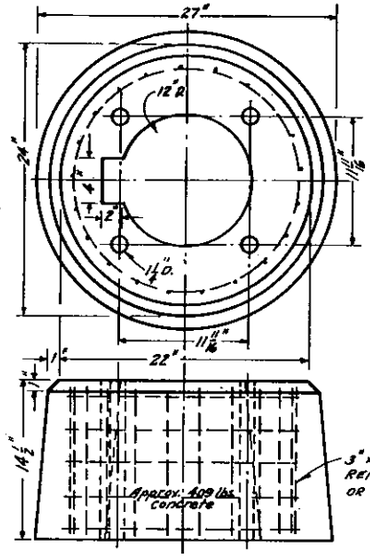
49822 BASE BLOCK AAR SIG. SEC. M-1939

STORES CAT. REF. NO. 2A-5921



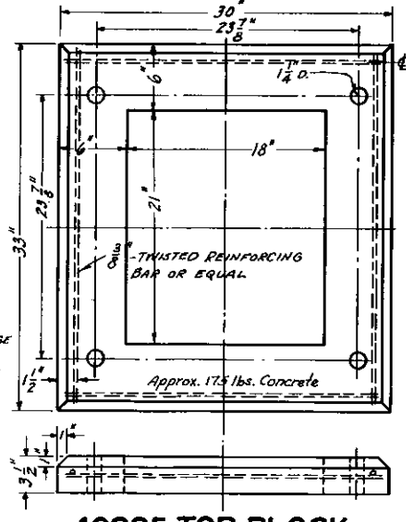
49823 TOP BLOCK

STORES CAT. REF. NO. 2A-5922



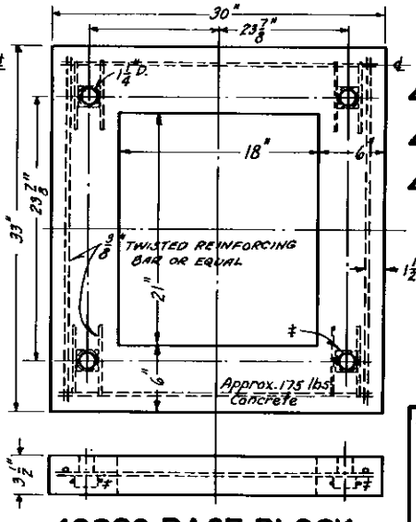
49824 TOP BLOCK

STORES CAT. REF. NO. 2A-5923



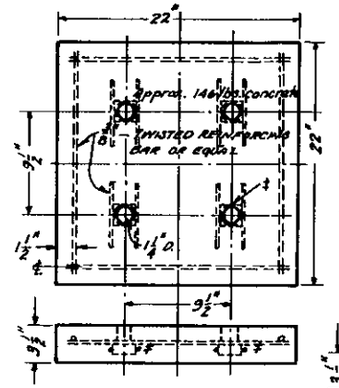
49825 TOP BLOCK

STORES CAT. REF. NO. 2A-5924



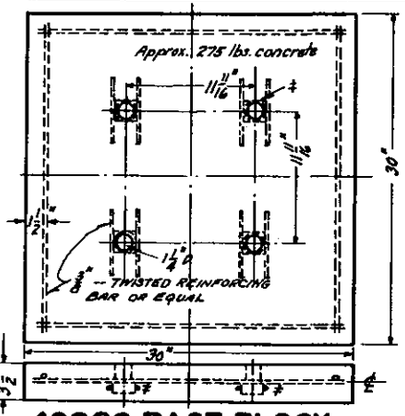
49826 BASE BLOCK

STORES CAT. REF. NO. 2A-5925



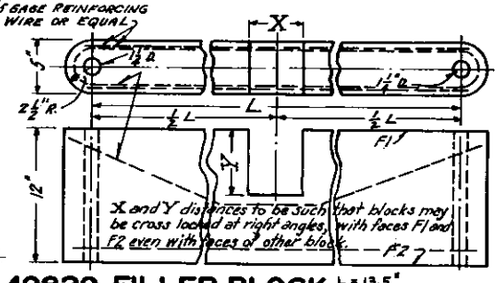
49827 BASE BLOCK

STORES CAT. REF. NO. 2A-5926



49828 BASE BLOCK

STORES CAT. REF. NO. 2A-5927



49829 FILLER BLOCK L = 13.5"

APPROX. 75 LBS. CONCRETE
STORES CAT. REF. NO. 2A-5928

49830 FILLER BLOCK L = 16.5"

APPROX. 93 LBS. CONCRETE
STORES CAT. REF. NO. 2A-5929

49831 FILLER BLOCK L = 33.5"

APPROX. 174 LBS. CONCRETE
STORES CAT. REF. No. 2A-5930

NOTE :-
THREADED FOR 1" BOLT AND WELDED TO REINFORCING BAR.

SHEET 2 OF 2

S-498-A

THE PENNSYLVANIA RAILROAD

STANDARD

FOUNDATIONS

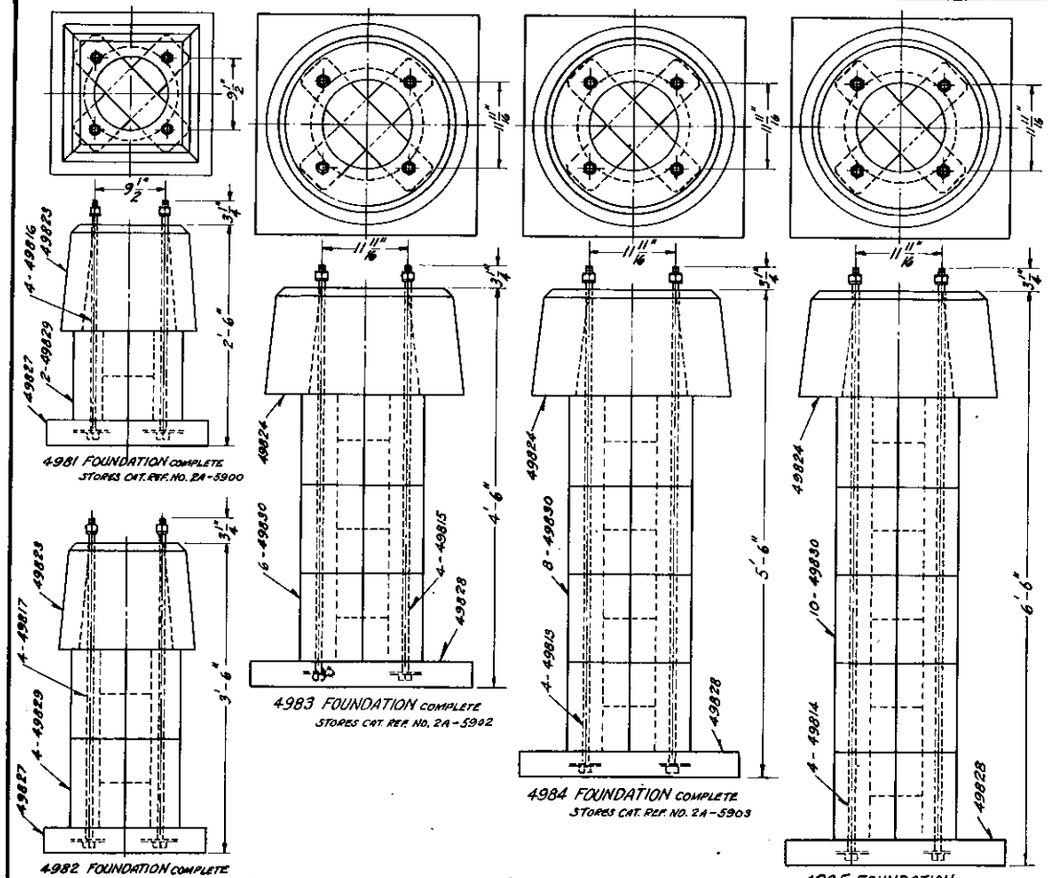
PRECAST CONCRETE

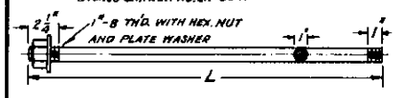
DETAILS

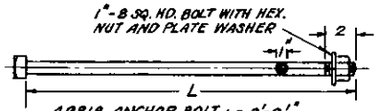
OFFICE OF CHIEF ENGINEER, PHILA., PA., SEPT. 14, 1948

Approved
Assistant Chief Engineer-T.C.&S.

Approved
Chief Engineer

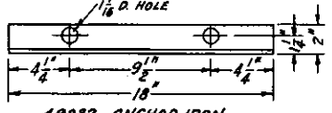




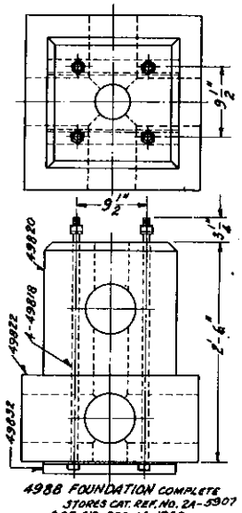


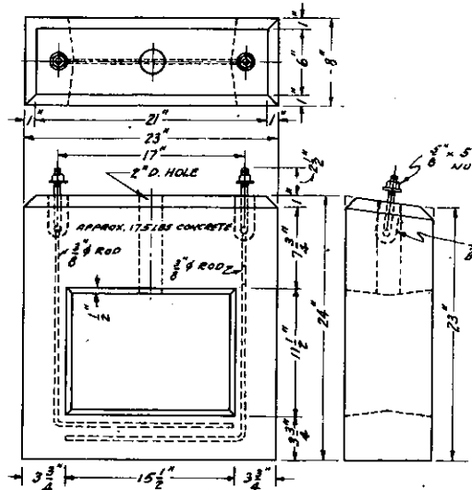
49818 ANCHOR BOLT L = 2'-9½"
STORES CAT. REF. NO. 2A-5916
49819 ANCHOR BOLT L = 3'-9½"
STORES CAT. REF. NO. 2A-5917
A A R 316. SEC. M-1939

49813 ANCHOR BOLT L = 5'-9½"
STORES CAT. REF. NO. 2A-5911
49814 ANCHOR BOLT L = 6'-9½"
STORES CAT. REF. NO. 2A-5912
49815 ANCHOR BOLT L = 4'-9½"
STORES CAT. REF. NO. 2A-5913
49816 ANCHOR BOLT L = 2'-9½"
STORES CAT. REF. NO. 2A-5914
49817 ANCHOR BOLT L = 3'-9½"
STORES CAT. REF. NO. 2A-5915



49832 ANCHOR IRON
1½" x 2" x ¼" ANGLE 2.77 LB. PER FT.
A A R 316. SEC. M-1939.
STORES CAT. REF. NO. 2A-5918





49810 FOUNDATION COMPLETE
STORES CAT. REF. NO. 2A-3806

APPLICATION TABLE

ORDER NUMBER	FOR SUPPORTING	BOLT CENTERS	HEIGHT
4981	SIG. 4102 AND MISCELLANEOUS (SEE 4988)	9½"	2'-6"
4982	SIGS. 4701, 4704, 4705, FLASHING LIGHT SIGS. WITHOUT S.A. GATES (SEE 4989)	9½"	3'-6"
4983	SHORT ARM GATES	11 11/16"	4'-6"
4984	SIGNAL 40030	11 11/16"	5'-6"
4985	SIGNAL 40026	11 11/16"	6'-6"
4988	SIGNAL 4102 AND MISCELLANEOUS (SEE 4981)	9½"	2'-6"
4989	FLASHING LIGHT SIGNALS WITHOUT S. A. GATES (SEE 4982)	9½"	3'-6"
49810	SIGNAL 4101	17	–

NOTES:-

1. TOP OF FOUNDATIONS SHALL BE LEVEL WITH BASE OF RAIL, EXCEPT 49810 WHICH SHALL BE 4" ABOVE BASE OF RAIL.
2. CENTER OF FOUNDATIONS (EXCEPT FOR HIGHWAY SIG'S.) SHALL BE NOT LESS THAN 10'-0" FROM GAUGE LINE OF RIGHT HAND RAIL OF TRACK GOVERNED. WHERE LOCATED BETWEEN TRACKS SEE SPEC. C.E.78. (FOR LOCATION OF HIGHWAY SIG'S. SEE DWG'S. S-462 & S-463.)
3. CENTER OF FOUNDATION 49810 WHEN BETWEEN TRACKS SHALL BE LOCATED ON THE CENTER LINE OF INTER-TRACK SPACE; WHEN OUTSIDE OF TRACK NOT LESS THAN 4'-3" FROM GAUGE LINE OF RIGHT HAND RAIL OF TRACK GOVERNED.
4. CONCRETE SHALL BE IN ACCORDANCE WITH NOTE ON A A R SIG. SEC. DRAWING 1694 A.
5. WHEN INSTALLING, COAT BOLTS AND ANGLE 49832 WITH No-Ox-ID OR EQUAL.
6. WHEN ASSEMBLING FOUNDATIONS, THE BOLTS SHOULD BE COATED WITH NO-OX-ID AND ENTERED INTO BASE BLOCK BEFORE ADDING ADDITIONAL SECTIONS.
7. WHEN THE USE OF SECTIONAL FOUNDATIONS IS NOT PRACTICABLE, FOUNDATIONS IN ACCORDANCE WITH A A R SIG. SEC. DRAWING 1107 MAY BE INSTALLED FOR HIGH SIGNALS, AND FOR HIGHWAY CROSSING SIGNALS WITH SHORT ARM GATES.
8. ANCHOR BOLTS 49813 TO 49819 INCL. AND ANGLE IRON 49832 SHALL BE MADE OF S.A.E.-1020 STEEL, GALVANIZED OR CADMIUM PLATED AFTER THREADING AND DRILLING.

REVISIONS

B- MARCH 9, 1953. FOUNDATIONS 4986 & 4987, ANCHOR BOLTS 49811 & 49812, BLOCKS 49825, 49826 & 49831 REMOVED FROM DRAWING. REINFORCING RODS ADDED TO 49825 & 49826.
APPROVED: W. S. Ballman

SHEET 1 OF 2

S-498-B

THE PENNSYLVANIA RAILROAD

STANDARD

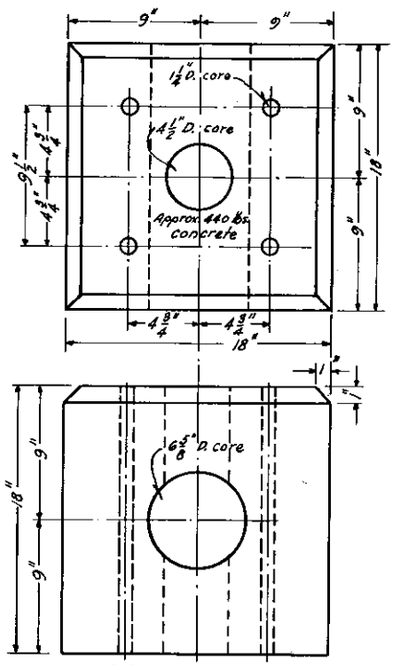
FOUNDATIONS

PRECAST CONCRETE

OFFICE OF CHIEF ENGINEER, PHILA., PA., SEPT. 14, 1948

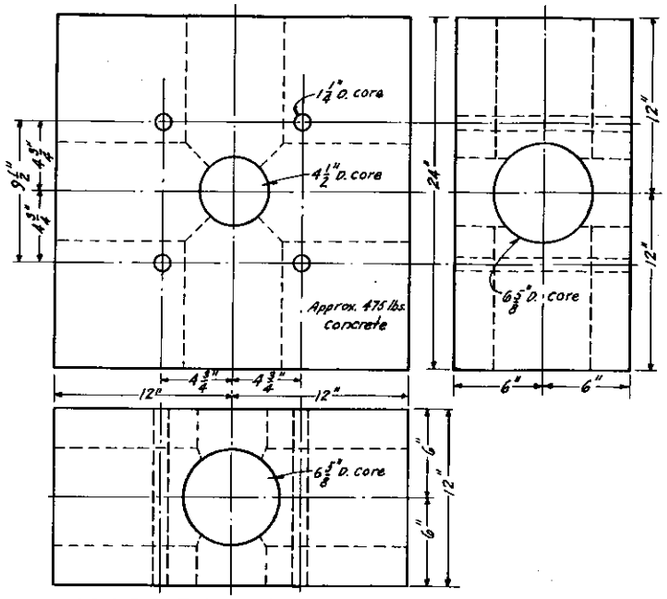
Approved
H. C. Griffith
Assistant Chief Engineer-T. C. & S.

Approved
J. Minnitt
Chief Engineer



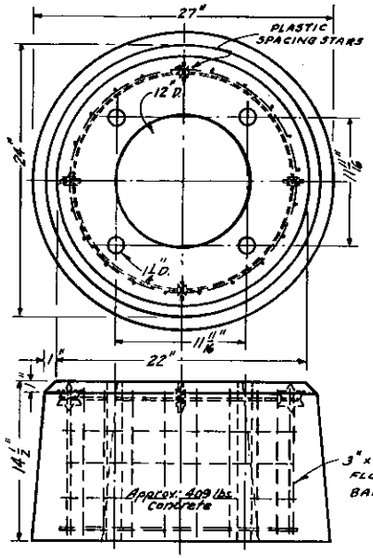
49820 TOP BLOCK

A A R SIG. SEC. M-1939
STORES CAT. REF. No. 2A-5919



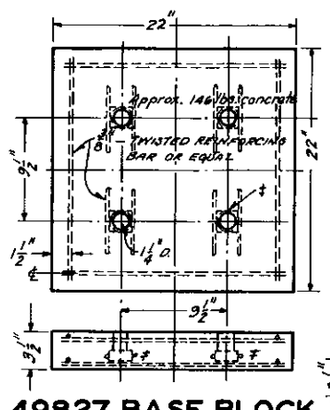
49822 BASE BLOCK A A R SIG. SEC. M-1939

STORES CAT. REF. No. 2A-5921



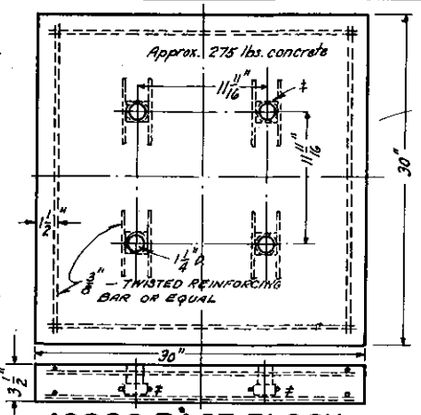
49824 TOP BLOCK

STORES CAT. REF. No. 2A-5923



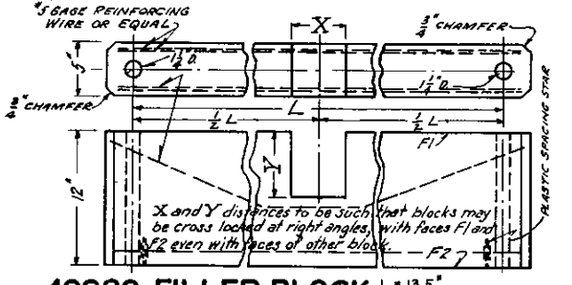
49827 BASE BLOCK

STORES CAT. REF. No. 2A-5926



49828 BASE BLOCK

STORES CAT. REF. No. 2A-5927

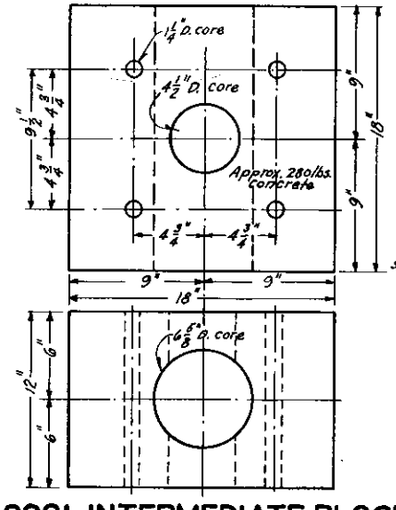


49829 FILLER BLOCK L = 13.5" APPROX. 75 LBS. CONCRETE.

STORES CAT. REF. No. 2A-5928

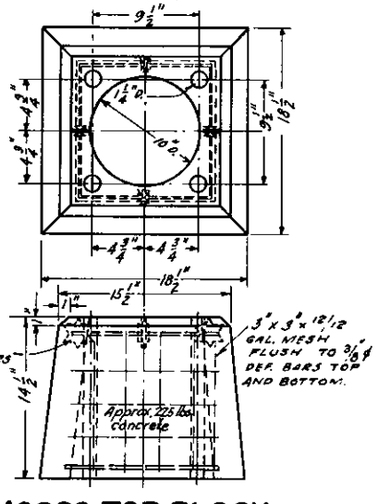
49830 FILLER BLOCK L = 16.5" APPROX. 93 LBS. CONCRETE

STORES CAT. REF. No. 2A-5929



49821 INTERMEDIATE BLOCK

AAR SIG. SEC. M-1939
STORES CAT. REF. No. 2A-5920



49823 TOP BLOCK

STORES CAT. REF. No. 2A-5922

NOTE :-
THREADED FOR 1" BOLT AND WELDED TO REINFORCING BAR. THREADS SHALL BE FILLED WITH GREASE BY MANUFACTURER.

SHEET 2 OF 2

S-498-B

THE PENNSYLVANIA RAILROAD

STANDARD

FOUNDATIONS

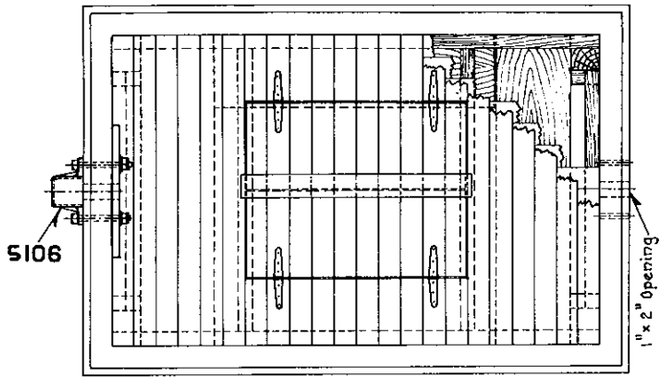
PRECAST CONCRETE

DETAILS

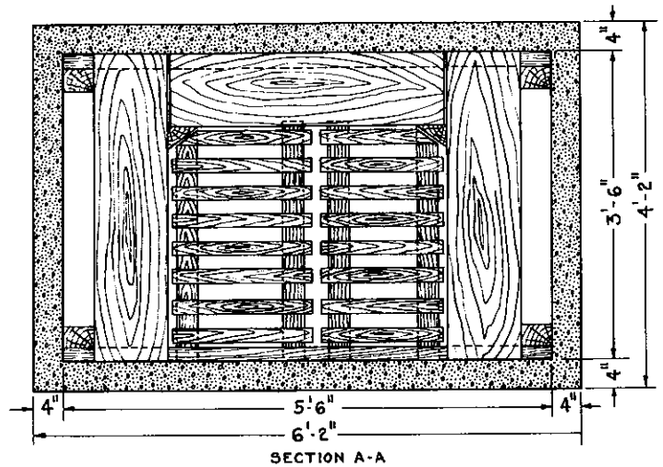
OFFICE OF CHIEF ENGINEER, PHILA., PA., SEPT. 14, 1948

Approved
W. C. Griffith
Assistant Chief Engineer-T.C.&S.

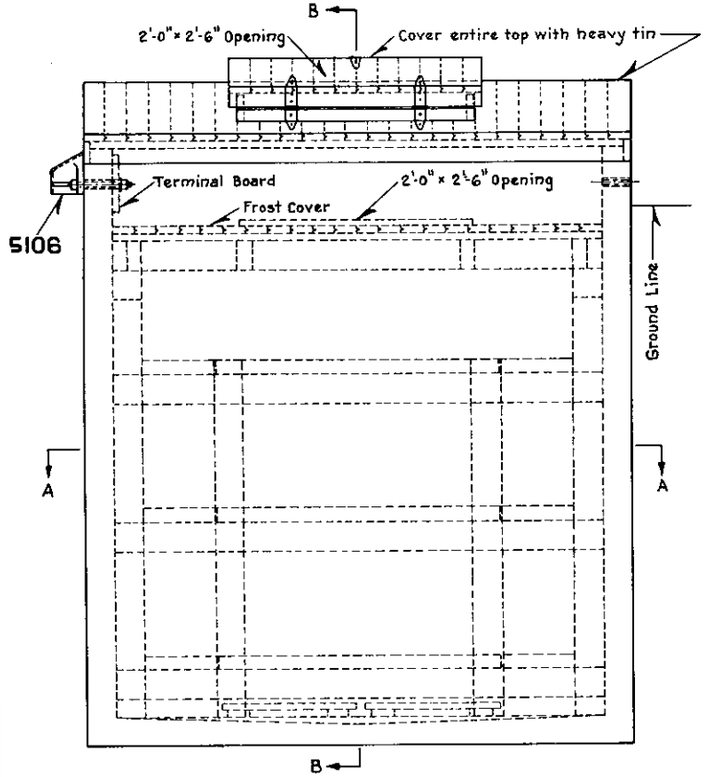
Approved
J. T. Emmett
Chief Engineer



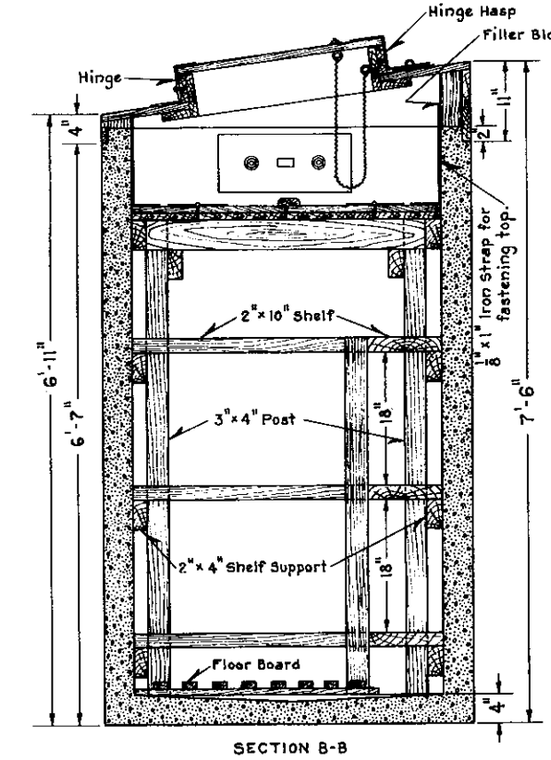
PLAN SHOWING FROST COVER



SECTION A-A



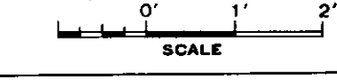
FRONT ELEVATION



SECTION B-B

Note:
Well shall be constructed in place.
Well shall be placed so that door opens away from Main Tracks.

REVISIONS



SCALE

1 SHEET

S-508-A

PENNSYLVANIA SYSTEM

STANDARD

BATTERY WELL

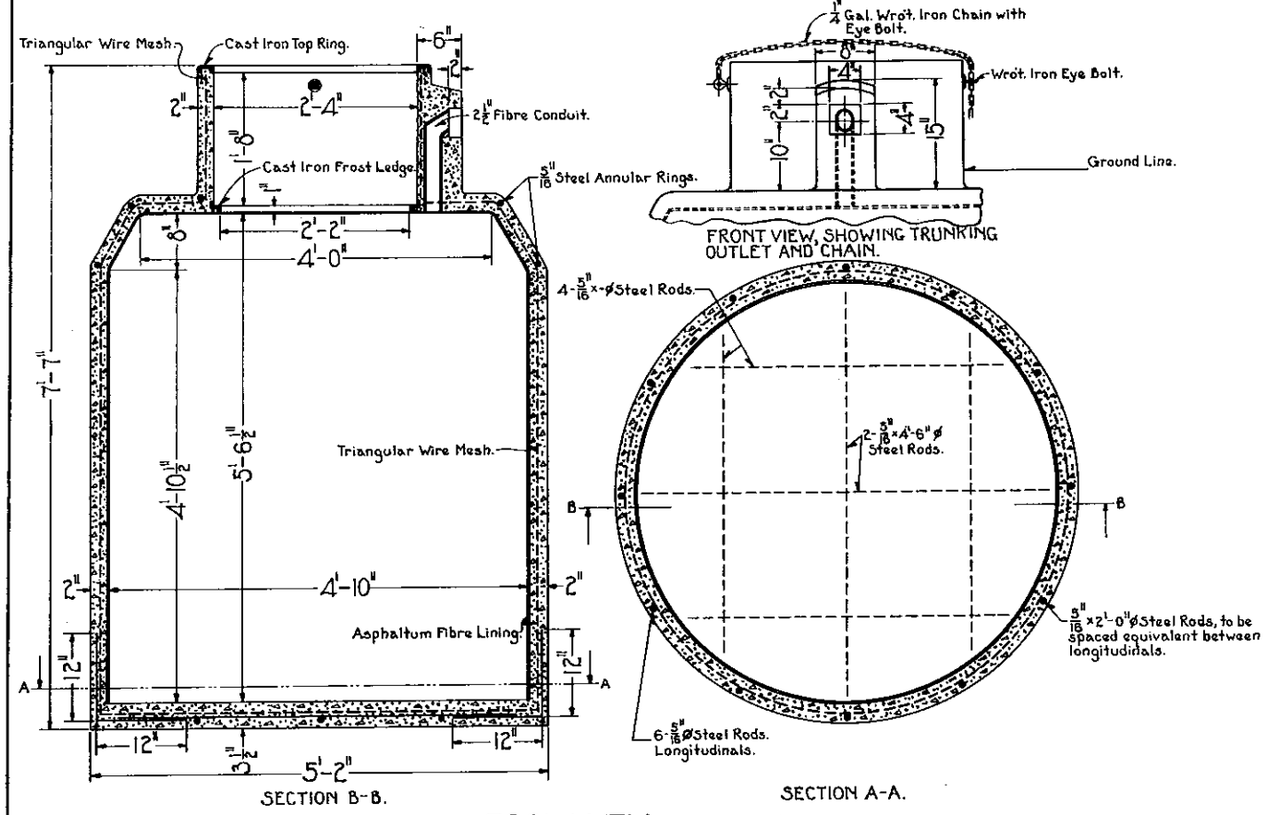
OFFICE OF CHIEF SIGNAL ENGINEER. PHILA., PA., MARCH. 6, 1922

Correct

Chief Signal Engineer

Approved

Chief Engineer



5091—WELL. Max. capacity {48 Cells 500 A.H. / 42 " 1000 "

ASSEMBLAGE.	
No. Req.	NAME.
1	Well Body.
1	Pressed Steel Cover.
1	Eye Bolt with 1-Sq. nut and 2 washers.
1	Chain with Eye Bolt with 1-Sq. nut and 2 washers.
1	Frost Cover.
1	Ladder.
18	Shelf Segments.
18	" Blocks.
18	" Strips.
12	" Uprights.
1	Slat Floor.

Note:-
Battery Well 5091 shall be provided with three complete circular shelves with 17" clearance between them, and Slat flooring.

Revisions
B- June 12, 1936.
Approved: A.H. Rudd

1 SHEET S-509-B

PENNSYLVANIA SYSTEM

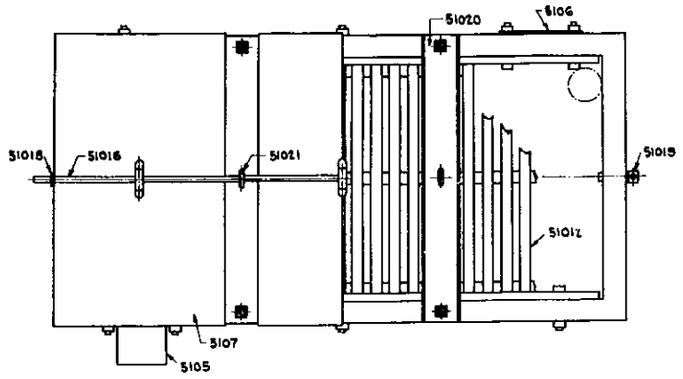
STANDARD

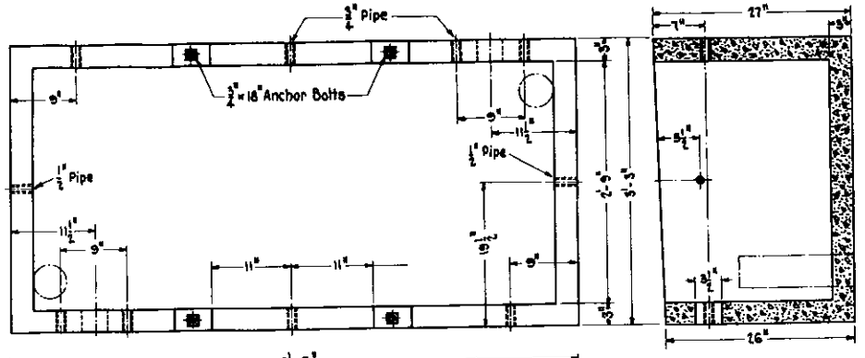
BATTERY WELL

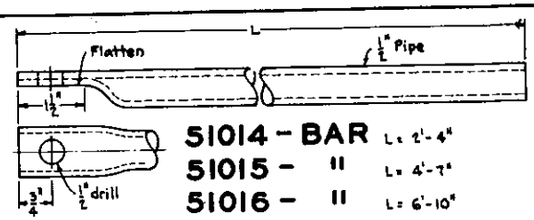
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., SEPT. 2, 1921.

Correct A.H. Rudd
Chief Signal Engineer.

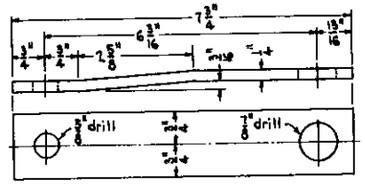
Approved
Chief Engineer.



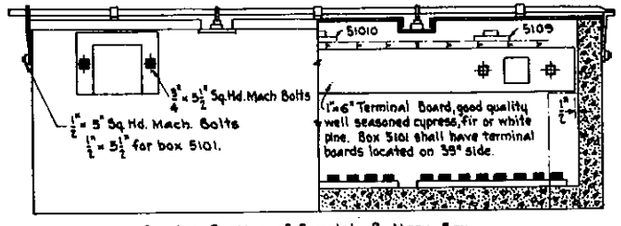




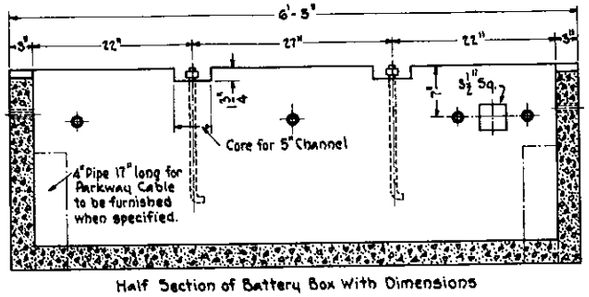
51014 - BAR L = 2'-4"
51015 - " L = 4'-7"
51016 - " L = 6'-10"
51017 - " L = 9'-11"



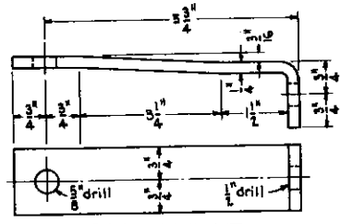
51018 - BRACKET O. H. Steel



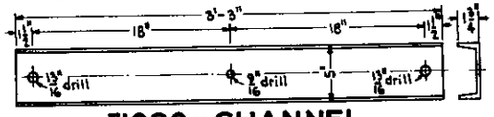
Quarter Section of Complete Battery Box



Half Section of Battery Box With Dimensions

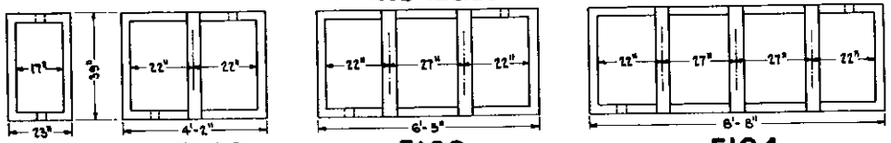


51019 - HASP
O. H. Steel

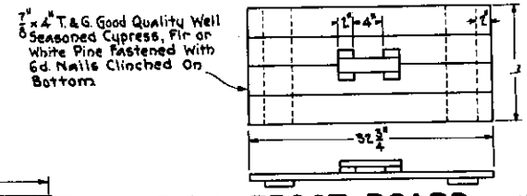


51020 - CHANNEL
Carnegie Sec. No. C-8, 6.7 lbs. per ft.

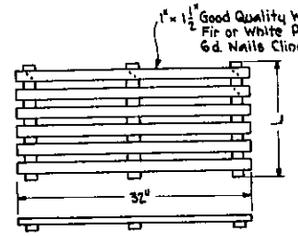
ASSEMBLIES



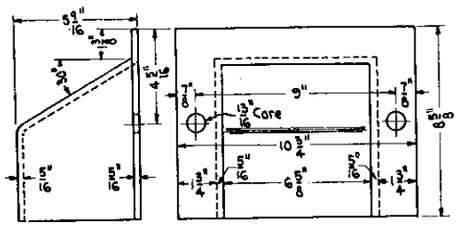
5101 **5102** **5103** **5104**



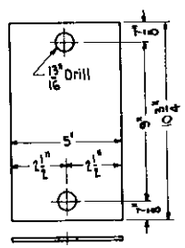
5108 - FROST BOARD L = 16¾"
5109 - " " L = 21⅞"
5110 - " " L = 22"



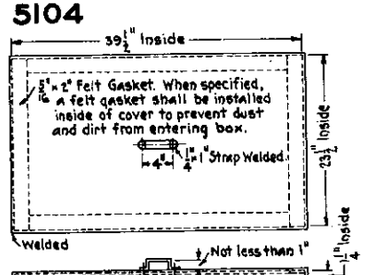
5111 - SLAT FLOOR L = 16'
5112 - " " L = 19½"
5113 - " " L = 26"



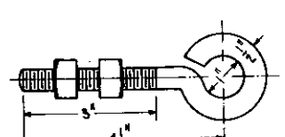
5105 - OUTLET CAP
Cast Iron



5106 - OUTLET COVER
No. 12 U.S. Std. Sheet Steel



5107 - COVER
No. 12 U.S. Std. Sheet Steel



51021 - EYE BOLT
O. H. Steel

Notes:-

1. One piece of thirty five mesh copper screen, the size of the outlet cover, shall be provided for one outlet of each box housing lead type battery.
2. The entire surface and top edges of box and all surfaces of terminal boards, slat floor and frost boards shall be given two coats of asphaltum paint before installation.
3. Iron work shall be thoroughly cleaned and given a priming brush or dipping coat of red oxide or graphite paint and two coats of light gray paint.
4. Interior iron work in boxes shall be protected with acid proof compound.
5. Box shall be made of Portland cement concrete in accordance with Association of American Railroads specification.
6. Coarse aggregate shall consist of ¾ inch maximum size stone or gravel.
7. Not less than 7 sacks of cement shall be used per cu. yd. of concrete.
8. Water cement ratio to produce a compressive strength of 3000 pounds per square inch after 28 days shall be used.

Revisions
Redrawn from approved plan S-510-A, dated Mar. 6, 1922, and revised.

A.A.R. Manual - Mar. 1936.

1 Sheet

S-510-B

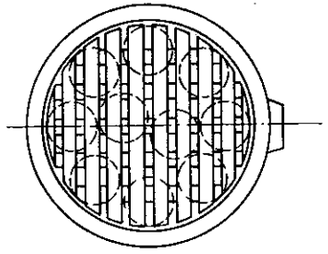
THE PENNSYLVANIA RAILROAD
STANDARD

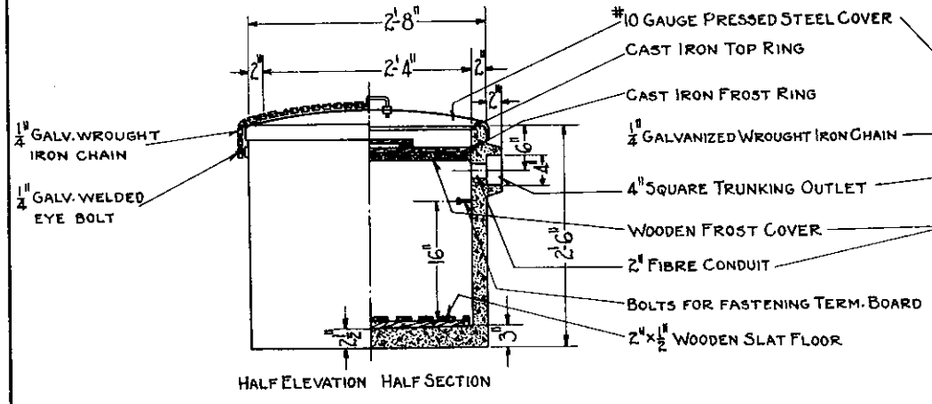
BATTERY BOX

Office of Chief Signal Engineer, Phila., Pa., June 10, 1936.

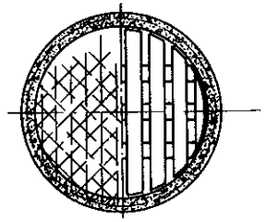
Approved: A. H. Rudd
Chief Signal Engineer

Approved: M. S. Higgins
Acting Chief Engineer

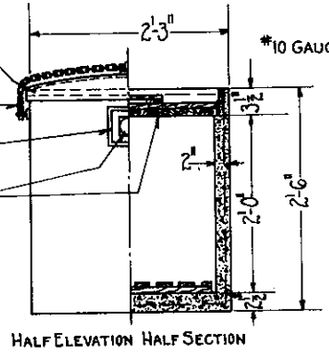




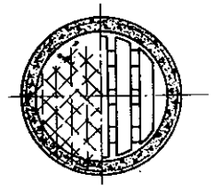
5111- BOX REINF. CONCRETE
CAP. 10 CELLS 500 A.H.
CAP. 7 CELLS 1000 A.H.



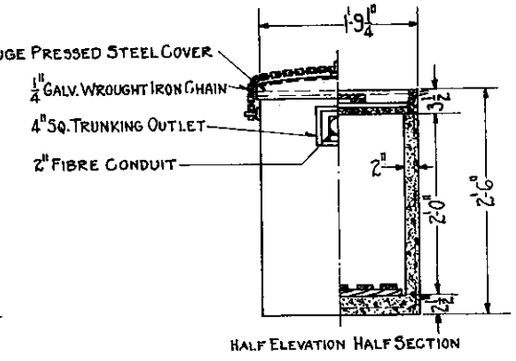
HALF SECTION SHOWING REINF. IN BOTTOM
HALF SECTION SHOWING SLATS IN FLOOR



5112-BOX REINF. CONCRETE
CAP. 6 CELLS 500 A.H.
CAP. 4 CELLS 1000 A.H.



HALF SECTION SHOWING REINF. IN BOTTOM
HALF SECTION SHOWING SLATS IN FLOOR



5113-BOX REINF. CONCRETE
CAP. 3 CELLS 500 A.H.
CAP. 2 CELLS 1000 A.H.

REVISIONS

1 SHEET

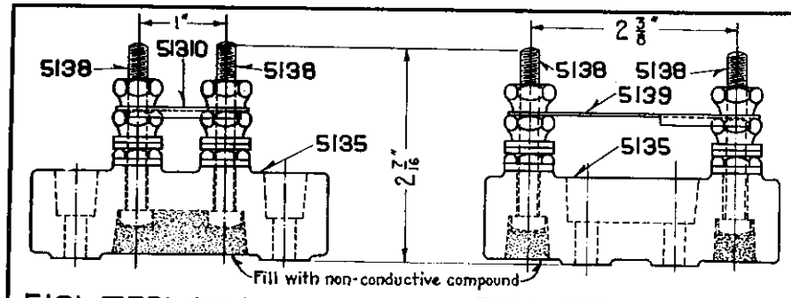
S-511-A

PENNSYLVANIA RAILROAD SYSTEM
STANDARD
BATTERY BOXES

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., JUNE 25, 1924.

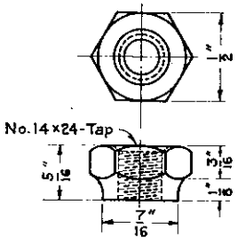
Approved
Chief Signal Engineer

Approved
Chief Engineer

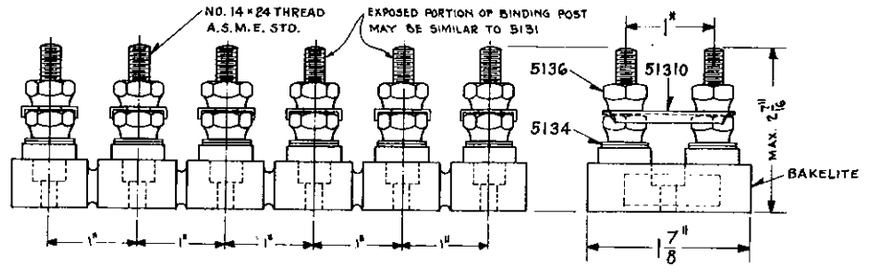


5131-TERMINAL COMPLETE
A.R.A. MAN. 1929

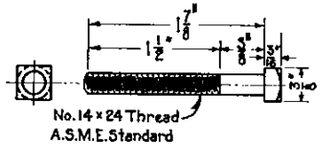
5132-TERMINAL COMPLETE
A.R.A. MAN. 1929



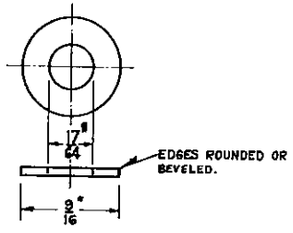
5136-BINDING NUT
BRASS A.R.A. MAN. 1929



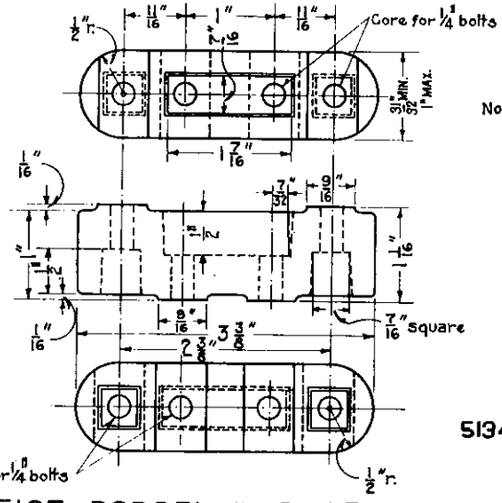
51311 MULTIPLE UNIT TERMINAL BLOCK COMPLETE.



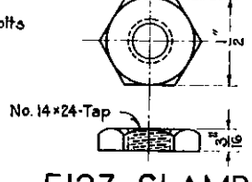
5133-BOLT
BRASS A.R.A. MAN. 1929



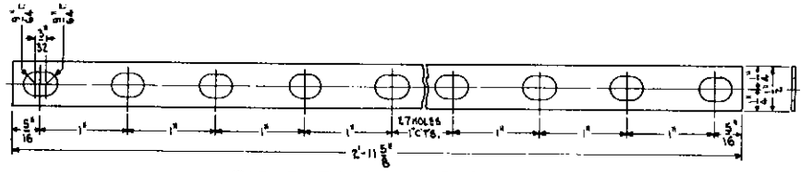
5134-WASHER
H.R. COPPER
NO. 18 A.W.G.
A.R.A. MAN. 1929



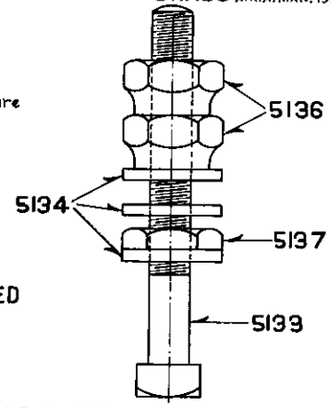
5135-PORCELAIN BASE GLAZED
REVERSIBLE A.R.A. MAN. 1929



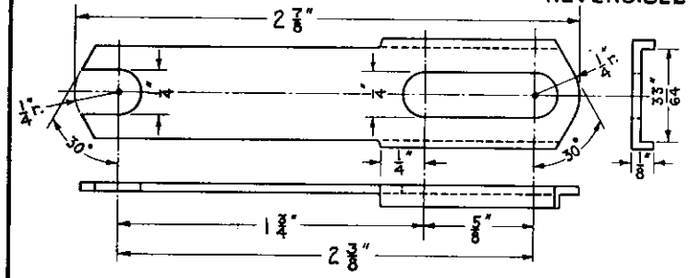
5137-CLAMP NUT
BRASS A.R.A. MAN. 1929



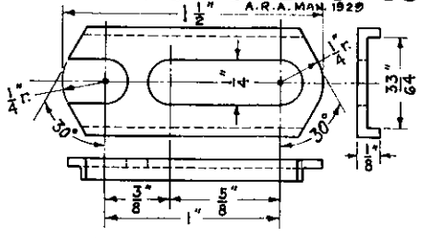
51312 BUS STRIP
NO. 16 A.W.G. GA. COPPER.



5138-BINDING POST COMPLETE
A.R.A. MAN. 1929



5139-CONNECTOR
COPPER NO. 18 A.W.G.
A.R.A. MAN. 1929



51310-CONNECTOR
COPPER NO. 18 A.W.G.
A.R.A. MAN. 1929

NOTE:-
1. ALL METAL PARTS, EXCEPT 51312, SHALL BE NICKEL PLATED.
2. 5131 & 5132 SHALL BE PLACED IN CONTAINERS HOLDING 10 OR LESS TERMINALS AND SHALL BE SECURELY PACKED IN CASES CONTAINING NOT MORE THAN 250 TERMINALS.
3. 51311 SHALL BE USED ONLY WHERE SPACE IS LIMITED AND WITH THE SPECIAL PERMISSION OF THE SUPT. OF TEL. & SIG'S. OR ENGR. TEL. & SIG'S. N.Y. ZONE.

REVISIONS
B-Oct. 21, 1924. Approved:- A.H. Rudd
C-MARCH 20, 1931. APPROVED:- A.H. Rudd
D-JULY 20, 1934. APPROVED:- A.H. Rudd
E-OCTOBER 23, 1934. APPROVED:- A.H. Rudd

1 SHEET S-513-E

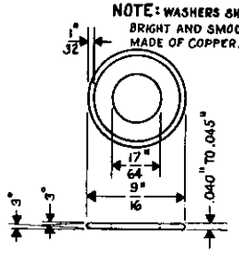
PENNSYLVANIA SYSTEM
STANDARD
TERMINAL BLOCKS

OFFICE OF CHIEF SIGNAL ENGINEER PHILA., PA., AUGUST 4, 1920

Correct
A.H. Rudd
Asst. Signal Engineer

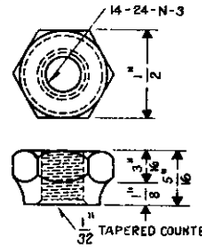
Chief Engineer

NOTE: WASHERS SHALL BE TUMBLED BRIGHT AND SMOOTH AND MAY BE MADE OF COPPER.



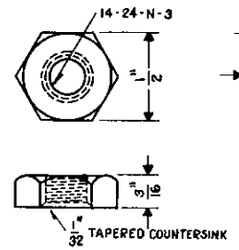
5134 WASHER.

A.A.R. SIG. SEC. M-1936.
STORES CAT. REF. NO. 2-A-2965



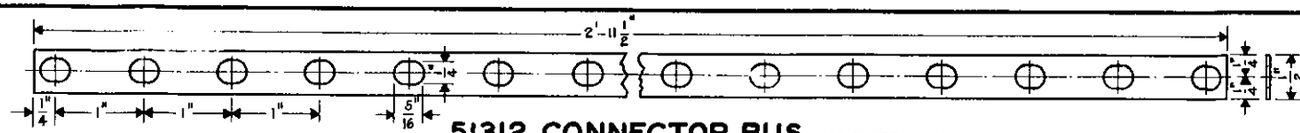
5136 BINDING NUT.

A.A.R. SIG. SEC. M-1936.
STORES CAT. REF. NO. 2-A-1698.



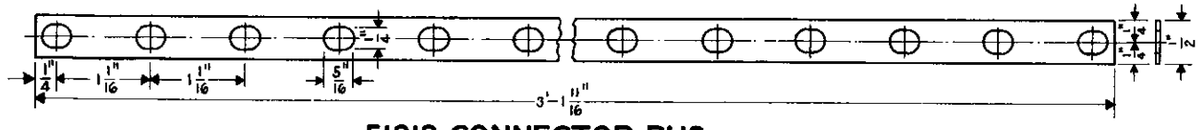
5137 CLAMP NUT.

A.A.R. SIG. SEC. M-1936.
STORES CAT. REF. NO. 2-A-1589.



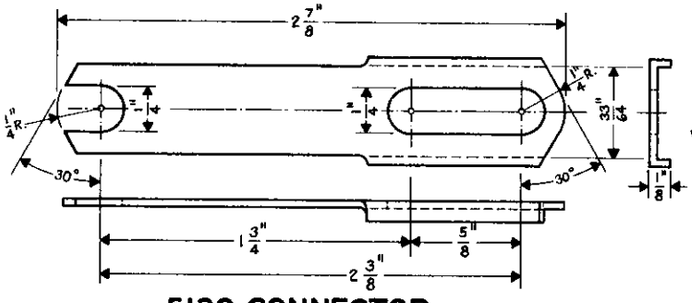
51312 CONNECTOR BUS. FOR 36 TERMINALS

HALF-HARD COPPER NO. 18 A.W.G. (NICKEL OR CHROMIUM PLATED)
A.A.R. SIG. SEC. MAR. 1939.
STORES CAT. REF. NO. 2-A-2694.



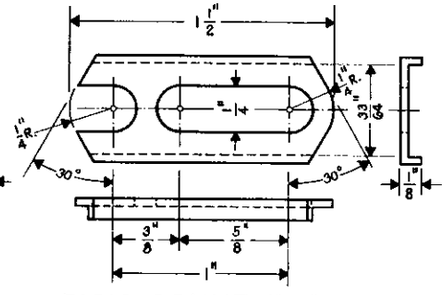
51313 CONNECTOR BUS. FOR 36 TERMINALS

HALF-HARD COPPER NO. 18 A.W.G. (NICKEL OR CHROMIUM PLATED)
STORES CAT. REF. NO. 2-A-4111



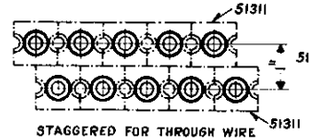
5139 CONNECTOR.

HALF-HARD COPPER NO. 18 A.W.G. (NICKEL OR CHROMIUM PLATED)
A.A.R. SIG. SEC. MAR. 1939.
STORES CAT. REF. NO. 2-A-688.

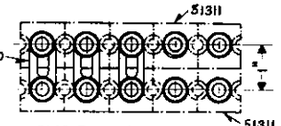


51310 CONNECTOR.

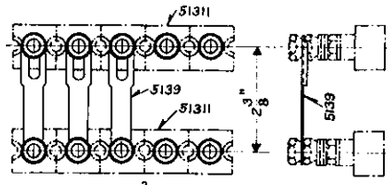
HALF-HARD COPPER NO. 18 A.W.G. (NICKEL OR CHROMIUM PLATED)
A.A.R. SIG. SEC. MAR. 1939.
STORES CAT. REF. NO. 2-A-689.



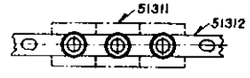
STAGGERED FOR THROUGH WIRE CONNECTIONS TO SINGLE POSTS.



FACE TO FACE FOR USE WITH 1 INCH CONNECTORS.



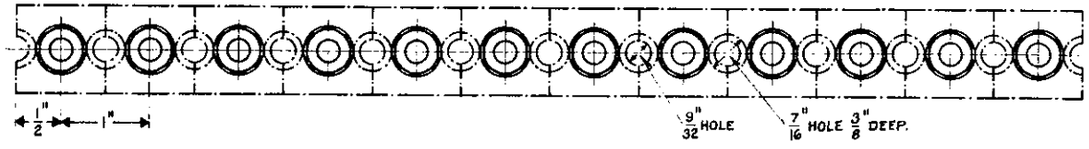
SPACED FOR 2 3/8 INCH CONNECTORS.

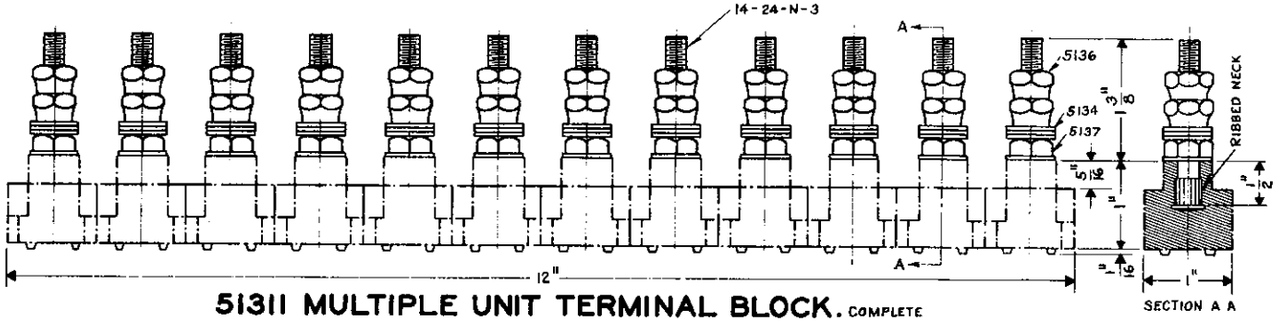


SINGLE ROW WITH CONNECTOR BUS.

NOTE:
1. MATERIAL FOR TERMINAL BLOCKS, WASHERS, NUTS AND BINDING POSTS SHALL BE IN ACCORDANCE WITH A.A.R. SIG. SEC. SPECIFICATIONS NO. 159 AND NO. 183.

REVISIONS
REDRAWN FROM APPROVED PLAN S-513-E, DATED AUG. 4, 1920, LAST REVISED OCT. 23, 1934 AND REVISED.





SECTION A A

51311 MULTIPLE UNIT TERMINAL BLOCK. COMPLETE

A.A.R. SIG. SEC. OCT. 1940
STORES CAT. REF. NO. 2-A-4110

1 SHEET

S-513-F

THE PENNSYLVANIA RAILROAD

STANDARD

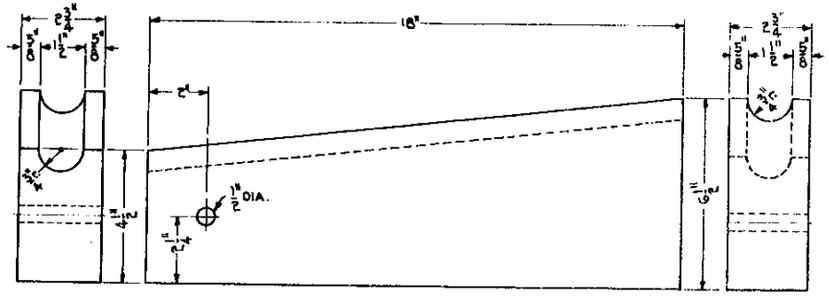
TERMINAL BLOCKS

MULTIPLE UNIT

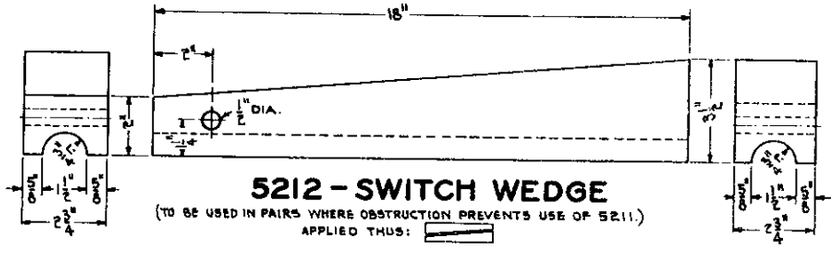
OFFICE OF CHIEF ENGINEER, PHILA., PA. MAY 14, 1940.

Approved
N. C. Stanton
Assistant Chief Engineer - Signals

Approved
Chief Engineer



5211 – SWITCH WEDGE



5212 – SWITCH WEDGE

(TO BE USED IN PAIRS WHERE OBSTRUCTION PREVENTS USE OF 5211.)
APPLIED THUS:

— SPECIFICATION —

MATERIAL: SWEET BIRCH, DOGWOOD, HORNBEAM, LOCUST, HARD MAPLE, OAK (EXCEPT SO-CALLED SWAMP OR WATER OAKS).

PHYSICAL REQUIREMENTS: SWITCH WEDGES SHALL BE FREE FROM DECAY, HOLES, KNOTS, SHAKES, SPLIT, WANE, GRAIN WITH SLANT GREATER THAN ONE IN TWENTY AND MOISTURE IN EXCESS OF 20%.

DESIGN: SWITCH WEDGES SHALL CONFORM TO THE SHAPES AND SIZES SPECIFIED. ALL DIMENSIONS SHOWN ARE MINIMA.

MANUFACTURE: SWITCH WEDGES SHALL BE STRAIGHT, CUT SQUARE AT THE ENDS, HAVE SMOOTH GROOVE, AND BE SURFACED ON ALL PLANES.

— FIELD NOTES —

WHERE SWITCH POINT OPENING IS SUCH THAT WEDGE 5211 CANNOT BE DRIVEN BETWEEN STOCK RAIL AND SWITCH POINT A SUFFICIENT DISTANCE TO INSURE A SAFE WEDGE, THAT SURFACE OF WEDGE WHICH IS PLACED AGAINST STOCK RAIL MAY BE CUT BACK TO OBTAIN THE DESIRED RESULTS.

WHERE UNUSUAL OBSTRUCTIONS, SUCH AS BOLT HEADS, ETC, PREVENT THE APPLICATION OF WEDGE 5212 AS INTENDED, THE LENGTH MAY BE REDUCED TO NOT LESS THAN NINE INCHES, BY SAWING OFF THE ENDS, TO MEET LOCAL CONDITIONS.

PRECAUTIONS MUST BE TAKEN TO INSURE WEDGES ALTERED TO MEET AN UNUSUAL CONDITION, SUCH AS OUTLINED ABOVE, ARE NOT USED WHERE STANDARD WEDGES 5211 OR 5212 CAN BE APPLIED.

REVISIONS

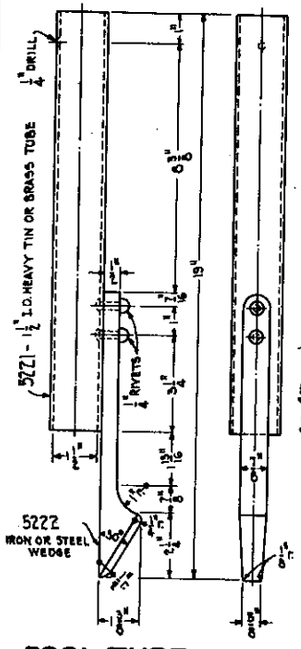
1 SHEET

5-521-A

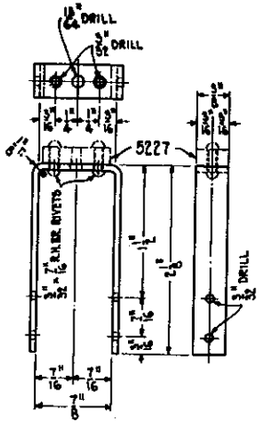
THE PENNSYLVANIA RAILROAD
STANDARD
SWITCH WEDGES
Office of Chief Signal Engineer, Phila., Pa., July 10, 1935.

Approved: Chief Signal Engineer

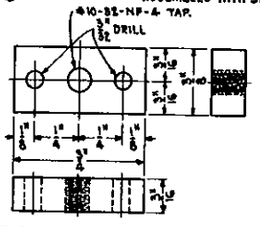
Approved: Actg. Chief Engineer



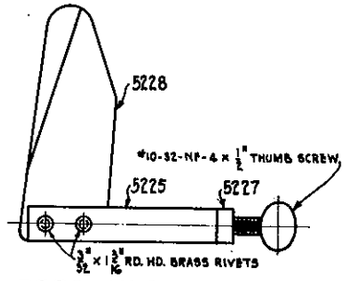
5221 - TUBE ONLY.
5222 - WEDGE ONLY.
5223 - BLOCK COMPLETE.
FOR MECHANICAL MACHINE.



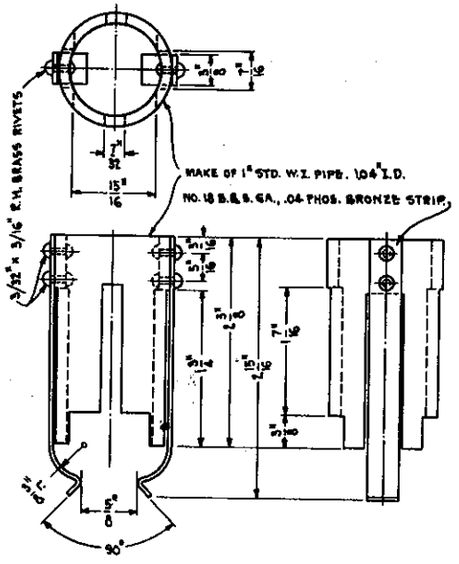
5225 - 'U' STRAP ONLY (NO. 14 A.W.G. BRASS).
5226 " " ASSEMBLED WITH 5227.



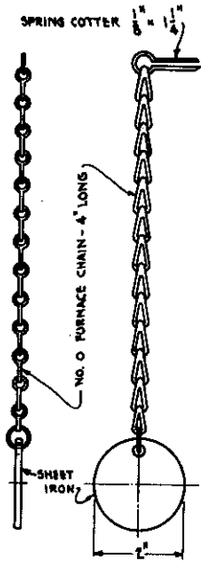
5227 - BLOCK (BRASS)



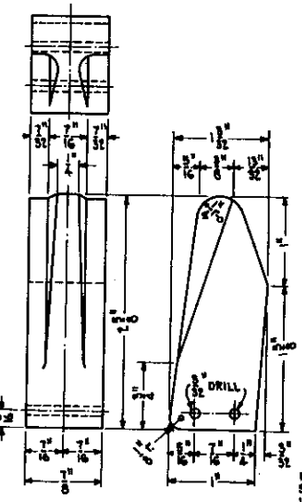
5229 - BLOCK COMPLETE
FOR U.S.&S. CO-TYPE S-6 AND P3 MACHINES



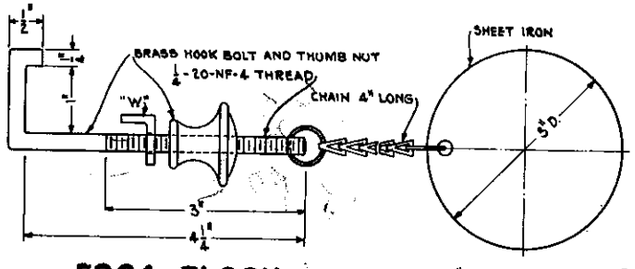
52210 - BLOCK
FOR U.S.&S. CO. POWER MACHINES.



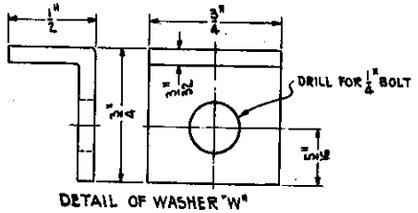
52211 - BLOCK
FOR ELECTRICALLY LOCKED SEMAPHORE INDICATOR AND CIRCUIT CONTROLLER.



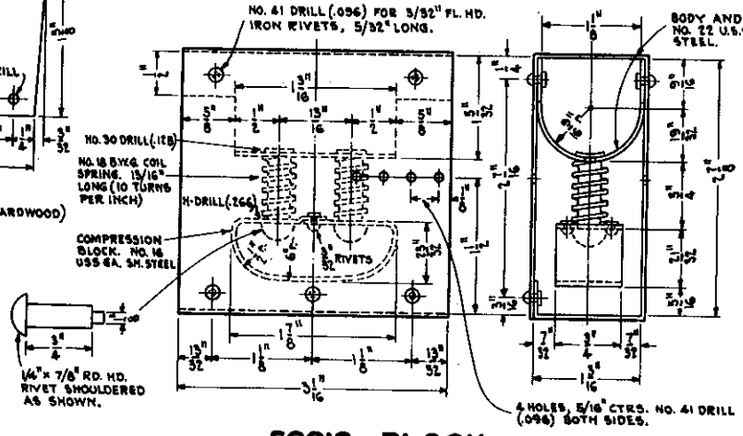
5228 - BLOCK (HARDWOOD)



5224 - BLOCK
FOR G.R.S. MODEL 2 UNIT LEVER TYPE ELECTRIC MACH.



DETAIL OF WASHER "W"



52212 - BLOCK
FOR G.R.S. MODEL 2 ELECTRIC MACHINE.

REVISIONS
REDRAWN FROM APPD. PLAN S-522-2 DATED 9-22-22, LAST REVISED 7-14-54, AND REVISED.

ALL EXPOSED PORTIONS, EXCEPT THREADED PARTS, ENAMELED VERMILION.

1 SHEET

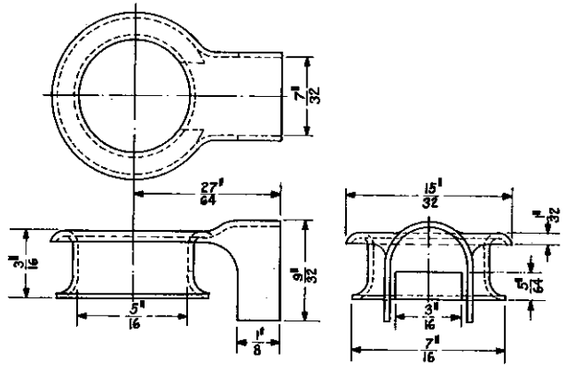
S-522-F

THE PENNSYLVANIA RAILROAD
STANDARD
BLOCKING DEVICES
FOR INTERLOCKING MACHINE LEVERS

Office of Chief Signal Engr, Phila., Pa., January 10, 1935

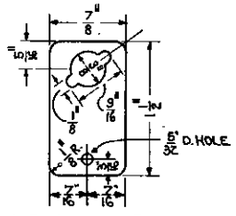
Approved
Chief Signal Engineer

Approved
Chief Engineer



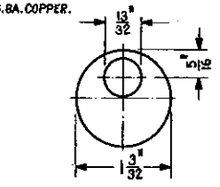
5281 - EYELET. TINNED.

#25 (.0179") B.&S.GA. COPPER.



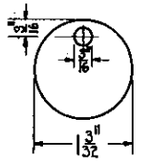
5284 — TAG.

VULCANIZED BLACK FIBRE 1/16" THICK.



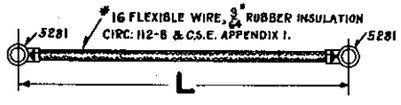
5285 — TAG

VULCANIZED BLACK FIBRE 1/16" THICK



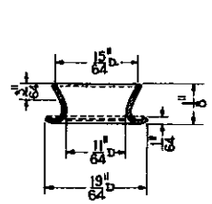
5286 — TAG.

NO. 16 A.W.G. ALUMINUM.
A.R.A. MAR. 1930



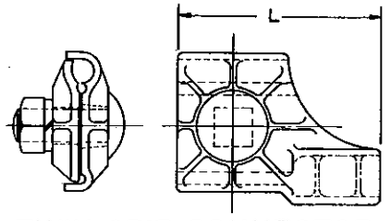
5287-RELAY CONNECTION L = 20".

5289- " " L = LENGTH AS DESIRED.



5283 — EYELET. TINNED.

#29 (.0113") B.&S.G. COPPER.



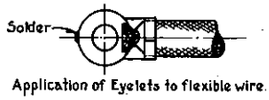
TWIN GRIP CONNECTOR

BRONZE

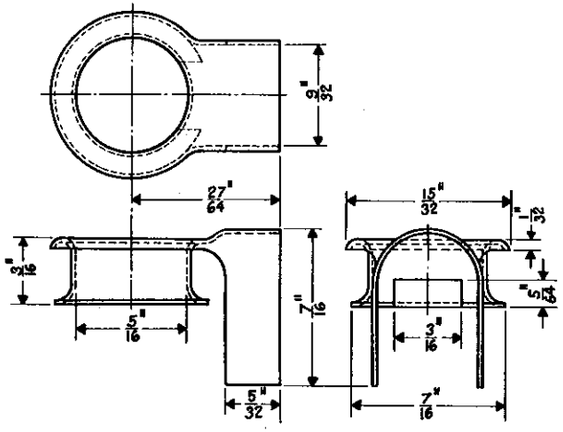
ORDERING REFERENCE

ORDER NUMBER	CONNECTS LINE	CONNECTS TAP	LENGTH L
52811	#4 #6 #8	#9	2 5/16"
52812	#2 #4	#9	2 5/16"
52813	#2 #4 #6	#6	2 5/16"
52814	#2 #4	#4	2 5/16"
52815	#2 #4	#6	2 5/16"
52816	#9 #10	#14	1 5/16"

Note:-
TAGS #5284 & #5285 FOR INSIDE USE.
TAG #5286 FOR OUTSIDE USE.
Use Eyelet 5281 for #16 Flexible Wire.
" " 5282 " #14 Solid Wire.
" " 5283 " machine combination wire.
" flat nose Pliers with parallel jaws for setting eyelets.



Application of Eyelets to flexible wire.



5282 EYELET TINNED.

#25 (.0179") B.&S.GAUGE COPPER.

REVISIONS.
B - October 31, 1923. Approved: A.H. Rudd
C - March 14, 1927. Approved: A.H. Rudd
D — July 18, 1930. Approved:- A.H. Rudd
E - February 26, 1932. Approved:- A.H. Rudd
F - March 16, 1934. Approved:- A.H. Rudd
G - March 21, 1935. Approved:- A.H. Rudd

1 SHEET S-528-G

THE PENNSYLVANIA RAILROAD
STANDARD

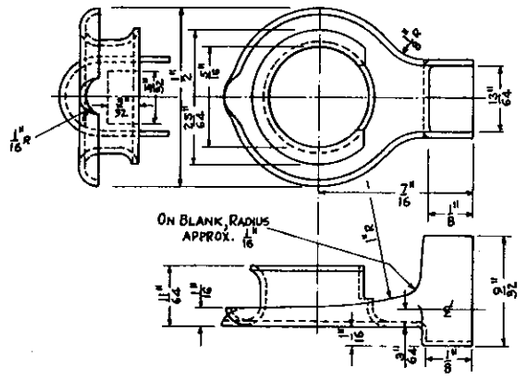
EYELETS, TAGS AND CONNECTORS

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., JUNE 16, 1921.

Correct A.H. Rudd
Chief Signal Engineer.

Approved
Chief Engineer.

CONNECTORS SHALL BE STAMPED OR OTHERWISE MARKED TO INDICATE SIZES OF WIRES CONNECTED



5281 – EYELET

STORES CAT. REF. 2A-1001

52817– "

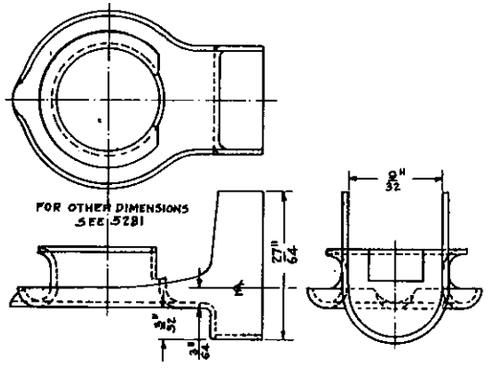
STORES CAT. REF. 2A-5400

52818– "

STORES CAT. REF. 2A-3937

52819– "

STORES CAT. REF. 2A-5402



5282 – EYELET

STORES CAT. REF. 2A-1002

52820– "

STORES CAT. REF. 2A-5403

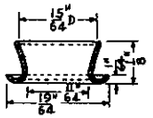
52821– "

STORES CAT. REF. 2A-5404

52822– "

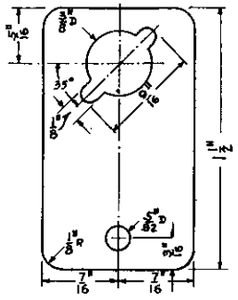
STORES CAT. REF. 2A-5405

EYELETS 5281-5282-52817-52818-52819-52820-52821 & 52822 SHALL BE MADE OF NO. 25 (.017") B. & S. GA. COPPER (TINNED) TO FIT NO. 14 & 24 A.A.R. BINDING POST.



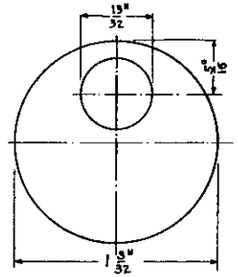
5283 – EYELET

NO. 29 (.0113") B. & S. GA. COPPER (TINNED)
STORES CAT. REF. 2A-999



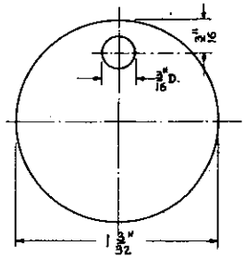
5284 – TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. 2A-2780



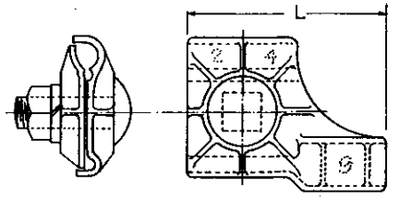
5285 – TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. 2A-2782



5286 – TAG

NO. 16 A.W.G. ALUMINUM
STORES CAT. REF. 2A-2779
A.R.A. DWG. 1622A

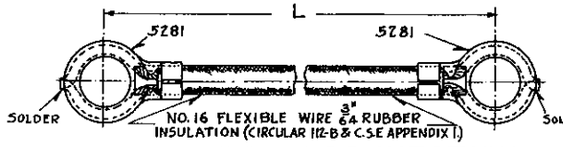


TWIN GRIP CONNECTOR

BRONZE

ORDERING REFERENCE FOR TWIN GRIP CONNECTORS

STORES CAT. REFERENCE	ORDER NUMBER	CONNECTS LINE B. & S. GA.	CONNECTS TAP 32/64	LENGTH L
2A-587	52811	4-6-8	9	2 5/16"
2A-5406	52812	2-4	9	"
2A-564	52813	2-4-6	6	"
2A-5407	52814	2-4	4	"
2A-566	52815	2-4	6	"
2A-567	52816	9-10	14	1 5/16"

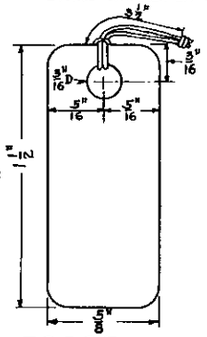


RELAY CONNECTION

ORDERING REFERENCE FOR RELAY CONNECTIONS

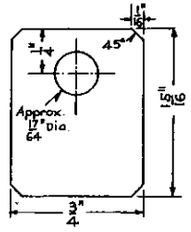
STORES CAT. REFERENCE	ORDER NUMBER	LENGTH L
2A-669	5287	20"
2A-4893	5280	*2" TO 10"
2A-4740	52827	14"
2A-4741	52828	16"
2A-4742	52829	18"
2A-4743	52830	22"
2A-4744	52831	24"
2A-4745	52832	26"

* SPECIFY LENGTH ON ORDER.



52825 – TAG (S-LOOP)

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. 2A-2753



52826 – TAG

VULCANIZED BLACK FIBRE APPROX 3/64" THICK
STORES CAT. REF. 2A-3566

NOTES:

EYELET 5281, AS SHOWN, FOR USE ON NO. 14 & NO. 16 STRANDED OR FLEXIBLE WIRE
" 52817 SIMILAR TO 5281 EXCEPT FOR USE ON NO. 12 " " " "
" 52818 " " " " " " NO. 9 " " " "
" 52819 " " " " " " NO. 6 " " " "
" 5282, AS SHOWN, FOR USE ON NO. 14 & NO. 16 SOLID WIRE
" 52820 SIMILAR TO 5282 EXCEPT FOR USE ON NO. 12 SOLID WIRE
" 52821 " " " " " " NO. 9 " "
" 52822 " " " " " " NO. 6 " "
" 5283 FOR USE ON MACHINE COMBINATION WIRES

TAG 5284 FOR INSIDE USE-INSTRUMENT HOUSE, CASE AND TOWERS
" 5285 " " " - " " " " "
" 5286 FOR OUTSIDE USE-WHERE IT IS SUBJECT TO WEATHER CONDITIONS
" 52825 FOR USE ON MACHINE COMBINATION WIRING
" 52826 " " AS MARKING TAG FOR PN-50 RELAY WIRING

USE FLAT NOSED PLIERS, SIMILAR TO RACO NO. 178-9 FOR SETTING EYELETS.

REVISIONS

REDRAWN FROM APPROVED DRAWING S-528-G DATED 6-16-1921 LAST REVISED 9-21-1935 & REVISED. EYELETS 5281 & 5282 CHANGED TO AGREE WITH LATEST DESIGN. EYELETS 52817-52818-52819-52820-52821-52822 ADDED. TAGS 52825 & 52826 ADDED. STORES CAT. REF. NOS. ADDED.

1 SHEET

S-528-H

THE PENNSYLVANIA RAILROAD

STANDARD

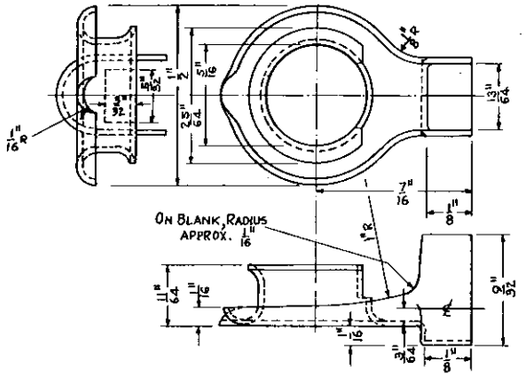
EYELETS, TAGS & CONNECTORS

OFFICE OF CHIEF ENGINEER, PHILA., PA., MAY 7, 1945.

Approved H. C. Griffith
Assistant Chief Engineer – T. C. & S.

Approved J. Minnick
Chief Engineer

CONNECTORS SHALL BE STAMPED OR OTHERWISE MARKED TO INDICATE SIZES OF WIRES CONNECTED



5281 - EYELET

STORES CAT. REF. 2A-1001

52817- "

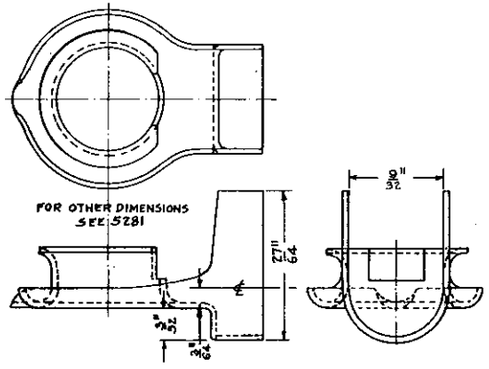
STORES CAT. REF. 2A-5400

52818- "

STORES CAT. REF. 2A-3937

52819- "

STORES CAT. REF. 2A-5402



5282 - EYELET

STORES CAT. REF. 2A-1002

52820- "

STORES CAT. REF. 2A-5403

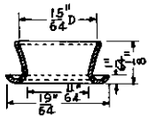
52821- "

STORES CAT. REF. 2A-5404

52822- "

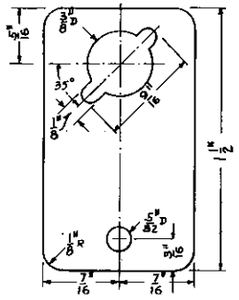
STORES CAT. REF. 2A-5405

EYELETS 5281-5282-52817-52818-52819-52820-52821 & 52822 SHALL BE MADE OF NO. 23 (.017") B. & S. GA. COPPER (TINNED) TO FIT NO. 14/24 A.A.R. BINDING POST.



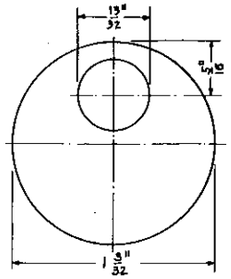
5283 - EYELET

NO. 29 (.0113") B. & S. GA. COPPER (TINNED)
STORES CAT. REF. 2A-999



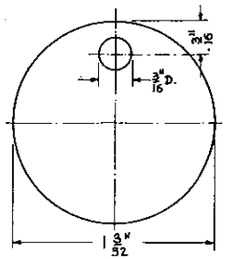
5284 - TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. 2A-2780



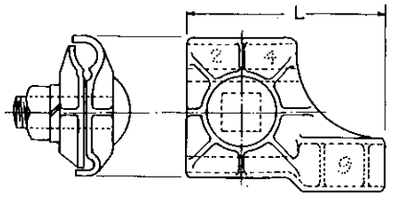
5285 - TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. 2A-2782



5286 - TAG

NO. 16 A.W.G. ALUMINUM
STORES CAT. REF. 2A-2779
A.R.A. DWG. 1622A

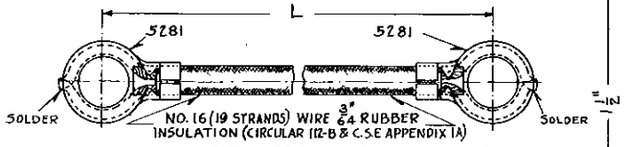


TWIN GRIP CONNECTOR

BRONZE

ORDERING REFERENCE FOR TWIN GRIP CONNECTORS

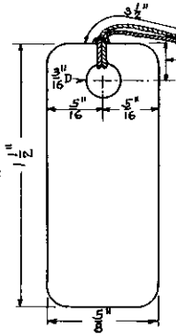
STORES CAT. REFERENCE	ORDER NUMBER	CONNECTS LINE B. & S. GA.	CONNECTS TAP B. & S. GA.	LENGTH L
2A-587	52811	4-6-8	9	2 5/16"
2A-5406	52812	2-4	9	"
2A-564	52813	2-4-6	6	"
2A-5407	52814	2-4	4	"
2A-566	52815	2-4	6	"
2A-567	52816	9-10	14	1 5/16"



RELAY CONNECTION

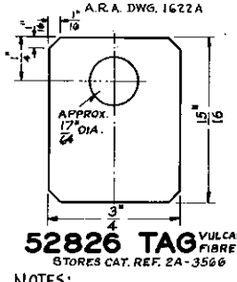
ORDERING REFERENCE FOR RELAY CONNECTIONS

STORES CAT. REFERENCE	ORDER NUMBER	LENGTH L
2A-669	5287	20"
2A-4893	5289	*2" TO 10"
2A-4740	52827	14"
2A-4741	52828	16"
2A-4742	52829	18"
2A-4743	52830	22"
2A-4744	52831	24"
2A-4745	52832	26"



52825 - TAG (S-LOOP)

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. 2A-2753



52826 TAG

VULCANIZED BLACK FIBRE APPROX. 3/64" THICK
STORES CAT. REF. 2A-3566

NOTES:

EYELET 5281, FOR USE ON #16 (19 STRAND) CONDUCTORS.
" 52817 SIMILAR TO 5281, FOR USE ON #12 STRANDED WIRE.
" 52818 " " " " " #9 " "
" 52819 " " " " " #6 " "
" 5282, FOR USE ON #14, #16 SOLID, AND #14 (19 STRAND) CONDUCTORS.
" 52820 SIMILAR TO 5282, FOR USE ON #12 SOLID WIRE.
" 52821 " " " " " #9 " "
" 52822 " " " " " #6 " "
" 5283 FOR USE ON MACHINE COMBINATION CONDUCTORS.
TAG 5284 FOR INSIDE USE-INSTRUMENT HOUSE, CASE AND TOWERS
" 5285 " " " - " " " "
" 5286 FOR OUTSIDE USE-WHERE IT IS SUBJECT TO WEATHER CONDITIONS.
" 52825 FOR USE ON MACHINE COMBINATION CONDUCTORS.
" 52826 " " AS MARKING TAG FOR PN-50 ETC. RELAY CONDUCTORS.

USE FLAT NOSED PLIERS, SIMILAR TO RACO NO. 178-9 FOR SETTING EYELETS.

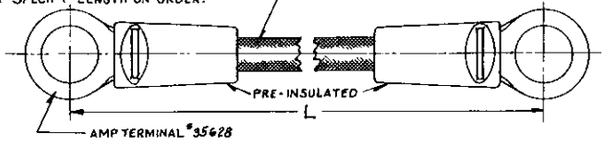
AIRCRAFT MARINE TERMINAL #35628 MAY BE APPLIED TO #14 OR #16 (19 STRAND) CONDUCTORS (STORES CAT. REF. 25E-12295)
USE AIRCRAFT MARINE HAND TOOL #59055 FOR CRIMPING TERMINAL #35628. (STORES CAT. REF. 45B-10800)

AMP TERMINAL 36908 MAY BE APPLIED TO NO 16 (19 STRAND) T.C. GREEN S.C.R. 25E-12373.
USE AMP HAND TOOL 49864 FOR CRIMPING TERMINAL 36908 S.C.R. 45B-15201.
WHEN EYELETS OR TERMINALS ARE APPLIED TO BINDING POSTS THEY MUST BE ARRANGED TO INSURE "NO CONTACT BETWEEN ADJACENT CONNECTIONS."

ORDERING REFERENCE FOR RELAY CONNECTION R

S.C.R NUMBER	ORDER NUMBER	LENGTH L
2A-5800	52835	20"
2A-5801	52836	*2" to 10"
2A-5802	52837	14"
2A-5803	52838	16"
2A-5804	52839	18"
2A-5805	52840	22"
2A-5806	52841	24"
2A-5807	52842	26"

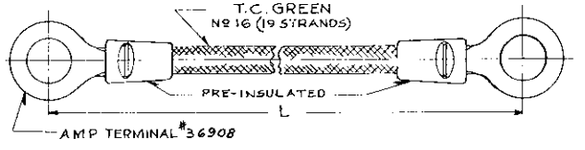
* SPECIFY LENGTH ON ORDER.



RELAY CONNECTION-R

ORDERING REFERENCE FOR RELAY CONNECTION T

S.C.R NUMBER	ORDER NUMBER	LENGTH L
2A-5830	52844	20"
2A-5831	52845	* 4" TO 10"
2A-5832	52846	14"
2A-5833	52847	16"
2A-5834	52848	18"
2A-5835	52849	22"
2A-5836	52850	24"
2A-5837	52851	26"



RELAY CONNECTION-T

REVISIONS

REDRAWN FROM APPROVED DRAWING S-528-G DATED 6-16-1921 LAST REVISED 3-21-1935 & REVISED. EYELETS 5281 & 5282 CHANGED TO AGREE WITH LATEST DESIGN. EYELETS 52817-52818-52819-52820-52821-52822 ADDED. TAGS 52825 & 52826 ADDED. STORES CAT. REF. NOS. ADDED.

J-REVISED 5-17-1950 RELAY CONNECTIONS 52835 TO 52851 INCL. ADDED. LAST 3 NOTES ADDED. NOTE "EYELET 5281, SIZE #14 REMOVED. (19 STRANDS) ADDED TO #16. NOTE EYELET 5282, SIZE #14 (19 STRANDS) ADDED.

APPROVED W. G. Palmenson

1 SHEET

S-528-J

THE PENNSYLVANIA RAILROAD

STANDARD

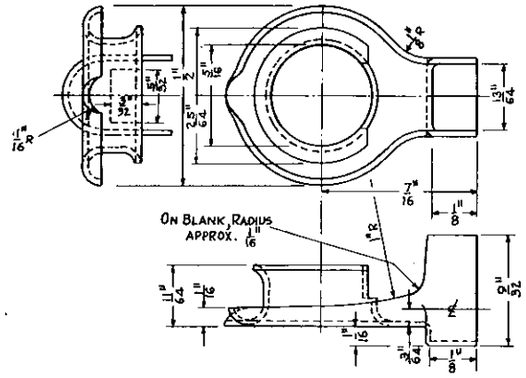
EYELETS, TAGS & CONNECTORS

OFFICE OF CHIEF ENGINEER, PHILA., PA., MAY 7, 1945.

Approved H.C. Griffith
Assistant Chief Engineer - T. C. & S.

Approved J.J. Bennett
Chief Engineer

CONNECTORS SHALL BE STAMPED OR OTHERWISE MARKED TO INDICATE SIZES OF WIRES CONNECTED



5281 - EYELET

STORES CAT. REF. 2A-1001

52817- "

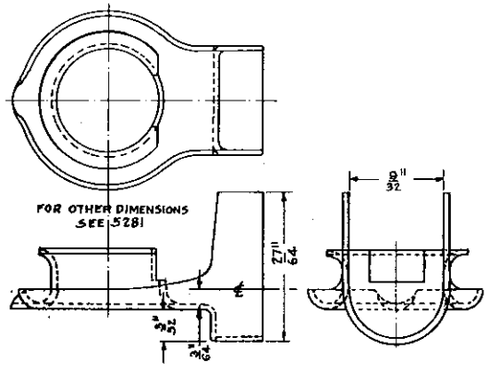
STORES CAT. REF. 2A-5400

52818- "

STORES CAT. REF. 2A-3937

52819- "

STORES CAT. REF. 2A-5402



5282 - EYELET

STORES CAT. REF. 2A-1002

52820- "

STORES CAT. REF. 2A-5403

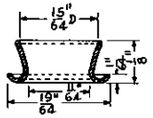
52821- "

STORES CAT. REF. 2A-5404

52822- "

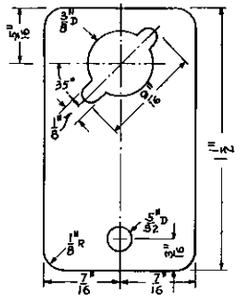
STORES CAT. REF. 2A-5405

EYELETS 5281-5282-52817-52818-52819-52820-52821 & 52822 SHALL BE MADE OF NO.25(.017") B.&S. GA. COPPER (TINNED) TO FIT NO. 14/24 A.A.R. BINDING POST.



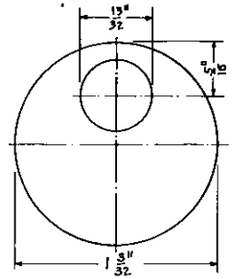
5283 - EYELET

NO. 29 (.0113") B.&S. GA. COPPER (TINNED)
STORES CAT. REF. 2A-999



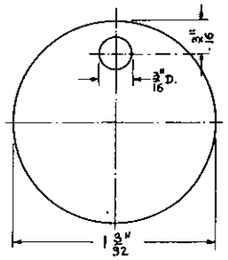
5284 - TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. 2A-2780



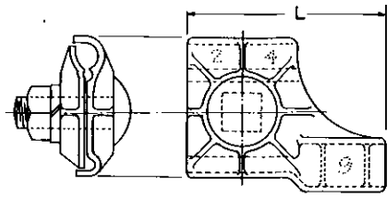
5285 - TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. 2A-2782



5286 - TAG

NO. 16 A.W.G. ALUMINUM
STORES CAT. REF. 2A-2779
A.R.A. DWG. 1622A

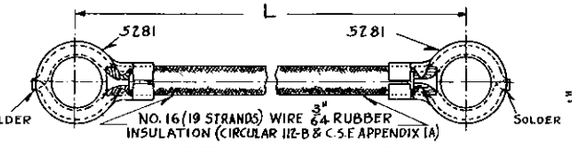


TWIN GRIP CONNECTOR

BRONZE

ORDERING REFERENCE FOR TWIN GRIP CONNECTORS

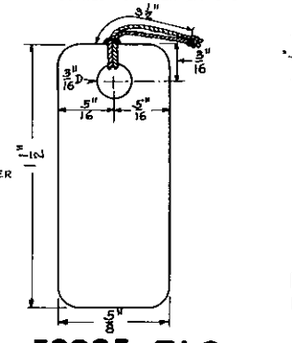
STORES CAT. REFERENCE	ORDER NUMBER	CONNECTS LINE B.&S. GA.	CONNECTS TAP B.&S. GA.	LENGTH L
2A-587	52811	4-6-8	9	2 5/16"
2A-5406	52812	2-4	9	"
2A-564	52813	2-4-6	6	"
2A-5407	52814	2-4	4	"
2A-566	52815	2-4	6	"
2A-567	52816	9-10	14	1 5/16"



RELAY CONNECTION

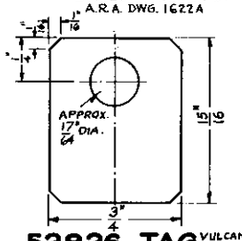
ORDERING REFERENCE FOR RELAY CONNECTIONS

STORES CAT. REFERENCE	ORDER NUMBER	LENGTH L
2A-669	5287	20"
2A-4893	5289	#2" TO 10"
2A-4740	52827	14"
2A-4741	52828	16"
2A-4742	52829	18"
2A-4743	52830	22"
2A-4744	52831	24"
2A-4745	52832	26"



52825 - TAG (S-LOOP)

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. 2A-2753



52826 TAG

VULCANIZED BLACK FIBRE APPROX. 3/64" THICK
STORES CAT. REF. 2A-3566

NOTES:

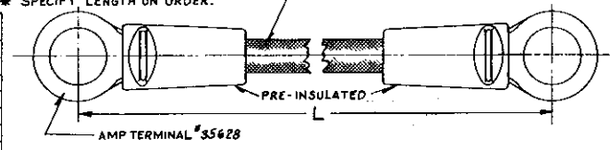
EYELET 5281, FOR USE ON #16 (19 STRAND) CONDUCTORS.
" 52817 SIMILAR TO 5281, FOR USE ON #12 STRANDED WIRE.
" 52818 " " " " " " #9 " "
" 52819 " " " " " " #6 " "
" 5282, FOR USE ON #14, #16 SOLID, AND #14 (19 STRAND) CONDUCTORS.
" 52820 SIMILAR TO 5282, FOR USE ON #12 SOLID WIRE.
" 52821 " " " " " " #9 " "
" 52822 " " " " " " #6 " "
" 5283 FOR USE ON MACHINE COMBINATION CONDUCTORS.
TAG 5284 FOR INSIDE USE-INSTRUMENT HOUSE, CASE AND TOWERS
" 5285 " " " - " " , " "
" 5286 FOR OUTSIDE USE-WHERE IT IS SUBJECT TO WEATHER CONDITIONS.
" 52825 FOR USE ON MACHINE COMBINATION CONDUCTORS.
" 52826 " " AS MARKING TAG FOR PN-50 ETC. RELAY CONDUCTORS.
USE FLAT NOSED PLIERS, SIMILAR TO RACO NO. 178-9 FOR SETTING EYELETS.
AIRCRAFT MARINE TERMINAL #35628 MAY BE APPLIED TO #14 OR #16 (19 STRAND) CONDUCTORS (STORES CAT. REF. 25E-12295)
USE AIRCRAFT MARINE HAND TOOL #59055 FOR CRIMPING TERMINAL #35628. (STORES CAT. REF. 45B-10800)

AMP TERMINAL 36908 MAY BE APPLIED TO #16 (19 STRAND) T.C. GREEN S.C.R. 25E-12373.
USE AMP HAND TOOL 49864 FOR CRIMPING TERMINAL 36908
S.C.R. 45B-15201.
WHEN EYELETS OR TERMINALS ARE APPLIED TO BINDING POSTS THEY MUST BE ARRANGED TO INSURE "NO CONTACT BETWEEN ADJACENT CONNECTIONS."

ORDERING REFERENCE FOR RELAY CONNECTION R

S.C.R NUMBER	ORDER NUMBER	LENGTH L
2A-5800	52835	20"
2A-5801	52836	*2" to 10"
2A-5802	52837	14"
2A-5803	52838	16"
2A-5804	52839	18"
2A-5805	52840	22"
2A-5806	52841	24"
2A-5807	52842	26"

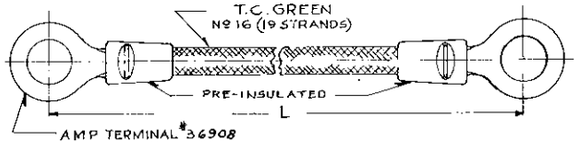
* SPECIFY LENGTH ON ORDER.



RELAY CONNECTION-R

ORDERING REFERENCE FOR RELAY CONNECTION T

S.C.R NUMBER	ORDER NUMBER	LENGTH L
2A-5830	52844	20"
2A-5831	52845	* 4" TO 10"
2A-5832	52846	14"
2A-5833	52847	16"
2A-5834	52848	18"
2A-5835	52849	22"
2A-5836	52850	24"
2A-5837	52851	26"



RELAY CONNECTION-T

REVISIONS

REDRAWN FROM APPROVED DRAWING S-528-G DATED 6-16-1921 LAST REVISED 3-21-1935 & REVISED. EYELETS 5281 & 5282 CHANGED TO AGREE WITH LATEST DESIGN. EYELETS 52817-52818-52819-52820-52821-52822 ADDED. TAGS 52825 & 52826 ADDED. STORES CAT. REF. NOS. ADDED.

J-REVISED 5-17-1950
RELAY CONNECTIONS 52835 TO 52851 INCL. ADDED, LAST 3 NOTES ADDED, NOTE "EYELET 5281, SIZE #14 REMOVED. (19 STRANDS) ADDED TO #16, NOTE EYELET 5282, SIZE #14 (19 STRANDS) ADDED.

APPROVED H. G. Salomon

1 SHEET

S-528-J

THE PENNSYLVANIA RAILROAD

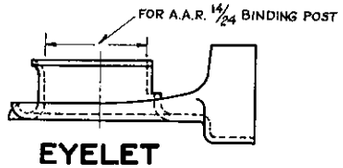
STANDARD

EYELETS, TAGS & CONNECTORS

OFFICE OF CHIEF ENGINEER, PHILA., PA., MAY 7, 1945.

Approved H.C. Griffith
Assistant Chief Engineer-T. C. & S.

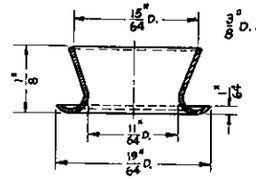
Approved J. Minnett
Chief Engineer



EYELET

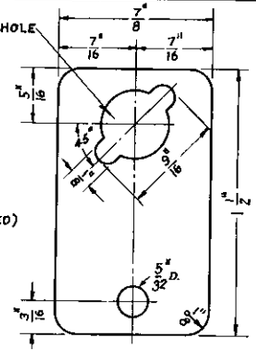
ORDERING REFERENCE

STORES CAT. REF. NO.	ORDER NUMBER	FOR USE ON
2A-1001	5281	#16 (19 STRAND) CONDUCTOR.
2A-1002	5282	#14, #16 SOLID AND #14 (19 STRAND) CONDUCTORS.
2A-5400	52817	#12 (19 STRAND) CONDUCTOR.
2A-3937	52818	#9 (19 STRAND) CONDUCTOR.
2A-5402	52819	#6 (19 STRAND) CONDUCTOR.
2A-5403	52820	#12 SOLID CONDUCTOR.
2A-5404	52821	#9 SOLID CONDUCTOR.
2A-5405	52822	#6 SOLID CONDUCTOR.



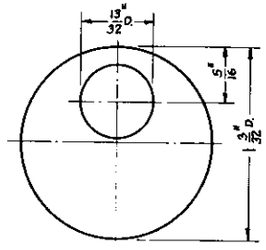
5283 EYELET

NO. 29 (.0113") B. & S. GA. COPPER (TINNED)
STORES CAT. REF. NO. 2A-999
FOR USE ON MACHINE COMBINATION CONDUCTORS.



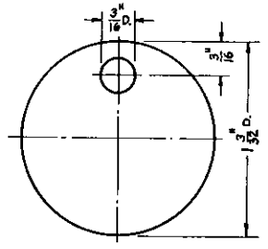
5284 TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. NO. 2A-2780
FOR INSIDE USE - INSTRUMENT HOUSES, CASES AND TOWERS.



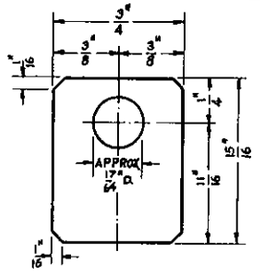
5285 TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. NO. 2A-2782
FOR INSIDE USE-INSTRUMENT HOUSES, CASES AND TOWERS.



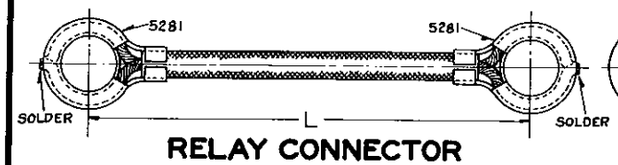
5286 TAG

NO. 16 A.W.G. ALUMINUM
STORES CAT. REF. NO. 2A-2779
FOR OUTSIDE USE WHERE SUBJECT TO WEATHER CONDITIONS.



52826 TAG

VULCANIZED BLACK FIBRE APPROX. 3/64" THICK
STORES CAT. REF. NO. 2A-3566
FOR MARKING TAG ON PN-50 ETC. RELAY CONDUCTORS.

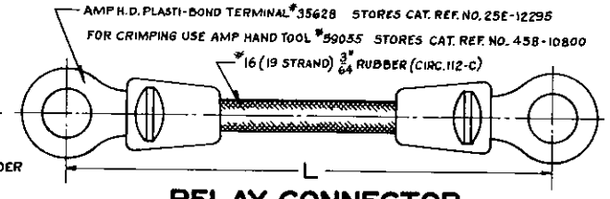


RELAY CONNECTOR

ORDERING REFERENCE

#16 (19 STRAND) 3/64" RUBBER (CIRC. 112-C.)			#16 (19 STRAND) T. C. GREEN		
STORES CAT. REF. NO.	ORDER NUMBER	LENGTH L	STORES CAT. REF. NO.	ORDER NUMBER	LENGTH L
2A-669	5287	20"	2A-5850	52855	20"
2A-4893	5289	* 2" TO 10"	2A-5851	52856	* 2" TO 10"
2A-4740	52827	14"	2A-5852	52857	14"
2A-4741	52828	16"	2A-5853	52858	16"
2A-4742	52829	18"	2A-5854	52859	18"
2A-4743	52830	22"	2A-5855	52860	22"
2A-4744	52831	24"	2A-5856	52861	24"
2A-4745	52832	26"	2A-5857	52862	26"

* SPECIFY LENGTH ON REQUISITION.



RELAY CONNECTOR

ORDERING REFERENCE

STORES CAT. REF. NO.	ORDER NUMBER	LENGTH L
2A-5800	52835	20"
2A-5843	52836	* 4" TO 10"
2A-5802	52837	14"
2A-5803	52838	16"
2A-5804	52839	18"
2A-5805	52840	22"
2A-5806	52841	24"
2A-5807	52842	26"

* SPECIFY LENGTH ON REQUISITION

RELAY CONNECTOR

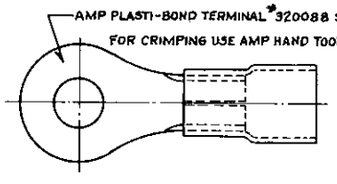
ORDERING REFERENCE

STORES CAT. REF. NO.	ORDER NUMBER	LENGTH L
2A-5830	52844	20"
2A-5849	52845	* 4" TO 10"
2A-5832	52846	14"
2A-5833	52847	16"
2A-5834	52848	18"
2A-5835	52849	22"
2A-5836	52850	24"
2A-5837	52851	26"

* SPECIFY LENGTH ON REQUISITION.

NOTES:-

1. WHEN APPLYING TERMINALS 35628, 36273 AND 320088 CARE SHOULD BE TAKEN IN CUTTING BACK THE INSULATION, SO THAT WHEN THE TERMINAL IS CRIMPED, THE BARE COPPER WIRE WILL NOT EXTEND BEYOND THE BARREL FAR ENOUGH TO FOUL THE WASHER OF THE TERMINAL POST.
2. USE RACO EYELET PLIERS NO. 530-10 OR SIMILAR FOR ATTACHING EYELETS TO CONDUCTORS.
3. WHEN CONNECTORS ARE APPLIED TO BINDING POSTS, THEY SHOULD BE ARRANGED TO INSURE "NO CONTACT BETWEEN ADJACENT CONNECTORS."



52853 TERMINAL

FOR USE ON MACHINE COMBINATION CONDUCTORS.

REVISIONS

REDRAWN FROM APPROVED DRAWING S-528-J, DATED MAY 7, 1945, LAST REVISED MAY 17, 1950 AND REVISED AS FOLLOWS:- TWIN GRIP CONNECTORS 52811 TO 52814 INCL. AND TAG 52815 OBSOLETED. RELAY CONNECTORS 52855 TO 52862 INCL. AND TERMINAL 52853 ADDED. MINOR CHANGES IN NOTES.

1 SHEET

S-528-K

THE PENNSYLVANIA RAILROAD

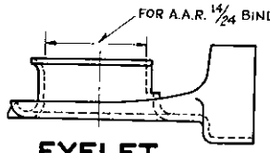
STANDARD

EYELETS, TAGS & CONNECTORS

OFFICE OF CHIEF ENGINEER, PHILA., PA., JULY 31, 1952.

Approved W. G. Salmonson
Assistant Chief Engineer-Signals

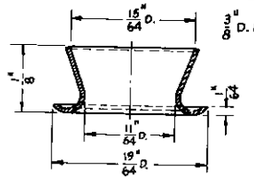
Approved J. Minnich
Chief Engineer



EYELET

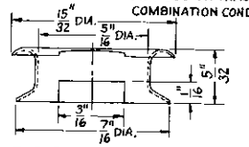
ORDERING REFERENCE

STORES CAT. REF. NO.	ORDER NUMBER	FOR USE ON
2A-1001	5281	*16 (19 STRAND) CONDUCTOR.
2A-1002	5282	*14 (19 STRAND) CONDUCTOR.
2A-5400	52817	*12 (19 STRAND) CONDUCTOR.
2A-3937	52818	*9 (19 STRAND) CONDUCTOR.



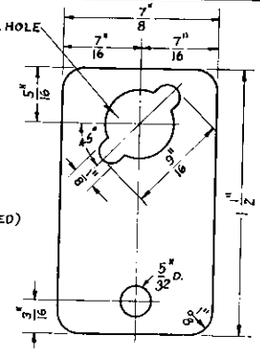
5283 EYELET

NO. 29 (.0113") B. & S. GA. COPPER (TINNED)
STORES CAT. REF. NO. 2A-999
FOR USE ON MACHINE COMBINATION CONDUCTORS.



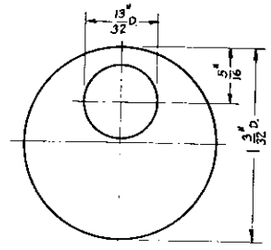
52852 EYELET

.017" COPPER-TINNED
S.C.R. NO. 2A-998
FOR USE ON 14/24 OR 1/4" BINDING POSTS ON MACHINE COMBINATIONS.



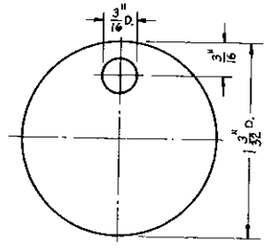
5284 TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. NO. 2A-2780
FOR INSIDE USE - INSTRUMENT HOUSES, CASES AND TOWERS.



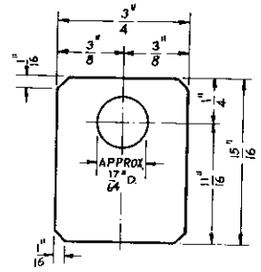
5285 TAG

VULCANIZED BLACK FIBRE 1/16" THICK
STORES CAT. REF. NO. 2A-2782
FOR INSIDE USE - INSTRUMENT HOUSES, CASES AND TOWERS.



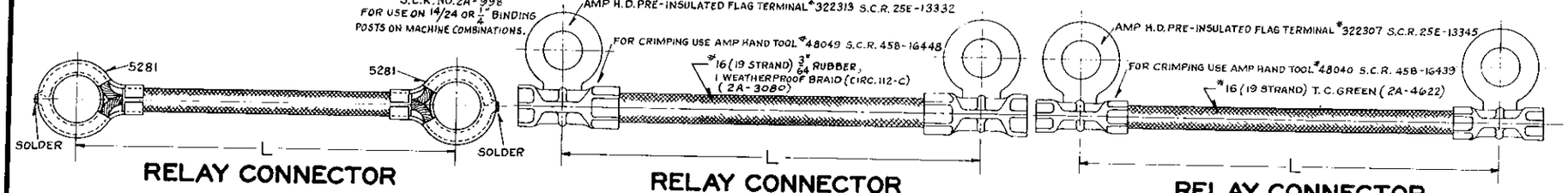
5286 TAG

NO. 16 A.W.G. ALUMINUM
STORES CAT. REF. NO. 2A-2779
FOR OUTSIDE USE WHERE SUBJECT TO WEATHER CONDITIONS.



52826 TAG

VULCANIZED BLACK FIBRE APPROX. 3/64" THICK
STORES CAT. REF. NO. 2A-3566
FOR MARKING TAG ON PN-50 ETC. RELAY CONDUCTORS.



RELAY CONNECTOR

ORDERING REFERENCE

*16 (19 STRAND) 3/64" RUBBER, 1 WEATHERPROOF BRAID (CIRC. 112-C)			*16 (19 STRAND) T.C. GREEN		
STORES CAT. REF. NO.	ORDER NUMBER	LENGTH L	STORES CAT. REF. NO.	ORDER NUMBER	LENGTH L
2A-669	5287	20"	2A-5850	52855	20"
2A-4893	5289	*2" TO 10"	2A-5851	52856	*2" TO 10"
2A-4740	52827	14"	2A-5852	52857	14"
2A-4741	52828	16"	2A-5853	52858	16"
2A-4742	52829	18"	2A-5854	52859	18"
2A-4743	52830	22"	2A-5855	52860	22"
2A-4744	52831	24"	2A-5856	52861	24"
2A-4745	52832	26"	2A-5857	52862	26"

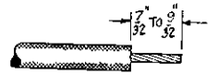
* SPECIFY LENGTH ON REQUISITION.

RELAY CONNECTOR

ORDERING REFERENCE

STORES CAT. REF. NO.	ORDER NUMBER	LENGTH L
2A-6000	52835	20"
2A-6001	52836	*4" TO 10"
2A-6002	52837	14"
2A-6003	52838	16"
2A-6004	52839	18"
2A-6005	52840	22"
2A-6006	52841	24"
2A-6007	52842	26"

* SPECIFY LENGTH ON REQUISITION



SKETCH A
(SEE NOTE 1.)

RELAY CONNECTOR

ORDERING REFERENCE

STORES CAT. REF. NO.	ORDER NUMBER	LENGTH L
2A-6008	52844	20"
2A-6009	52845	*4" TO 10"
2A-6010	52846	14"
2A-6011	52847	16"
2A-6012	52848	18"
2A-6013	52849	22"
2A-6014	52850	24"
2A-6015	52851	26"

* SPECIFY LENGTH ON REQUISITION.

NOTES:-

1. WHEN APPLYING TERMINALS 322307 AND 322313, CARE SHOULD BE TAKEN IN CUTTING BACK THE INSULATION, SO THAT WHEN THE TERMINAL IS CRIMPED, ALL THE COPPER STRANDS WILL BE FULLY ENCLOSED WITHIN THE CRIMPED BARREL AND THAT THE INSULATION OF THE WIRE IS FULLY GRIPPED BY THE CRIMPED INSULATION SUPPORT. (SEE SKETCH A)
2. USE RACO EYELET PLIERS NO. 530-10 OR SIMILAR FOR ATTACHING EYELETS TO 5281, 5282, 52817 AND 52818 TO CONDUCTORS. FOR ATTACHING EYELETS 5283 AND 52852 TO CONDUCTORS USE FLAT NOSED PLIERS WITH PARALLEL JAWS.
3. WHEN CONNECTORS ARE APPLIED TO BINDING POSTS, THEY SHOULD BE ARRANGED TO INSURE "NO CONTACT BETWEEN ADJACENT CONNECTORS."
4. AMP TERMINAL 322313 (25E-13332) TO BE USED ALSO ON THE FOLLOWING CABLES USING TOOL * 48049
   1. *14 (37 STRAND) 5/64" T.C. GREEN (2A-471).
   2. *14 (37 STRAND) 3/64" INS 2/64 NEOPRENE JACKET (2A-3016).

REVISIONS
REDRAWN FROM APPROVED DRAWING S-528-J, DATED MAY 7, 1945, LAST REVISED MAY 17, 1950 AND REVISED AS FOLLOWS:- TWIN GRIP CONNECTORS 52811 TO 52816 INCL. AND TAG 52825 OBSOLETED. RELAY CONNECTORS 52855 TO 52862 INCL. AND TERMINAL 52853 ADDED. MINOR CHANGES IN NOTES.
L NOVEMBER 9, 1953. TERMINAL FOR CONNECTORS 52835 TO 52842 INCL. FORMERLY AMP 35628. CRIMPING TOOL FORMERLY AMP 59055 TERMINAL FOR CONNECTORS 52844 TO 52851 INCL. FORMERLY AMP 36273, CRIMPING TOOL FORMERLY AMP 49864. TERMINAL 52853 OBSOLETED. S.C.R. NUMBERS CHANGED ACCORDINGLY. NOTES 1 & 2 CHANGED, NOTE 4 ADDED. EYELETS 52819, 52820, 52821 & 52822 OBSOLETED. EYELET 52852 ADDED. APPROVED W. G. Salmonson
M AUGUST 14, 1954. L REVISION NOT ISSUED. FLAG TERMS. 322313 & 322307 FORMERLY 36878 & 320232. NOTE 1 CHANGED TO AGREE. APPROVED W. G. Salmonson

1 SHEET

S-528-M

THE PENNSYLVANIA RAILROAD

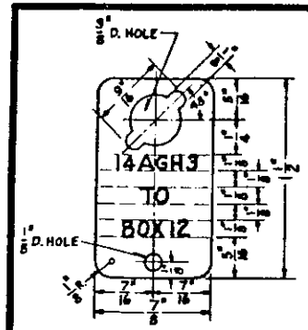
STANDARD

EYELETS, TAGS & CONNECTORS

OFFICE OF CHIEF ENGINEER, PHILA., PA., JULY 31, 1952.

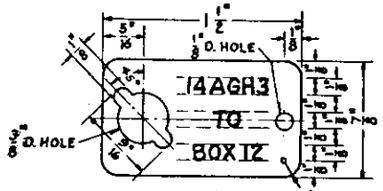
Approved W. G. Salmonson
Assistant Chief Engineer-Signals

Approved J. H. Crossett
Chief Engineer

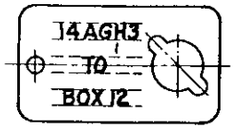


5291 TAG FOR VARIOUS WIRES
S. C. R. NO. 2A-2705

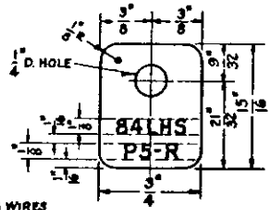
5292 TAG FOR VARIOUS WIRES
S. C. R. NO. 2A-2709



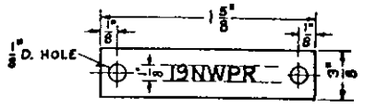
5293 TAG FOR VARIOUS WIRES.
S. C. R. NO. 2A-2712



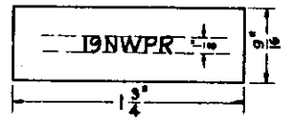
5294 TAG FOR VARIOUS WIRES
S. C. R. NO. 2A-2716



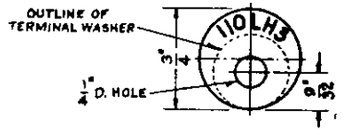
5295 TAG FOR PLUG-IN RELAY TERMINALS.
S. C. R. NO. 2A-2724



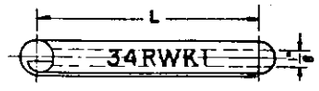
5296 TAG BACK DESIGNATION PLUG-IN RELAYS
S. C. R. NO. 2A-2685



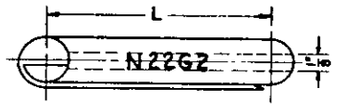
5298 TAG HANDLE DESIGNATION PLUG-IN RELAYS
S. C. R. NO. 2A-2691



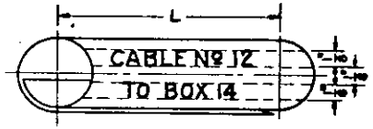
5297 TAG FOR MACHINE TERMINALS.
S. C. R. NO. 2A-2686



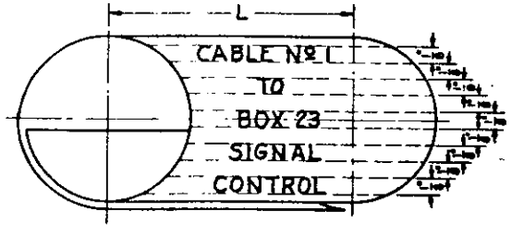
52910 SLEEVE TAG
S. C. R. NO 2A-2678
FOR NO. 20 TO NO. 14 WIRE



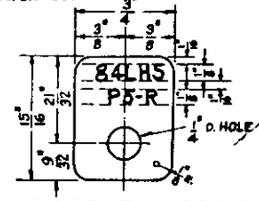
52911 SLEEVE TAG
S. C. R. NO. 2A-2680
FOR NO. 9 TO NO. 6 WIRE



52912 SLEEVE TAG
S. C. R. NO. 2A-2681
FOR CABLES $\frac{1}{2}$" TO 1" O.D.



52913 SLEEVE TAG
S. C. R. NO. 2A-2683
FOR CABLES $1\frac{1}{4}$" TO 2" O.D.



5299 TAG FOR PLUG-IN RELAY TERMINALS
S. C. R. NO. 2A-2699

NOTE

1. WHEN ORDERING PRINTED PLASTIC TAGS, FURNISH A LIST OF DESIGNATIONS FOR EACH STYLE OF TAG NEEDED.
2. TAG DESIGNATIONS INDICATED ON DRAWING ARE FOR PURPOSE OF ILLUSTRATION ONLY.
3. IF A SLEEVE TAG HAS A TENDENCY TO SLIP, APPLY A COATING OF "SLEEVE MARKER LIQUID PLASTIC" (ACTIONCRAFT PRODUCTS OR EQUAL) LIBERALLY ALL OVER THE TAG AND ESPECIALLY AT THE LAP.
4. WHEN ORDERING SLEEVE TAGS 52910 & 52911 SPECIFY SIZE OF WIRE AND APPROX. O. D. OF INSULATION.
5. WHEN ORDERING SLEEVE TAGS 52912 & 52913 SPECIFY OUTSIDE DIAMETER OF CABLE.
6. LENGTH L OF SLEEVE TAGS SHALL BE DETERMINED BY THE LENGTH OF DESIGNATIONS REQUIRED.
7. USE NO. 4 ROUND HEAD SLOTTED SHEET METAL SCREWS $\frac{3}{8}$" LONG, FOR SECURING TAGS 5291, 5292, 5293, 5294 & 5296.

REVISIONS

1 SHEET

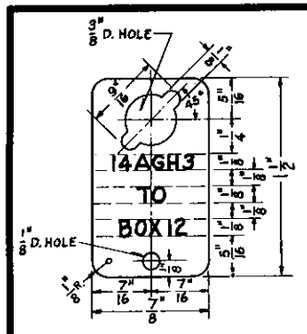
S-529-A

THE PENNSYLVANIA RAILROAD
STANDARD
TAGS
PRINTED PLASTIC

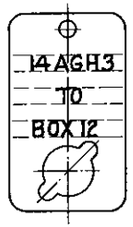
OFFICE OF CHIEF ENGINEER, PHILA., PA., JULY 31, 1952

Approved
N. S. Salinman
Assistant Chief Engineer-Signals

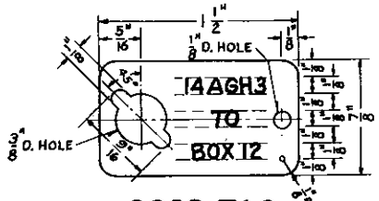
Approved
J. H. Rennie
Chief Engineer



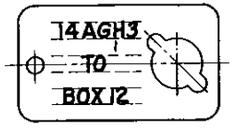
5291 TAG FOR VARIOUS WIRES
S. C. R. NO. 2A-2705



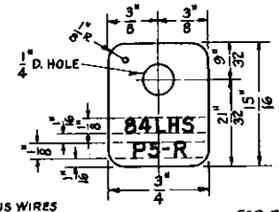
5292 TAG FOR VARIOUS WIRES
S. C. R. NO. 2A-2709



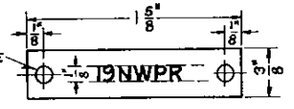
5293 TAG FOR VARIOUS WIRES.
S. C. R. NO. 2A-2712



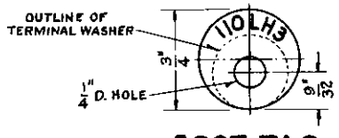
5294 TAG FOR VARIOUS WIRES
S. C. R. NO. 2A-2716



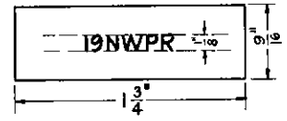
5295 TAG FOR PLUG-IN RELAY TERMINALS.
S. C. R. NO. 2A-2724



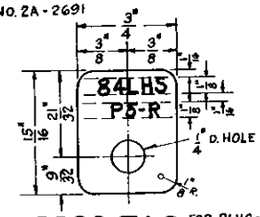
5296 TAG BACK DESIGNATION PLUG-IN RELAYS
S. C. R. NO. 2A-2685



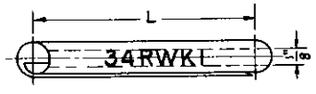
5297 TAG FOR MACHINE TERMINALS.
S. C. R. NO. 2A-2686



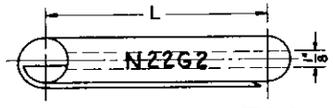
5298 TAG HANDLE DESIGNATION PLUG-IN RELAYS
S. C. R. NO. 2A-2691



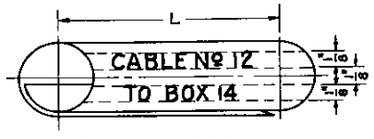
5299 TAG FOR PLUG-IN RELAY TERMINALS.
S. C. R. NO. 2A-2699



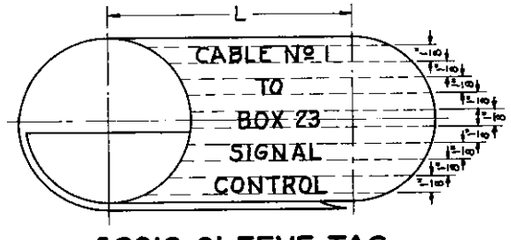
52910 SLEEVE TAG
S. C. R. NO. 2A-2678
FOR NO. 20 TO NO. 14 WIRE



52911 SLEEVE TAG
S. C. R. NO. 2A-2680
FOR NO. 9 TO NO. 6 WIRE



52912 SLEEVE TAG
S. C. R. NO. 2A-2681
FOR CABLES $\frac{1}{2}$" TO 1" O.D.



52913 SLEEVE TAG
S. C. R. NO. 2A-2683
FOR CABLES $1\frac{1}{4}$" TO 2" O.D.

NOTE

1. WHEN ORDERING PRINTED PLASTIC TAGS, FURNISH A LIST OF DESIGNATIONS FOR EACH STYLE OF TAG NEEDED.
2. TAG DESIGNATIONS INDICATED ON DRAWING ARE FOR PURPOSE OF ILLUSTRATION ONLY.
3. IF A SLEEVE TAG HAS A TENDENCY TO SLIP, APPLY A COATING OF "SLEEVE MARKER LIQUID PLASTIC" (ACTIONCRAFT PRODUCTS OR EQUAL) LIBERALLY ALL OVER THE TAG AND ESPECIALLY AT THE LAP.
4. WHEN ORDERING SLEEVE TAGS 52910 & 52911 SPECIFY SIZE OF WIRE AND APPROX. O. D. OF INSULATION.
5. WHEN ORDERING SLEEVE TAGS 52912 & 52913 SPECIFY OUTSIDE DIAMETER OF CABLE.
6. LENGTH L OF SLEEVE TAGS SHALL BE DETERMINED BY THE LENGTH OF DESIGNATIONS REQUIRED.
7. USE NO. 4 ROUND HEAD SLOTTED SHEET METAL SCREWS $\frac{3}{8}$" LONG, FOR SECURING TAGS 5291, 5292, 5293, 5294 & 5296.

REVISIONS

1 SHEET

S-529-A

THE PENNSYLVANIA RAILROAD

STANDARD

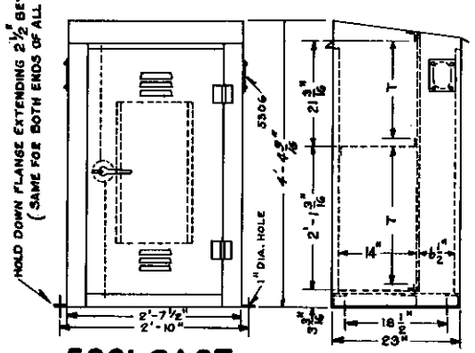
TAGS

PRINTED PLASTIC

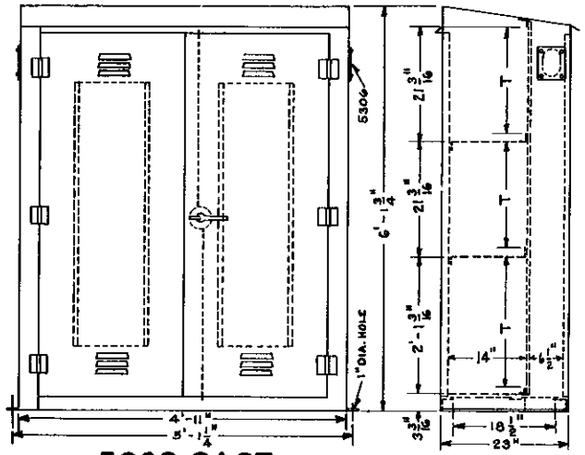
OFFICE OF CHIEF ENGINEER, PHILA., PA., JULY 31, 1952

Approved
W. G. Salmonson
Assistant Chief Engineer-Signals

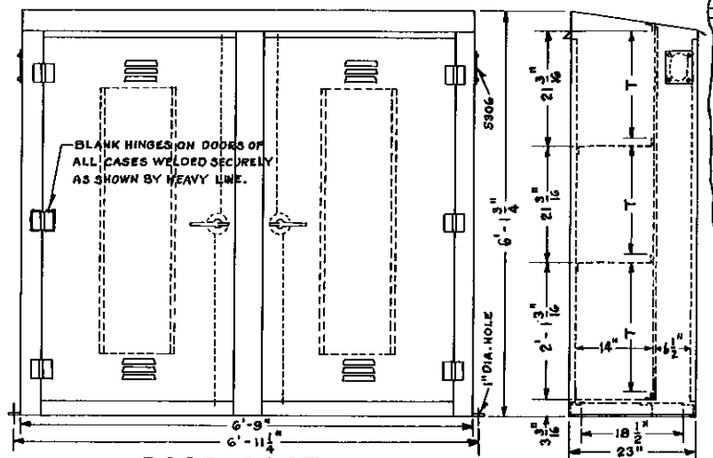
Approved
J. H. Merritt
Chief Engineer



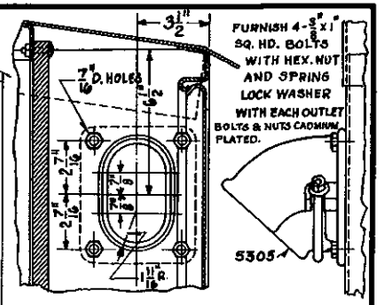
5301 CASE. STORES CAT. REF. NO. 2A-4177.



5302 CASE. STORES CAT. REF. NO. 2A-531.

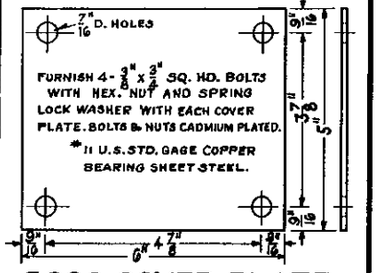


5303 CASE. STORES CAT. REF. NO. 2A-4702.



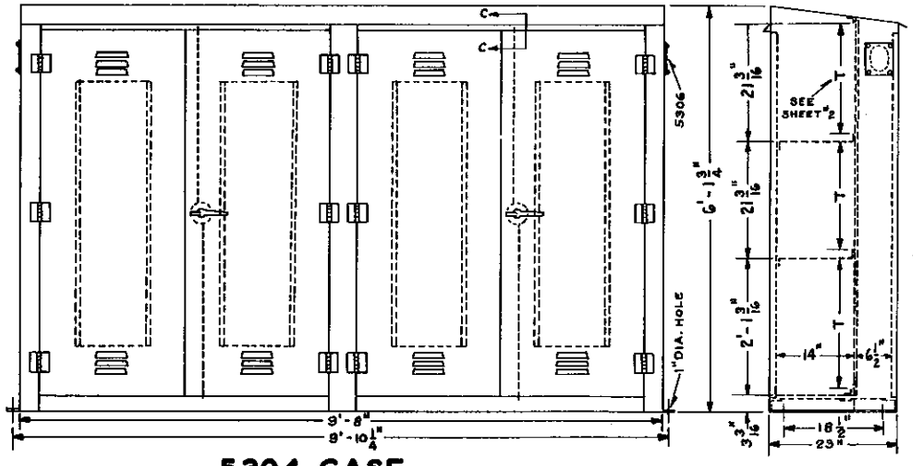
5305 CABLE OUTLET.

STORES CAT. REF. NO. 2A-1388

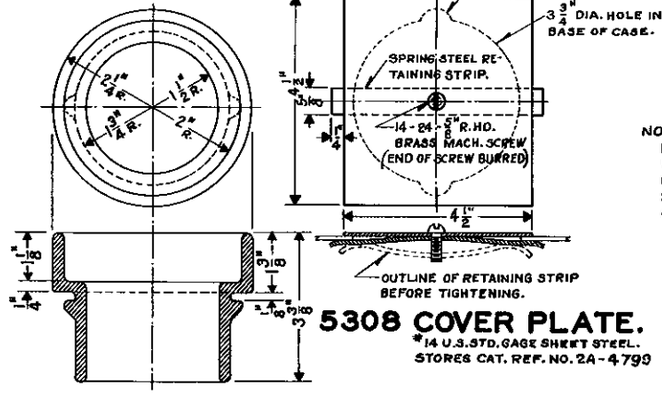


5306 COVER PLATE.

STORES CAT. REF. NO. 2A-4797.



5304 CASE. STORES CAT. REF. NO. 2A-530.



5308 COVER PLATE.

*14 U.S. STD. GAGE SHEET STEEL.

STORES CAT. REF. NO. 2A-4799

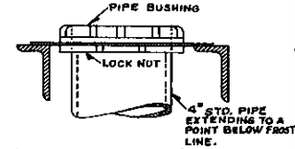
5307 CABLE OUTLET.

CAST IRON.

STORES CAT. REF. NO. 2A-4798.

NOTE 1-

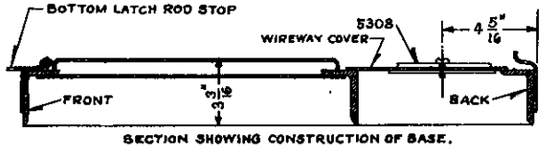
1. INSTRUMENT CASES WILL BE FURNISHED WITH CABLE OPENINGS EQUIPPED WITH COVER PLATES AS SHOWN.
2. CABLE OUTLETS 5305 AND 5307 SHALL BE ORDERED SEPARATELY. (NOT WITH CASE)



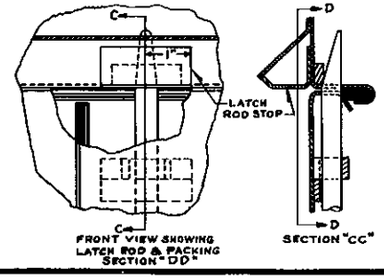
THIS METHOD MAY BE USED WHERE THERE IS NO PROBABILITY OF GROUND SINKING AND PULLING DOWNWARD ON PIPE.

FOR SPECIFICATIONS AND OTHER DETAILS SEE SHEET NO. 2.

REVISIONS
REDRAWN FROM APPROVED PLAN S-530-F, DATED JANUARY 23, 1933 AND REVISED AS FOLLOWS- CASES 5301 AND 5302, STORES CAT. REF'S., CONSTRUCTION DETAILS, AND 5305, 5306, 5307, 5308 ADDED. SPECIFICATIONS SHOWN ON A SECOND SHEET. SLIGHT CHANGES IN SPECIFICATIONS TO AGREE WITH MANUFACTURERS PRACTICES, AND P.R.R. REQUIREMENTS. VARIOUS SKETCHES SHOWING APPLICATION OF OUTLETS, COVER PLATES, ETC. ADDED.

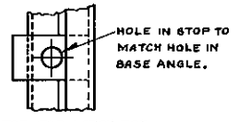


SECTION SHOWING CONSTRUCTION OF BASE.

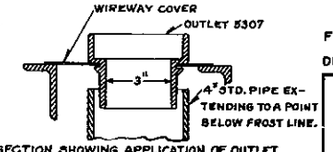


FRONT VIEW SHOWING LATCH ROD & PACKING SECTION "DD"

SECTION "CC"



STOP FOR LATCH ROD AT BASE OF DOOR.



SECTION SHOWING APPLICATION OF OUTLET 5307 WITH 4" STD. PIPE (WITH FLAT PLATE AT BOTTOM OF PIPE IF DESIRED TO PREVENT SINKING) FOR CABLE ENTRANCE. WHERE AN EXTRA LARGE CABLE, OR INSULATED JOINT IN CABLE IS REQUIRED, CHANGES MAY BE MADE TO SUIT LOCAL CONDITIONS IN THE FIELD. BENDS INSTEAD OF STRAIGHT PIPE MAY BE USED. HEAVY WALL TRANSITE MAY BE USED INSTEAD OF GALV. IRON PIPE, PARTICULARLY IN ELECTRIFIED TERRITORY.

B.D.
E.B.

SHEET 1 OF 2

S-530-G

THE PENNSYLVANIA RAILROAD

STANDARD

INSTRUMENT CASES

OFFICE OF CHIEF ENGINEER, PHILA., PA., NOVEMBER 18, 1942.

Approved

N. C. Stanton

Assistant Chief Engineer-Signals

Approved

M. Kiggins

Chief Engineer

SPECIFICATIONS

1. GENERAL:

(a) INSTRUMENT CASES UNDER THESE SPECIFICATIONS SHALL BE MADE IN FOUR SIZES. THE OVERALL LENGTH, WIDTH AND HEIGHT AND THE FOUNDATION BOLT HOLE SPACING SHALL BE AS SHOWN ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER.

(b) INSIDE OF EACH CASE SHALL BE ARRANGED AS SHOWN ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER SO THAT WITH THE ROOF FORMED IN ACCORDANCE WITH SECTION 4 OF THESE SPECIFICATIONS, TERMINAL WALL SHALL HAVE A CLEAR SPACE "T", FREE OF METAL BETWEEN SHELVES, AND EXTENDING THE ENTIRE LENGTH OF THE CASE.

(c) A CLEAR SPACE APPROXIMATELY 6½ INCHES WIDE EXTENDING THE FULL LENGTH OF CASE SHALL BE PROVIDED BETWEEN THE TERMINAL WALL AND REAR PANELS.

(d) EACH CASE SHALL BE PROVIDED WITH SHELVES AS SHOWN ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER, THE FULL INSIDE LENGTH OF CASE AND EXTENDING BACK TO THE TERMINAL WALL.

(e) ALL SHEET METAL PARTS SHALL BE MADE OF COPPER BEARING STEEL, PATENT LEVELED AND RESQUARED. ROOF AND WEATHER EXPOSED WALLS SHALL BE MADE OF #14 U.S.GAGE. SHELVES, TERMINAL WALL SUPPORTS ETC. SHALL BE MADE OF #16 U.S.GAGE. MATERIAL FOR BASE FRAME SHALL BE AS SPECIFIED UNDER SECTION 2.

(f) THE DESIGN AND CONSTRUCTION OF CASE WHICH MANUFACTURER PROPOSES TO FURNISH SHALL MEET THE APPROVAL OF THE ASSISTANT CHIEF ENGINEER-SIGNALS.

2. BASE FRAME:

(a) BASE FRAME SHALL BE CONSTRUCTED OF O.H. STEEL ANGLES WITH CROSS TIES IF NECESSARY TO PROVIDE A FRAME OF PROPER RIGIDITY.

(b) THE ENTIRE BASE FRAME SHALL BE FIRMLY WELDED TOGETHER.

(c) EACH BASE SHALL BE PROVIDED WITH CABLE ENTRANCE OPENINGS COVERED WITH PLATE 5308, THE NUMBER OF OPENINGS FOR EACH CASE SHALL BE AS SHOWN ON PLAN S-530 SHEET NO. 2 BASIC NUMBER.

3. UPRIGHTS:

(a) THE END UPRIGHTS SHALL BE OF ONE PIECE, IN CHANNEL SECTION, OF A SIZE SUFFICIENT TO FORM END OF CASE AND SIDE OF FRAME FOR DOORS AND BACK PANELS. THEY SHALL BE MOUNTED AGAINST OUTSIDE OF BASE FRAME AND SUBSTANTIALLY WELDED TO IT.

(b) IN CENTER OF FRONT AND REAR OF CASES 5303 AND 5304 SHALL BE FORMED CHANNEL-SECTION UPRIGHTS. THE FRONT CHANNEL SHALL FORM A PART OF DOOR FRAME, THE REAR CHANNEL SHALL FORM A PART OF BACK FRAME TO HELP SUPPORT BACK PANELS AND TO SERVE AS A STIFFENER. BOTH CHANNELS SHALL BE SECURELY WELDED TO TOP RAIL AND BASE FRAME.

(c) THE END UPRIGHTS SHALL BE PROVIDED WITH CABLE OPENING AND PLATE 5306 BOLTED TO END WALL WITH NUTS AND LOCK WASHERS INSIDE OF CASE.

4. ROOF:

(a) ROOF, WATERSHED OVER DOORS, AND REAR PANELS SHALL BE FORMED FROM ONE PIECE OF SHEET METAL WITH A ROOF SLOPE DOWNWARD TO THE REAR, OF 1½ INCHES TO THE FOOT.

(b) ENDS AND FRONT SHALL BE STRUCK DOWN VERTICALLY AND SECURELY WELDED TO VERTICAL WALL WITH FILLET WELDS 1½ INCHES LONG, ON 10¾ INCH CENTERS.

(c) BACK OF ROOF SHALL BE STRUCK DOWN AT AN ANGLE, AS INDICATED ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER TO A POINT 1¼ INCHES FROM CASE TO PRODUCE A SUBSTANTIAL WATERSHED.

(d) FRONT OF ROOF SHALL BE FORMED DIRECTLY OVER DOORS WITH A SLOPE OF 45 DEGREES AS SHOWN AND EXTEND TO A POINT NOT LESS THAN 1 INCH FROM CASE, TO PRODUCE A SUBSTANTIAL WATERSHED.

(e) CORNERS OF ROOF SHALL BE WELDED TO PRODUCE A WATERPROOF SEAM.

5. DOOR AND PANEL FRAMES:

(a) SUITABLY FORMED HORIZONTAL ANGULAR SHAPES, FORMING DOOR AND PANEL FRAME, SHALL BE SECURELY WELDED TO BASE FRAME, ROOF AND UPRIGHTS, FRONT AND BACK.

(b) ALL PERMANENT JOINTS AT THE JUNCTION OF SHAPES, FORMING DOOR AND PANEL FRAMES SHALL BE SEAM-WELDED TO PRODUCE A ONE-PIECE WATERPROOF FRAME.

6. DOORS.

(a) EACH DOOR SHALL BE FORMED INTO A CHANNEL SECTION FROM ONE PIECE, WITH CORNERS SEAM-WELDED, AND SHALL BE REINFORCED WITH A CHANNEL BRACE 12 INCHES WIDE, BETWEEN THE LOUVRES, WELDED TO INSIDE OF DOOR.

(b) EACH DOOR SHALL BE PROVIDED WITH 2 THREE-LOUVRE VENTILATORS AND SLIDING REMOVABLE BRASS SCREENS (0.0135 INCH WIRE, 24 WIRES PER INCH) AS INDICATED ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER. LOUVRES SHALL BE PUNCHED 1 INCH HIGH AND 6 INCHES WIDE ON APPROXIMATELY 1⅜ INCH CENTERS.

(c) EACH DOOR SHALL BE SUPPORTED BY SUITABLE HEAVY BLANK HINGES, SECURELY WELDED TO DOOR AND FRAME AS SHOWN ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER.

(d) EACH PAIR OF DOORS, OR SINGLE DOOR SHALL BE EQUIPPED WITH A SUBSTANTIAL THREE POINT LOCKING DEVICE, LOCKING AT TOP, BOTTOM AND CENTER OF DOOR. A STOP TO PREVENT LOCKING DEVICE BEING LOCKED BEFORE DOOR IS FULLY CLOSED SHALL BE WELDED TO FRAME DIRECTLY OVER TOP OF DOOR AND ON BASE UNDER BOTTOM OF DOOR.

(e) EACH DOOR SHALL BE EQUIPPED WITH A DEVICE FOR SECURING IT IN THE OPEN POSITION.

(f) HANDLE, OPERATING LOCKING DEVICE, SHALL BE SO MADE AND ASSOCIATED WITH AN ANGLE PLATE OR EQUIVALENT, WELDED TO THE DOOR, THAT A PADLOCK HAVING A ⅜ INCH BAIL MAY BE APPLIED.

(h) EACH DOOR SHALL BE SO CONSTRUCTED THAT WHEN IT IS CLOSED AGAINST A SUITABLE FABRICATED PACKING SECURELY MOUNTED TO DOOR FRAME, IT SHALL BE PRACTICALLY WATERPROOF.

7. PANELS:

(a) BACK OF CASE EXCEPT FRAME SHALL BE REMOVABLE AND SHALL CONSIST OF SUITABLE VERTICAL PANELS, EACH FORMED IN CHANNEL SECTION FROM ONE PIECE WITH CORNERS WELDED. EACH CASE SHALL HAVE THE SAME NUMBER OF PANELS AS DOORS.

(b) EACH REAR DOOR PANEL SHALL BE HELD IN ITS VERTICAL POSITION BY ONE SUPPORT WELDED TO THE CENTER OF THE LOWER INSIDE OF THE DOOR SO THE END OF SUPPORT WILL REST ON THE DOOR PACKING GROOVE. THE DOOR PANEL IS TO BE SECURED TO THE CASE WITH ⅜ INCH CAP SCREWS, LOCATED ONE ON EACH SIDE, APPROXIMATELY 10 INCHES FROM THE BOTTOM OF THE DOOR. THE TWO CAP SCREWS ARRANGED SO THAT THEY CANNOT BE REMOVED FROM DOOR.

8. SHELVES:

(a) SHELVES 14 INCHES WIDE (TOLERANCE ¼ INCH) SHALL BE FORMED WITH 1½ INCH FLANGE BENT DOWN IN FRONT AND BENT UP IN BACK AND WELDED IN PLACE. THE ENDS OF SHELVES SHALL BE WELDED TO END WALLS.

(b) BACK FLANGE SHALL BE PROVIDED WITH SUITABLE HOLES FOR ¼ INCH STOVE BOLTS PROPERLY SPACED FOR SUPPORTING THE TERMINAL WALL, AS SHOWN IN SKETCH "A" PLAN S-530 SHEET NO. 2. BASIC NUMBER.

(c) ALL SHELVES, EXCEPT BOTTOM OF CASE, SHALL BE PROVIDED WITH VENTILATION OPENINGS AS SHOWN ON PLAN S-530 SHEET NO. 2.

9. TERMINAL WALL:

(a) TERMINAL WALL SHALL CONSIST OF ½ INCH THICK HARD ASBESTOS BOARD OR EQUIVALENT (IF APPROVED BY THE ASSISTANT CHIEF ENGINEER-SIGNALS) THE FULL LENGTH AND HEIGHT OF CASE AS INDICATED ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER. THE SECTIONS OF ASBESTOS BOARD SHALL RUN HORIZONTALLY, JOINING THE SECTIONS AT BACK OF EACH SHELF, AND SHALL BE SECURELY BOLTED TO BACK OF SHELVES, ALSO TOP AND BOTTOM HORIZONTAL SHAPES, WITH ¼ INCH ROUND HEAD STOVE BOLTS IN ACCORDANCE WITH SKETCH "A" PLAN S-530 SHEET NO. 2, EXCEPT CASES 5303 & 5304 ARE PROVIDED WITH A VERTICAL UPRIGHT 3½ INCHES WIDE MOUNTED DIRECTLY AGAINST BACK OF SHELVES MIDWAY BETWEEN END WALLS. THE ASBESTOS BOARDS FOR THESE TWO CASES BUTT AGAINST THIS UPRIGHT.

10. FINISH:

(a) THE ENTIRE CASE SHALL BE THOROUGHLY CLEANED BEFORE PAINTING.

(b) ALL METAL PARTS, INSIDE AND OUTSIDE, SHALL BE GIVEN ONE COAT OF RED LEAD OR EQUAL, THEN TWO COATS OF A HIGH GRADE ALUMINUM PAINT INSIDE, AND TWO COATS OF A HIGH GRADE BLACK PAINT OUTSIDE. (UNLESS OTHERWISE APPROVED BY THE ASSISTANT CHIEF ENGINEER-SIGNALS)

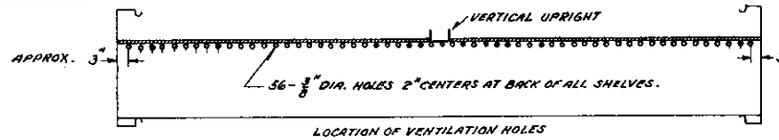
(c) A FINAL COAT OF CLEAR VARNISH SHALL BE GIVEN TO THE INSIDE OF CASE OVER THE LAST COAT OF ALUMINUM PAINT.

(d) TERMINAL WALL SHALL NOT BE PAINTED.

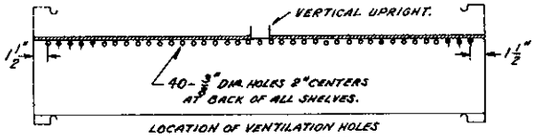
11. SHIPMENT:

(a) ALL CASES SHALL BE SHIPPED INTACT MOUNTED ON TWO 2 INCH x 4 INCH WOOD SKIDS.

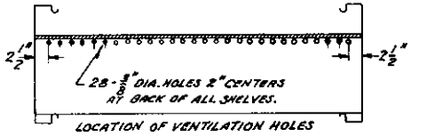
(b) TWO 1½ INCH x 2 INCH WOOD SKIDS SHALL EXTEND THE FULL LENGTH OF CASE AT TOP, ONE IN BACK AND ONE IN FRONT, AND SHALL BE SECURELY WIRED IN PLACE AS A PROTECTION TO THE TOP OF CASE.



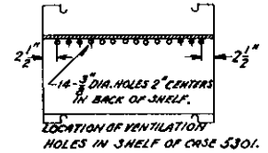
LOCATION OF VENTILATION HOLES IN SHELVES OF CASE 5304.



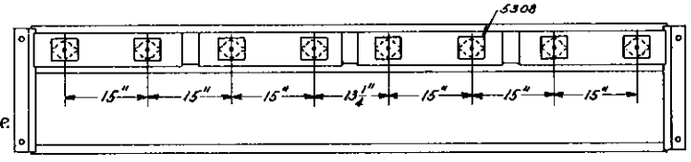
LOCATION OF VENTILATION HOLES IN SHELVES OF CASE 5303.



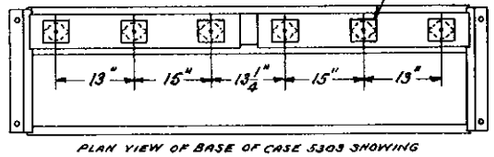
LOCATION OF VENTILATION HOLES IN SHELVES OF CASE 5302.



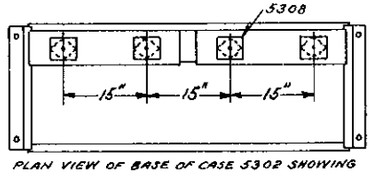
LOCATION OF VENTILATION HOLES IN SHELF OF CASE 5301.



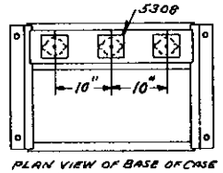
PLAN VIEW OF BASE OF CASE 5304 SHOWING LOCATION OF HOLES FOR CABLE ENTRANCE.



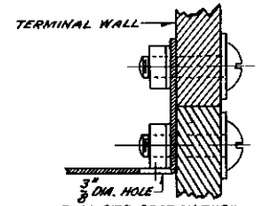
PLAN VIEW OF BASE OF CASE 5303 SHOWING LOCATION OF HOLES FOR CABLE ENTRANCE.



PLAN VIEW OF BASE OF CASE 5302 SHOWING LOCATION OF HOLES FOR CABLE ENTRANCE.



PLAN VIEW OF BASE OF CASE 5301 SHOWING LOCATION OF HOLES FOR CABLE ENTRANCE.



FULL SIZE SECTION THRU ALL SHELVES AT HOLES.
SKETCH "A"

FOR ORDERING REFERENCES AND OTHER DETAILS SEE SHEET NO. 1.

S-530-G

THE PENNSYLVANIA RAILROAD

STANDARD

INSTRUMENT CASES

SPECIFICATIONS AND DETAILS

OFFICE OF CHIEF ENGINEER, PHILA., PA., NOVEMBER 18, 1942.

Approved

N. L. Stanton
Assistant Chief Engineer-Signals

Approved

M. D. Kiggins
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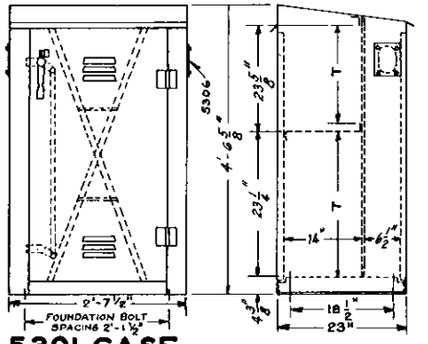
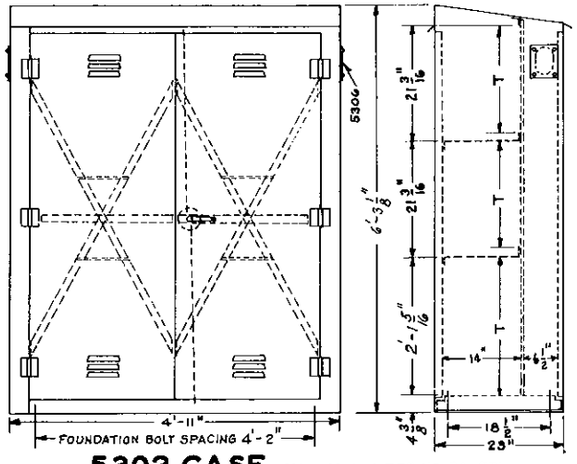
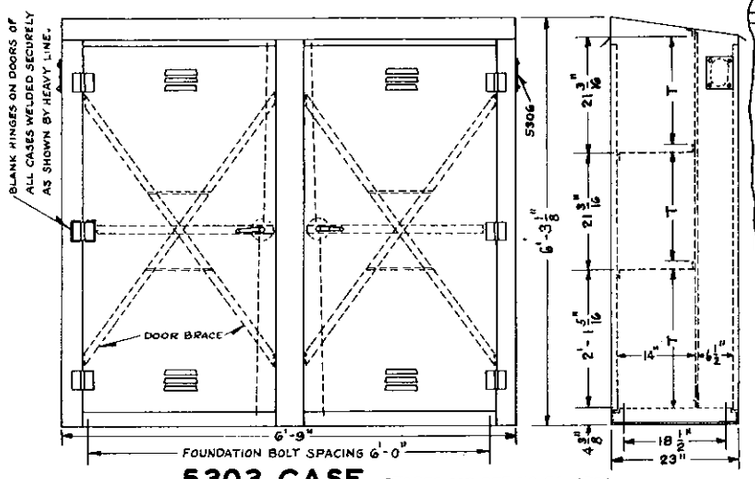


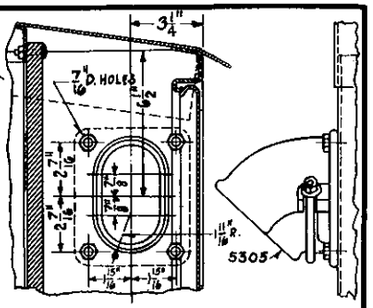
5301 CASE. STORES CAT. REF. NO. 2A-4177.



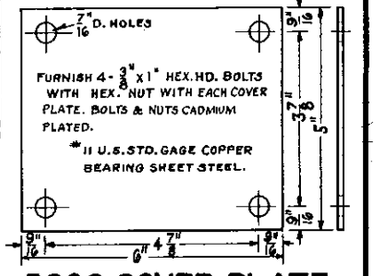
5302 CASE. STORES CAT. REF. NO. 2A-531.



5303 CASE. STORES CAT. REF. NO. 2A-4702.



5305 CABLE OUTLET.
STORES CAT. REF. NO. 2A-1389



5306 COVER PLATE.
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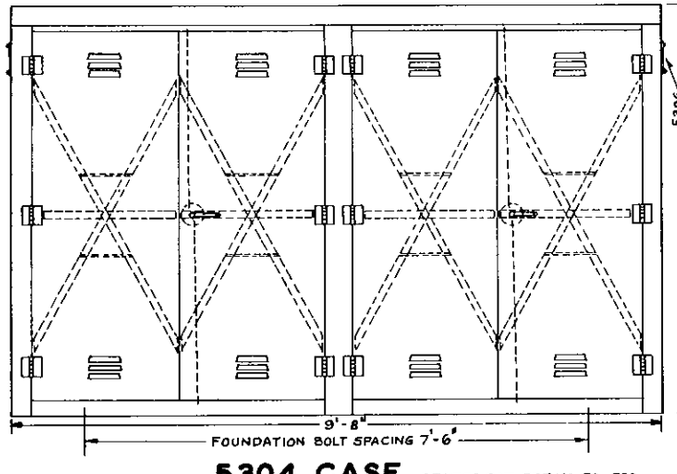
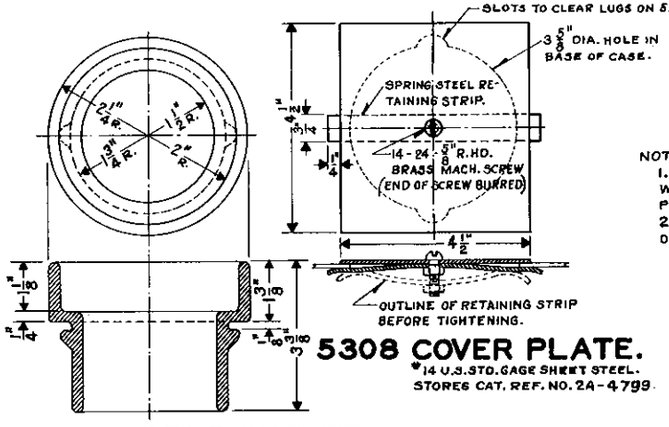


5304 CASE. STORES CAT. REF. NO. 2A-530.



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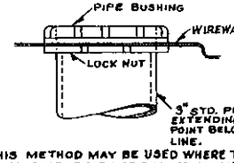

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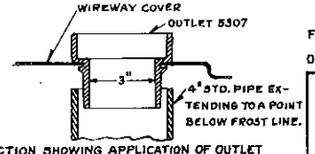

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H MARCH 4, 1946.
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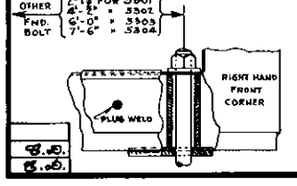
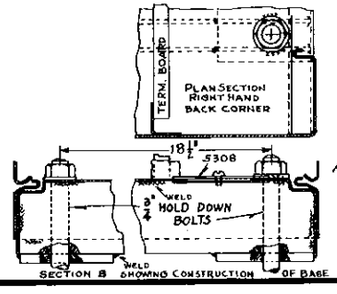
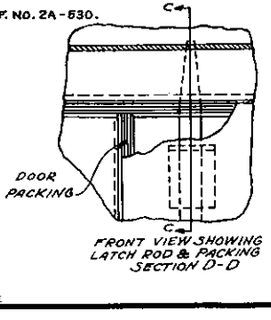
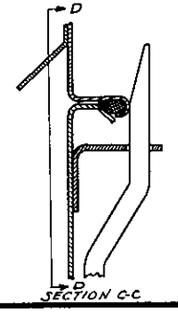
CONSTRUCTION OF BASE CHANGED. BRACING OF DOORS CHANGED.
APPROVED W. C. Griffith









SHEET 1 OF 2

S-530-H

THE PENNSYLVANIA RAILROAD
STANDARD
INSTRUMENT CASES
OFFICE OF CHIEF ENGINEER, PHILA., PA., NOVEMBER 18, 1942.

Approved
N. L. Stanton
Assistant Chief Engineer-Signals

Approved
M. Leggett
Chief Engineer

SPECIFICATIONS

1. GENERAL:

(a) INSTRUMENT CASES UNDER THESE SPECIFICATIONS SHALL BE MADE IN FOUR SIZES. THE OVERALL LENGTH, WIDTH AND HEIGHT AND THE FOUNDATION BOLT HOLE SPACING SHALL BE AS SHOWN ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER.

(b) INSIDE OF EACH CASE SHALL BE ARRANGED AS SHOWN ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER SO THAT WITH THE ROOF FORMED IN ACCORDANCE WITH SECTION 4 OF THESE SPECIFICATIONS, TERMINAL WALL SHALL HAVE A CLEAR SPACE "T", FREE OF METAL BETWEEN SHELVES, AND EXTENDING THE ENTIRE LENGTH OF THE CASE.

(c) A CLEAR SPACE APPROXIMATELY 6½ INCHES WIDE EXTENDING THE FULL LENGTH OF CASE SHALL BE PROVIDED BETWEEN THE TERMINAL WALL AND REAR PANELS.

(d) EACH CASE SHALL BE PROVIDED WITH SHELVES AS SHOWN ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER, THE FULL INSIDE LENGTH OF CASE AND EXTENDING BACK TO THE TERMINAL WALL.

(e) ALL SHEET METAL PARTS SHALL BE MADE OF COPPER BEARING STEEL, PATENT LEVELED. ROOF AND WEATHER EXPOSED WALLS SHALL BE MADE OF #14 U.S. STD. GAGE. SHELVES, TERMINAL WALL SUPPORTS ETC. SHALL BE MADE OF #16 U.S. STD. GAGE. MATERIAL FOR BASE SHALL BE AS SPECIFIED UNDER SECTION 2 OF THIS SPECIFICATION.

(f) THE DESIGN AND CONSTRUCTION OF CASE WHICH MANUFACTURER PROPOSES TO FURNISH SHALL MEET THE APPROVAL OF THE ASSISTANT CHIEF ENGINEER – T. C. & S.

2. BASE:

(a) THE BASE SHALL BE FORMED TO SPECIAL CHANNEL CROSS SECTION BY BENDING AS INDICATED BY SECTION "B" SHOWN ON SHEET 1 OF THIS PLAN.

(b) THE REQUIRED END PLATES AND CROSS RIBS ARE TO BE ASSEMBLED WITH THE LONGEST RECTANGULAR SECTION IN A VERTICAL POSITION WITH RESPECT TO THE FOUNDATION AND SUITABLY WELDED IN PLACE TO PROVIDE THE NECESSARY STRENGTH AND RIGIDITY.

(c) EACH BASE SHALL BE PROVIDED WITH CABLE ENTRANCE OPENINGS COVERED WITH PLATE 5308, THE NUMBER OF OPENINGS FOR EACH CASE SHALL BE AS SHOWN ON PLAN S-530 SHEET NO. 2 BASIC NUMBER.

3. UPRIGHTS AND WALLS.

(a) THE END WALLS SHALL EACH BE OF ONE PIECE, OF CHANNEL-SECTION, OF A SIZE SUFFICIENT TO FORM END OF CASE AND SIDE OF FRAME FOR DOORS AND BACK PANELS. THEY SHALL BE MOUNTED AGAINST OUTSIDE OF BASE SUBSTANTIALLY ATTACHED BY WELDING.

(b) UPRIGHT SUPPORTS OF FORMED CHANNEL-SECTION ARE TO BE ASSEMBLED IN FRONT AND REAR OF CASES 5303 AND 5304 AT CENTER TO FORM A PART OF DOOR AND PANEL FRAMES, AND TO PROVIDE THE NECESSARY RIGIDITY OF CASE. UPRIGHT SUPPORTS SHALL BE SECURELY WELDED TO ROOF AND BASE.

(c) EACH END WALL SHALL BE PROVIDED WITH A CABLE OPENING APPROX. 13 SQ. INCHES AREA. A COVER PLATE 5306 SHALL BE ASSEMBLED WITH SUITABLE SEALING COMPOUND BETWEEN THE PLATE AND WALL, AND HELD IN PLACE BY FOUR ⅜" X 1" HEX. HEAD CAD. PLATED TAP BOLTS ASSEMBLED WITH THE NUT INSIDE THE CASE.

4. ROOF:

(a) ROOF, WATERSHED OVER DOORS, AND REAR PANELS SHALL BE FORMED FROM ONE PIECE OF SHEET METAL WITH A ROOF SLOPE DOWNWARD TO THE REAR, OF 1½ INCHES TO THE FOOT.

(b) ENDS AND FRONT SHALL BE STRUCK DOWN VERTICALLY AND SECURELY WELDED TO WALL WITH FILLET WELDS 1½" LONG, ON 10¾" CENTERS.

(c) BACK OF ROOF SHALL BE STRUCK DOWN AT AN ANGLE, AS INDICATED ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER TO A POINT 1¼ INCHES FROM CASE TO PRODUCE A SUBSTANTIAL WATERSHED.

(d) FRONT OF ROOF SHALL BE FORMED DIRECTLY OVER DOORS WITH A SLOPE OF 45 DEGREES AS SHOWN AND EXTEND TO A POINT NOT LESS THAN 1 INCH FROM CASE, TO PRODUCE A SUBSTANTIAL WATERSHED.

(e) CORNERS OF ROOF SHALL BE WELDED TO PRODUCE A WATERPROOF SEAM.

5. DOOR AND PANEL FRAMES:

(a) SUITABLY FORMED HORIZONTAL ANGULAR SHAPES, FORMING DOOR AND PANEL FRAME, SHALL BE SECURELY WELDED TO BASE, ROOF AND UPRIGHTS, FRONT AND BACK.

(b) ALL JOINTS AT THE JUNCTION OF SHAPES, FORMING DOOR AND PANEL FRAMES SHALL BE SEAM-WELDED TO PRODUCE A ONE-PIECE WATERPROOF JOINT.

6. DOORS:

(a) EACH DOOR SHALL BE FORMED TO A CHANNEL SECTION FROM ONE PIECE WITH CORNERS WELDED. SATISFACTORY RIGIDITY OF THE DOOR SHALL BE PROVIDED WITH A SUITABLE DESIGN OF X-BRACE WELDED TO THE CHANNEL-FORMED SECTION.

(b) EACH DOOR SHALL BE PROVIDED WITH 2 THREE-LOUVRE VENTILATORS AND SLIDING REMOVABLE BRASS SCREENS (0.0135 INCH WIRE, 24 WIRES PER INCH) AS INDICATED ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER. LOUVRES SHALL BE PUNCHED 1 INCH HIGH AND 6 INCHES WIDE ON APPROXIMATELY 1⅜ INCH CENTERS.

(c) EACH DOOR SHALL BE SUPPORTED BY SUITABLE HEAVY BLANK HINGES, SECURELY WELDED TO DOOR AND FRAME AS SHOWN ON DRAWING S-530 SHEET NO. 1 BASIC NUMBER.

(d) EACH PAIR OF DOORS FOR CASES 5302 AND 5304 AND EACH DOOR FOR CASE 5303 SHALL BE PROVIDED WITH A SUBSTANTIAL THREE POINT LOCKING DEVICE, LOCKING AT TOP, BOTTOM AND CENTER OF DOOR. DOOR FOR CASE 5301 SHALL BE PROVIDED WITH A SUBSTANTIAL TWO POINT LOCKING DEVICE.

(e) EACH DOOR SHALL BE EQUIPPED WITH A DEVICE FOR SECURING IT IN THE OPEN POSITION. DEVICE SHALL BE APPROVED BY THE ASST. CHF. ENGR. T.C.&S.

(f) HANDLE, OPERATING LOCKING DEVICE, SHALL BE SO MADE AND ASSOCIATED WITH AN ANGLE PLATE OR EQUIVALENT, WELDED TO THE DOOR, THAT A PADLOCK HAVING A ⅜ INCH BAIL MAY BE APPLIED.

(h) EACH DOOR SHALL BE SO CONSTRUCTED THAT WHEN IT IS CLOSED AGAINST A SUITABLE FABRICATED PACKING SECURELY MOUNTED TO DOOR FRAME, IT SHALL BE PRACTICALLY WATERPROOF.

7. PANELS:

(a) BACK OF CASE SHALL BE PROVIDED WITH REMOVABLE PANELS, EACH FORMED TO CHANNEL-SECTION FROM ONE PIECE WITH CORNERS WELDED. EACH CASE SHALL HAVE THE SAME NUMBER OF PANELS AS DOORS.

(b) EACH REAR PANEL SHALL BE POSITIONED VERTICALLY BY ONE SUPPORT WELDED TO THE LOWER INSIDE OF THE PANEL AT THE CENTER TO LOCATE THE PANEL VERTICALLY FOR ALIGNMENT OF ATTACHMENT SCREWS. EACH PANEL SHALL BE SECURED TO THE CASE WITH FOUR ⅜" CAP SCREWS, ONE LOCATED ON EACH SIDE APPROX. 10" FROM THE TOP, AND ONE ON EACH SIDE APPROX. 10" FROM THE BOTTOM OF THE PANEL. CAP SCREWS ARE TO HAVE NUTS ASSEMBLED INSIDE THE PANEL, SECURED AGAINST LOOSENING SO THE CAP SCREWS WILL BE RETAINED AS A PART OF THE PANEL ASSEMBLY.

8. SHELVES:

(a) SHELVES 14" WIDE ± ¼" SHALL BE FORMED TO HAVE 1½" TURN-DOWN IN FRONT AND 1½" TURN-UP IN BACK, AND ARE TO BE SECURELY WELDED TO END WALLS AND UPRIGHTS.

(b) BACK TURN-UP SHALL BE PROVIDED WITH SUITABLE HOLES FOR ¼" STOVE BOLTS PROPERLY SPACED FOR SUPPORTING THE TERMINAL WALL, AS SHOWN IN SKETCH "A" ON THIS PLAN.

(c) ALL SHELVES, EXCEPT BOTTOM OF CASE, SHALL BE PROVIDED WITH VENTILATION OPENINGS AS SHOWN ON THIS PLAN.

9. TERMINAL WALL:

(a) TERMINAL WALL SHALL CONSIST OF ½" THICK TRANSITE ASBESTOS BOARD OR EQUIVALENT (IF APPROVED BY ASST. CHIEF ENGR. – T.C.&S.) THE FULL LENGTH AND HEIGHT OF CASE AS INDICATED ON SHEET NO. 1 OF THIS PLAN. THE SECTIONS OF ASBESTOS BOARD SHALL RUN HORIZONTALLY, JOINING THE SECTIONS AT BACK OF EACH SHELF, AND SHALL BE SECURELY BOLTED TO BACK OF SHELVES, ALSO TOP AND BOTTOM HORIZONTAL SHAPES, WITH ¼" ROUND HEAD STOVE BOLTS IN ACCORDANCE WITH SKETCH "A" SHOWN ON THIS PLAN, EXCEPT, CASES 5303 & 5304 ARE PROVIDED WITH A VERTICAL UPRIGHT 3½" WIDE MOUNTED DIRECTLY AGAINST BACK OF SHELVES MIDWAY BETWEEN END WALLS. THE ASBESTOS BOARDS FOR THESE TWO CASES BUTT AGAINST THIS UPRIGHT.

10. PAINTING:

(a) THE ENTIRE CASE SHALL BE THOROUGHLY CLEANED BEFORE PAINTING.

(b) ALL METAL PARTS SHALL BE PRIMED WITH ONE COAT OF RED LEAD OR EQUAL BEFORE ASSEMBLING. AFTER ASSEMBLY, ALL WELDED AND BURNED AREAS SHALL BE THOROUGHLY CLEANED OF SCALE, AND GIVEN ONE COAT OF RUST-INHIBITOR SUCH AS "PARCOLITE B" AND THE WELDED AND BURNED AREAS REPRIMED; THEN APPLY TWO COATS OF A HIGH-GRADE ALUMINUN PAINT INSIDE AND TWO COATS OF A HIGH-GRADE BLACK PAINT OUTSIDE (UNLESS OTHERWISE APPROVED BY THE ASST. CHIEF ENGR. T.C.&S.

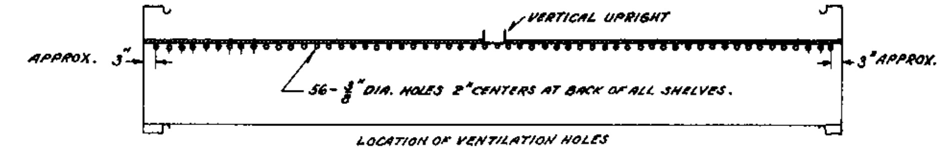
(c) A FINAL COAT OF CLEAR VARNISH SHALL BE GIVEN TO THE INSIDE OF CASE OVER THE LAST COAT OF ALUMINUM PAINT.

(d) TERMINAL WALL SHALL NOT BE PAINTED.

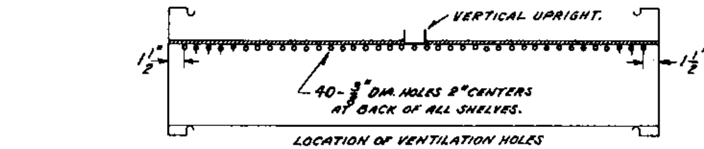
11. SHIPMENT:

(a) ALL CASES SHALL BE SHIPPED MOUNTED ON TWO 2" x 4" WOOD SKIDS.

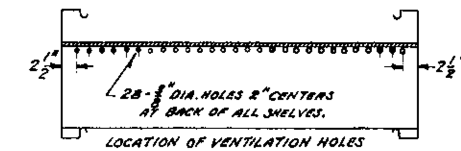
(b) TWO 1½" x 2" WOOD SKIDS SHALL EXTEND THE FULL LENGTH OF CASE AT TOP, ONE IN BACK AND ONE IN FRONT, AND SHALL BE SECURELY WIRED IN PLACED AS A PROTECTION TO THE TOP OF CASE.



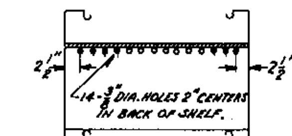
LOCATION OF VENTILATION HOLES IN SHELVES OF CASE 5304.



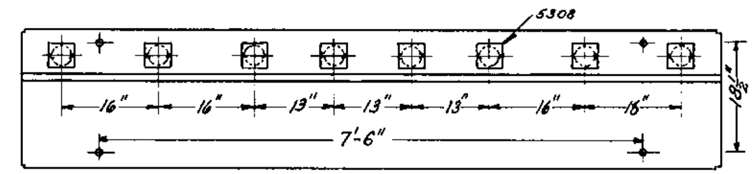
LOCATION OF VENTILATION HOLES IN SHELVES OF CASE 5303.



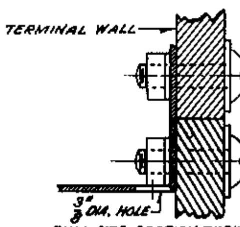
LOCATION OF VENTILATION HOLES IN SHELVES OF CASE 5302.



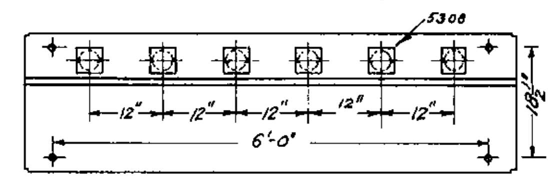
LOCATION OF VENTILATION HOLES IN SHELF OF CASE 5301.



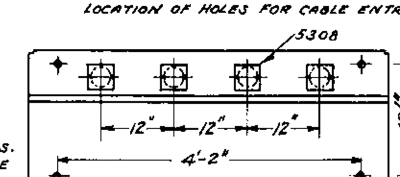
PLAN VIEW OF BASE OF CASE 5304 SHOWING LOCATION OF HOLES FOR CABLE ENTRANCE.



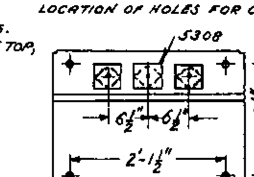
FULL SIZE SECTION THRU ALL SHELVES AT HOLES.
SKETCH "A"



PLAN VIEW OF BASE OF CASE 5303 SHOWING LOCATION OF HOLES FOR CABLE ENTRANCE.



PLAN VIEW OF BASE OF CASE 5302 SHOWING LOCATION OF HOLES FOR CABLE ENTRANCE.



PLAN VIEW OF BASE OF CASE 5301 SHOWING LOCATION OF HOLES FOR CABLE ENTRANCE.

FOR ORDERING REFERENCES AND OTHER DETAILS SEE SHEET NO. 1.

SHEET 2 OF 2

S-530-H

THE PENNSYLVANIA RAILROAD

STANDARD

INSTRUMENT CASES

SPECIFICATIONS AND DETAILS

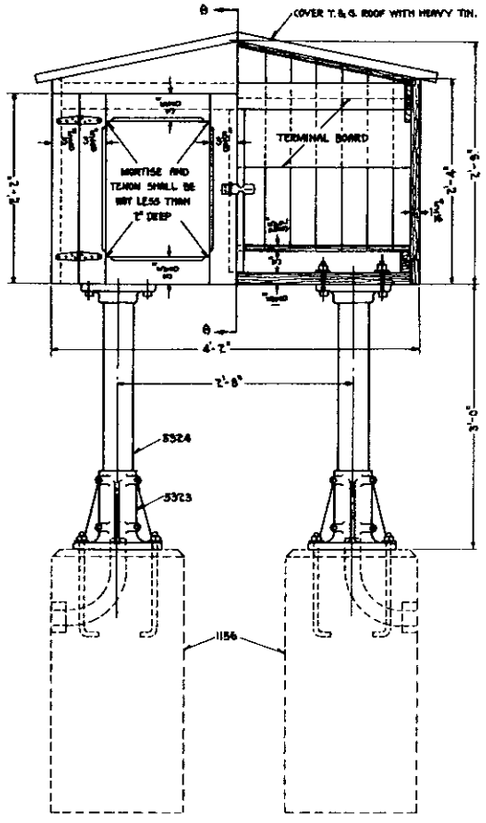
OFFICE OF CHIEF ENGINEER, PHILA., PA., NOVEMBER 18, 1942.

Approved

Assistant Chief Engineer - Signals

Approved

Chief Engineer



FRONT ELEVATION
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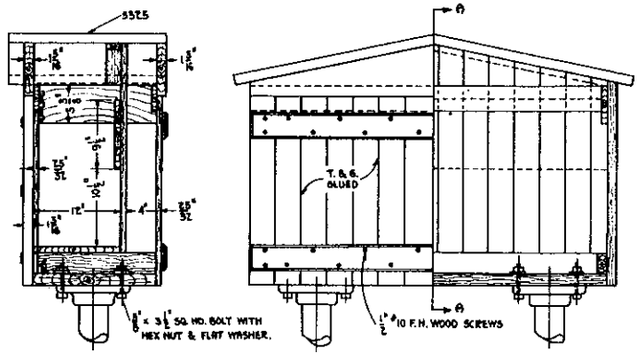
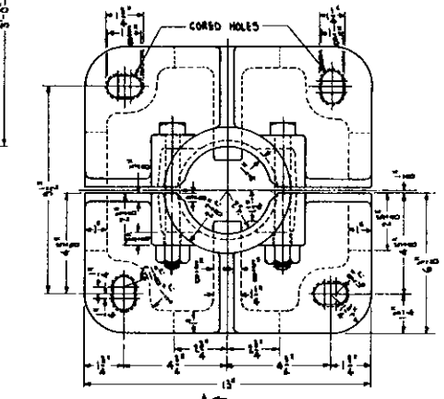
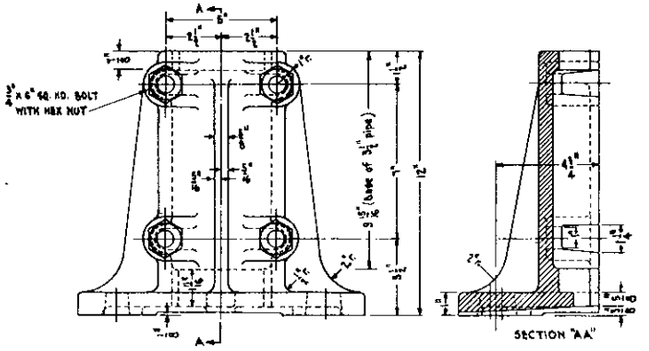
5321-CASE

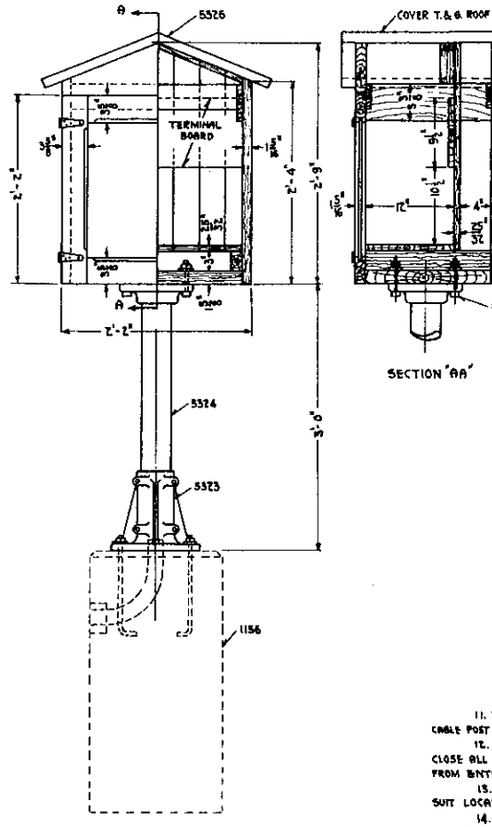






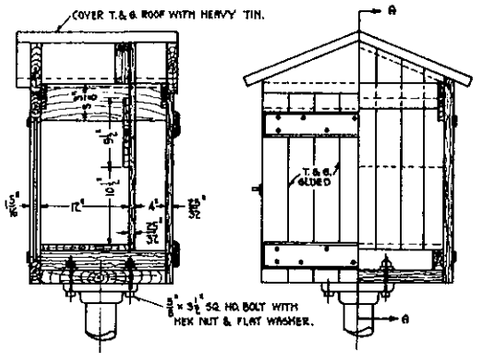
5323-BASE C.I.

ORDERING REFERENCE	
ORD. NO.	REMARKS
5321	CASE 5325 WITH 2-5323 AND 2-5324.
5322	" 5326 " 1-5323 " 1-5324.
5323	BASE COMPLETE.
5324	STD. 5 1/2" PIPE, 2'-10" LONG, WITH FLANGE AND BOLTS AS SHOWN.
5325	CASE ONLY.
5326	" "



FRONT ELEVATION
(HALF FRONT REMOVED)

5322-CASE



NOTE:-

1. CASING SHALL BE MADE OF NORTHERN WHITE PINE, CEDAR, CYPRESS OR REDWOOD.
2. TERMINAL BOARDS SHALL BE MADE OF CEDAR, CYPRESS, WHITE PINE (IDAHO, NORTHERN OR SUGAR), PONDOSA PINE, SPRUCE (EASTERN OR SITKA) OR REDWOOD, SURFACED TO 25/32", SHELLACED (2 COATS) AND VARNISHED.
3. TERMINAL BOARDS SHALL BE GRADE B AND BETTER, FREE OF KNOTS.
4. ALL BOARDS AND STRIPS, OTHER THAN TERMINAL BOARDS, SHALL BE GRADE B AND BETTER, FREE OF SAPWOOD.
5. TERMINAL BOARDS SHALL BE SURFACED FOUR SIDES (S4S).
6. CASING SHALL BE SURFACED TWO SIDES (S2S) AND TONGUE AND GROOVE (CM OR SM).
7. ALL GRADES, SIZES AND WORKING SHALL BE IN ACCORDANCE WITH AMERICAN LUMBER STANDARDS.
8. ALL JOINTS EXPOSED TO THE WEATHER SHALL BE GLUED.
9. INSIDE OF CASE, EXCEPT TERMINAL BOARDS, SHALL BE GIVEN TWO COATS OF SLATE COLORED FIRE RETARDING PAINT APPROVED BY THE CHIEF SIGNAL ENGINEER.
10. PAINT OUTSIDE OF CASE BLACK.
11. WHERE AERIAL CABLES ARE USED, SEPARATE CABLE POST SHOULD BE INSTALLED IN BACK OF CASE.
12. AFTER WIRING HAS BEEN COMPLETED CLOSE ALL OPENINGS SO AS TO PREVENT RODENTS FROM ENTERING.
13. WIRE INLETS MAY BE LOCATED TO SUIT LOCAL CONDITIONS.
14. EACH HINGE SHALL BE SECURED WITH BOLTS AND SCREWS, USING NO LESS THAN FOUR BOLTS.

REVISIONS.
REDRAWN FROM APPROVED PLAN S-532-E, DATED JAN. 10, 1928.
7-APRIL 16, 1929. APPROVED: A.H. Rudd
8-JULY 6, 1934. APPROVED: A.H. Rudd

1 SHEET

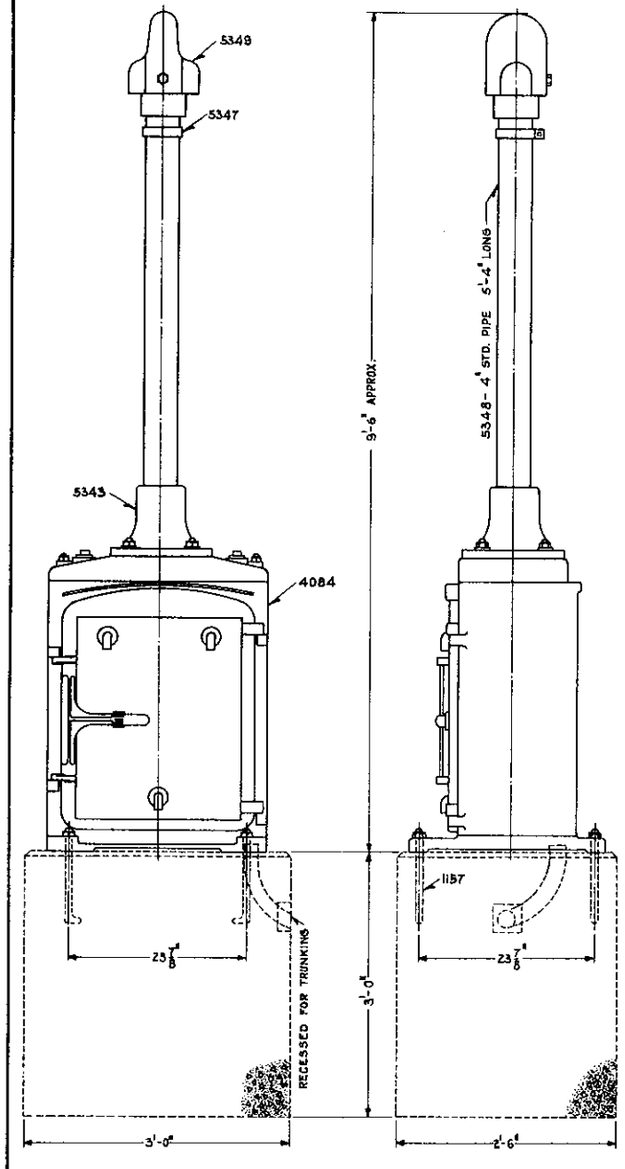
S-532-G

THE PENNSYLVANIA RAILROAD
STANDARD
INSTRUMENT CASES

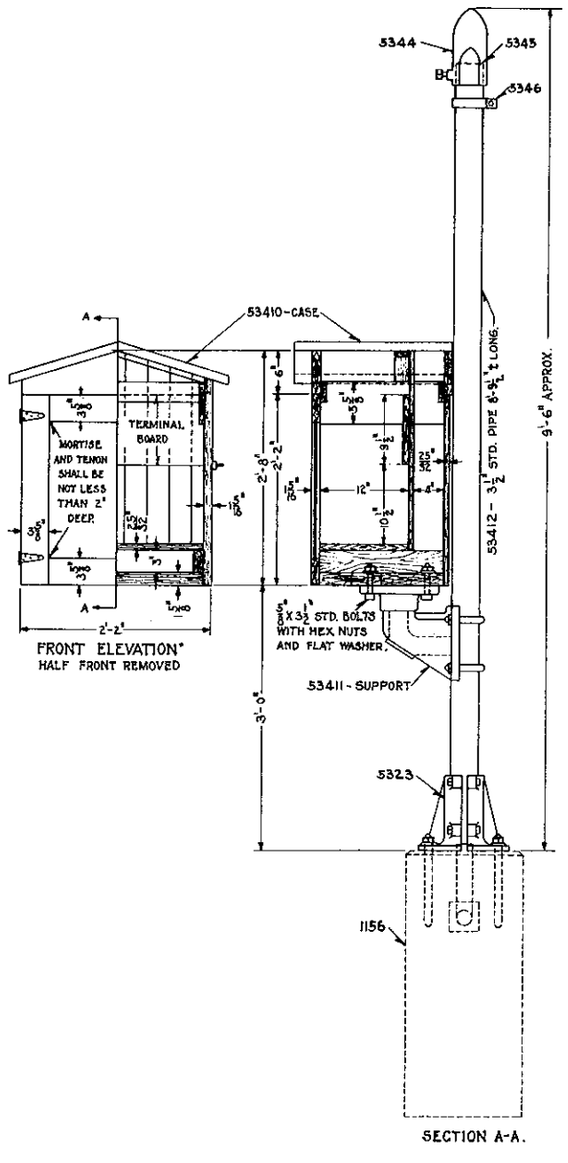
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., JANUARY 10, 1928.

Approved: A.H. Rudd
Chief Signal Engineer

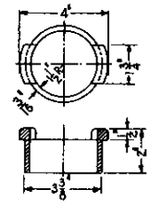
Approved: J.T. Williams
Chief Engineer



5341 - INSTRUMENT CASE

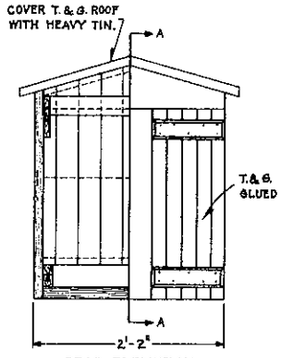


5342 - INSTRUMENT CASE

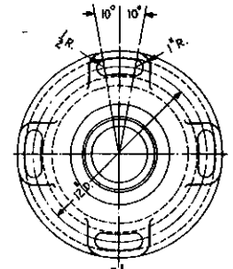


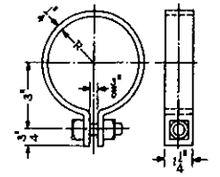
5345 - BUSHING C.I.

R.S.A. JUNE 1917.



REAR ELEVATION
HALF BACK REMOVED.

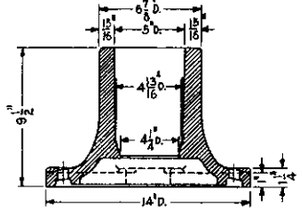




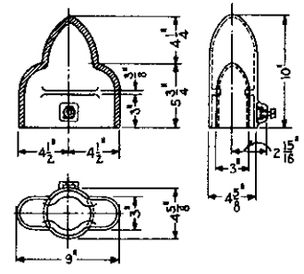
5346 - CLAMP R = 2"

5347 - " R = 2¼"

O.H.S.
R.S.A. JUNE 1917.



5343 - BASE C.I.



5344 - CAP C.I.

R.S.A. JUNE 1917.

NOTE :-

1. CASING FOR 53410 SHALL BE MADE OF NORTHERN WHITE PINE, CEDAR, CYPRESS OR REDWOOD.
2. TERMINAL BOARDS SHALL BE MADE OF CEDAR, CYPRESS, WHITE PINE (IDAHO, NORTHERN OR SUGAR), PONDOSA PINE, SPRUCE (EASTERN OR SITKA) OR REDWOOD, SURFACED TO 25/32", SHELLACED (2 COATS) AND VARNISHED.
3. TERMINAL BOARDS SHALL BE GRADE B AND BETTER, FREE OF KNOTS.
4. ALL BOARDS AND STRIPS, OTHER THAN TERMINAL BOARDS, SHALL BE GRADE B AND BETTER, FREE OF SAPWOOD.
5. TERMINAL BOARDS SHALL BE SURFACED FOUR SIDES (S4S).
6. CASING FOR 53410 SHALL BE SURFACED TWO SIDES (S2S) AND TONGUE AND GROOVE (C.M. OR S.M.).
7. ALL GRADES, SIZES AND WORKINGS SHALL BE IN ACCORDANCE WITH AMERICAN LUMBER STANDARDS.
8. ALL JOINTS EXPOSED TO THE WEATHER SHALL BE GLUED.
9. INSIDE OF CASE, EXCEPT TERMINAL BOARDS, SHALL BE GIVEN TWO COATS OF SLATE COLORED FIRE RETARDING PAINT APPROVED BY THE CHIEF SIGNAL ENGINEER.
10. PAINT OUTSIDE OF CASE BLACK.
11. EACH HINGE SHALL BE SECURED WITH BOLTS AND SCREWS, USING NOT LESS THAN FOUR BOLTS.
12. CONCRETE SHALL BE IN ACCORDANCE WITH SPECIFICATION C.E. 76, PROPORTION B.
13. FOUNDATIONS SHALL BE NOT LESS THAN TWO FEET UNDERGROUND.
14. AFTER WIRING HAS BEEN COMPLETED, CLOSE ALL OPENINGS SO AS TO PREVENT RODENTS FROM ENTERING.
15. WIRE INLETS MAY BE LOCATED TO SUIT LOCAL CONDITIONS.

REVISIONS

REDRAWN FROM APPROVED PLAN S-534-C, DATED 5-2-22, LAST REVISED 5-31-26, AND REVISED.
6-JULY 6, 1934.
APPROVED:- A.H. Rudd

1 SHEET

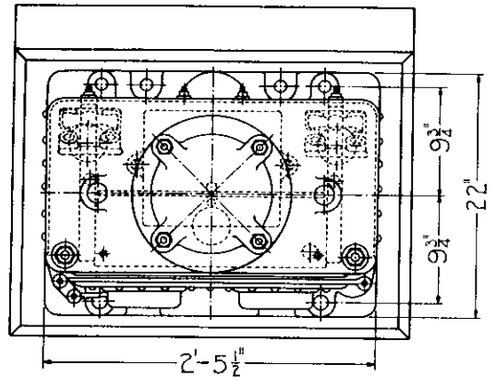
S-534-E

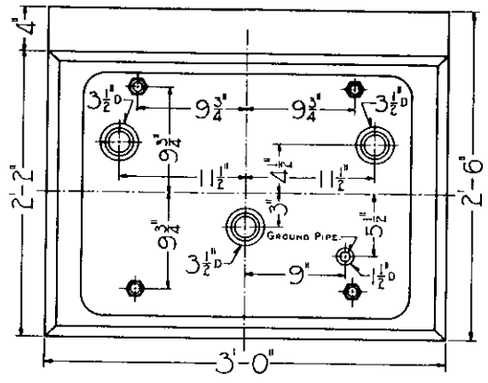
THE PENNSYLVANIA RAILROAD
STANDARD
CABLE POST AND INSTRUMENT CASES

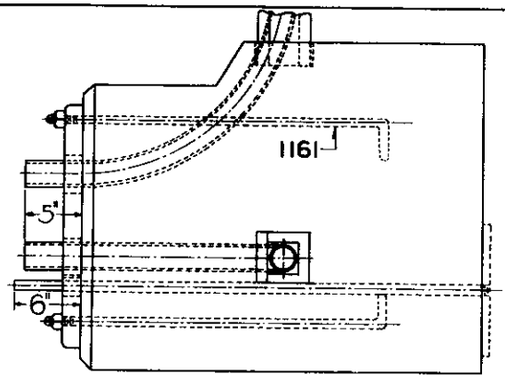
OFFICE OF CHIEF SIGNAL ENGINEER. PHILA., PA. MARCH 1, 1922.

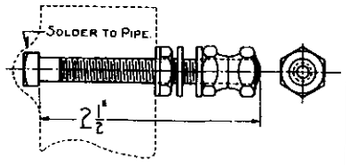
Approved
A.H. Rudd
Chief Signal Engineer

Approved
Chief Engineer









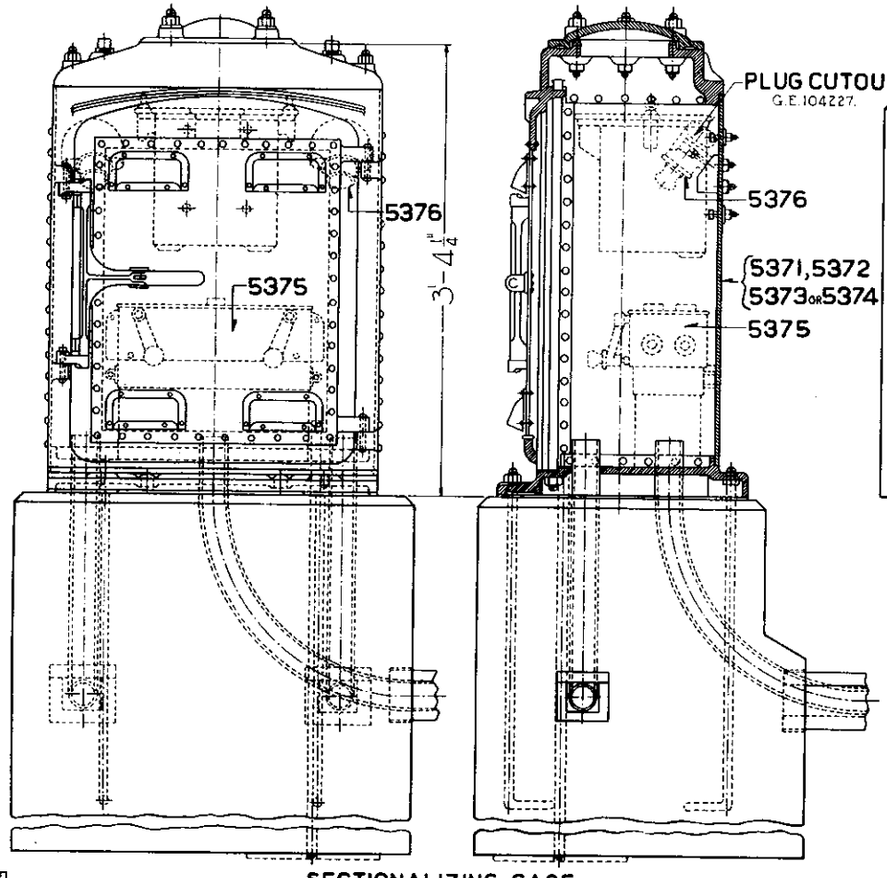
Same as 5138 except as shown.
Scale - Full Size.

5377 - GROUND WIRE BOLT.

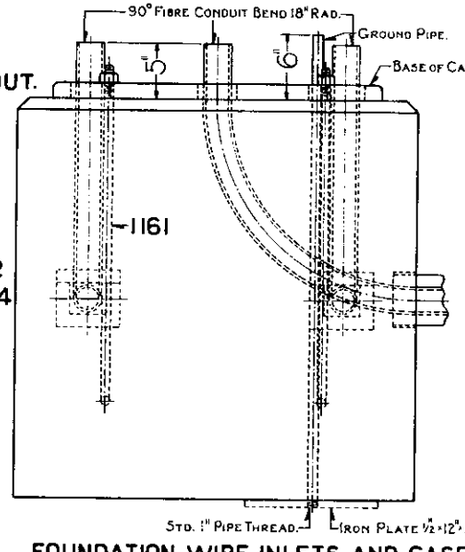
Ordering Reference.

Order No	Name.
5371	Sectionalizing Case with 5375 & 2-5376
5372	" " " 5375.
5373	" " " 2-5376.
5374	" " only G.E. K-1126719
5375	" Switch Gen. Elec. DL. 2193646 Group 1.
5376	Plug Cutout G.E. 104227 & Block.
5377	Ground Wire Bolt.

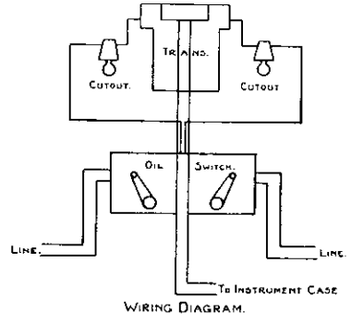
Transformers ordered separately.



SECTIONALIZING CASE.



FOUNDATION, WIRE INLETS AND CASE DRILLING



Wiring Diagram.

NOTES.

Where possible, a one (1) inch galvanized iron pipe shall be driven, not less than five (5) feet below bottom of foundation, extending six (6) inches above top of foundation through opening provided in bottom of case. It shall be connected to case by a number 6 A. W. G. copper wire, secured to top of pipe and side of case by bolts 5377. Where conditions will not permit driving pipe below bottom of foundation, an iron plate shall be fastened to lower end of pipe as shown.

Foremen should use their best judgment as to proper depth of foundation, to be governed by the nature of the ground, and in no case should it be less than three (3) feet.

Wire inlets may be located to suit local conditions.

Case shall be so placed that the door opens away from the main track.

SCALE

REVISIONS.

1 SHEET

S-537-A

PENNSYLVANIA SYSTEM

STANDARD

SECTIONALIZING CASE AND FOUNDATION

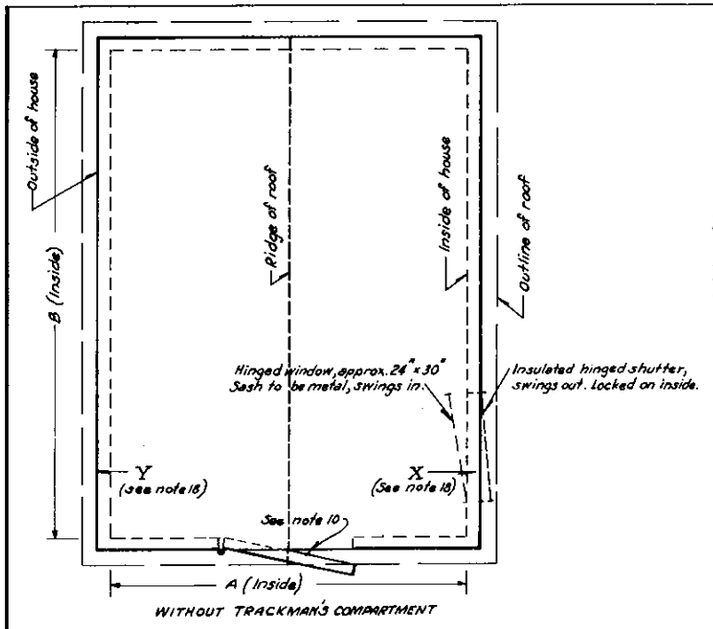
OFFICE OF CHIEF SIGNAL ENGINEER. PHILA., PA., JUNE 14, 1922

Correct

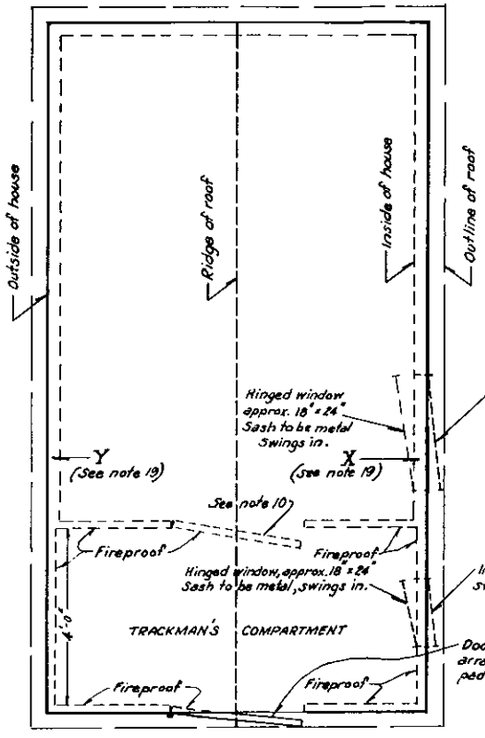
Chief Signal Engineer

Approved

Chief Engineer



WITHOUT TRACKMAN'S COMPARTMENT



ORDERING REFERENCE

ORDER NUMBER		APPROXIMATE DIMENSIONS	
WITH FLOOR	WITHOUT FLOOR	A	B
53811	53811	8' 0"	11' 0"
53822	53822	8' 0"	14' 0"
53833	53833	8' 0"	19' 0"
	53844	11' 0"	16' 0"
	53855	14' 0"	16' 0"
	53866	14' 0"	19' 0"
	53877	16' 0"	19' 0"

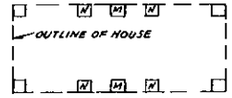
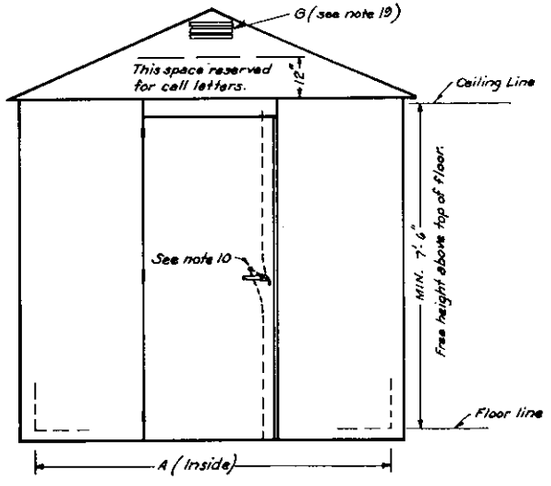
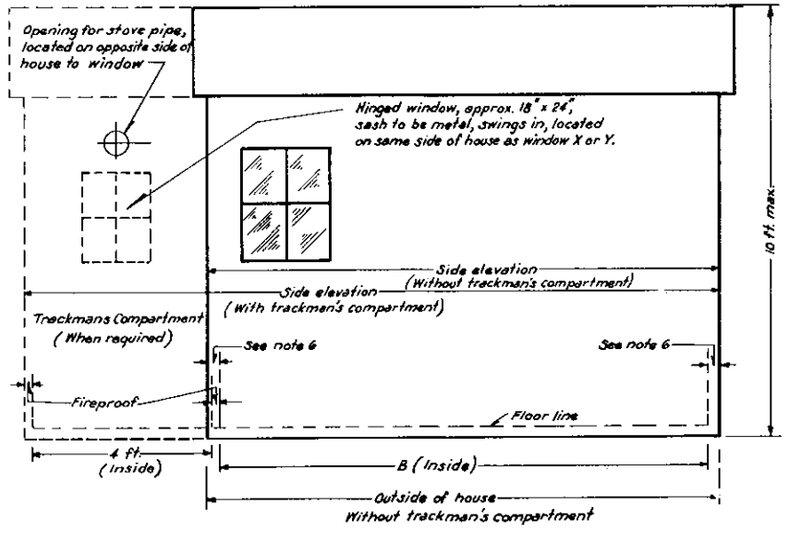


DIAGRAM F

MINIMUM NUMBER OF PIERS (WHEN USED) FOR HOUSES WITH 8 FT. "A" DIMENSION.

Note:-
Provide intermediate piers M when B = 11' or 14'.
Provide intermediate piers N when B = 19'.





GENERAL SPECIFICATIONS.

1. DESIGN AND CONSTRUCTION SHALL BE STRONG ENOUGH TO WITHSTAND ANY DETRIMENTAL REACTION FROM HIGH WIND AND STORM.
2. ALL SHEET METAL PARTS SHALL BE CONSTRUCTED OF COPPER BEARING STEEL, OR EQUAL IN RUST RESISTING PROPERTIES.
3. THE HOUSE SHALL BE CONSTRUCTED EITHER IN SECTIONS FOR DISASSEMBLING AT THE FACTORY AND REASSEMBLING IN THE FIELD, OR CONSTRUCTED AS A UNIT IN ACCORDANCE WITH ORDERING INFORMATION CONTAINED IN THE REQUISITION. REQUISITION SHALL CLEARLY INDICATE WHETHER OR NOT A SECTIONAL HOUSE IS DESIRED.
4. ALL METAL PARTS SHALL BE PRIMED WITH ONE COAT OF RED OXIDE OR EQUAL BEFORE ASSEMBLING. TO PERMIT ADHESION OF BOTH PRIMING AND FINISHING COATS OF PAINT, ALL WELDED AND BURNED AREAS SHALL BE PROPERLY TREATED. THE WSIDE SHALL THEN BE GIVEN TWO COATS OF HIGH GRADE ALUMINUM PAINT, AND THE OUTSIDE TWO COATS OF A FIRST GRADE PAINT - COLOR PENNSYLVANIA RAILROAD STANDARD LIGHT, ROOF BLACK, AND TRIM (WHERE PROVIDED) PENNSYLVANIA RAILROAD STANDARD DARK (BUILDING PAINT).
5. ALL JOININGS OF SECTIONS SHALL BE CLOSE FITTING, RIGID AND SECURE, SO THAT THE ENTIRE HOUSE WILL BE WEATHERPROOF.
6. ALL WALLS, ROOF AND DOORS, EXCEPT TRACKMAN'S COMPARTMENT (IF REQUIRED), SHALL BE PROVIDED WITH INSULATION AGAINST TRANSFER OF HEAT EQUIVALENT TO 12 INCHES OF BRICK.
7. DOOR FRAME SHALL PROVIDE NOT LESS THAN 30 INCHES CLEAR ENTRANCE SPACE.
8. THICKNESS OF SHEET METAL SHALL BE NOT LESS THAN # 22 GAGE FOR PANELS, # 18 GAGE FOR ROOF, AND # 12 GAGE FOR DOOR FRAME.
9. HOUSES SHALL BE PROVIDED WITH LOUVRES OR EQUIVALENT FOR PROPER VENTILATION.
10. DOOR SHALL BE PROVIDED WITH A SUBSTANTIAL THREE POINT LOCKING DEVICE, LOCKING DOOR AT TOP, BOTTOM AND CENTER. THE HANDLE AT THE CENTER, OPERATING THE DEVICE, TO BE SO ARRANGED AS TO PERMIT IT TO BE LOCKED WITH A SIGNAL DEPARTMENT PADLOCK.
11. PANELS IN BOTH SIDES, AND END OPPOSITE ENTRANCE DOOR, SHALL BE MADE REMOVABLE, FROM THE OUTSIDE.
12. BASE FRAME (WITH OR WITHOUT FLOOR) SHALL BE CONSTRUCTED WITH SUFFICIENT STRENGTH TO SUPPORT THE ENTIRE HOUSE. HOUSES FURNISHED WITHOUT FLOOR SHALL BE PROVIDED WITH BASE ANGLE TO PERMIT SECURING TO FLOOR (FLOOR WILL BE CONSTRUCTED IN THE FIELD). HOUSES FURNISHED WITH FLOOR (SEE NOTE 13) AND TO BE SUPPORTED AS INDICATED IN DIAGRAM F. HOLES NOT LESS THAN 1 INCH DIA. SHALL BE PROVIDED IN BASE FRAME FOR SECURING BASE FRAME TO FOUNDATION.
13. FLOORS, WHEN PROVIDED AS A PART OF THE HOUSES, SHALL BE CONSTRUCTED TO WITHSTAND A LOADING OF 125 POUNDS PER SQUARE FOOT.
14. OPENINGS IN HOUSES FOR CABLES AND WIRES (WITH OR WITHOUT FLOOR) IF REQUIRED, SHALL BE SPECIFIED ON REQUISITION.
15. THE ENTIRE HOUSE SHALL BE ERECTED AT THE FACTORY FOR INSPECTION BY PENNSYLVANIA RAILROAD REPRESENTATIVES.
16. CONCRETE WALLS OR PIERS, AND FLOOR (WHEN NOT PROVIDED WITH HOUSE), SHALL BE CONSTRUCTED BY THE PENNSYLVANIA RAILROAD FORCES.
17. MANUFACTURER SHALL SUBMIT DRAWINGS, INDICATING THEIR PROPOSAL, TO THE CHIEF ENGINEER, PENNSYLVANIA RAILROAD FOR APPROVAL.
18. WHEN WINDOW IS DESIRED, REQUISITION SHALL SPECIFY WHETHER IT IS TO BE LOCATED AT X OR Y.
19. REQUISITION SHALL SPECIFY IF TRACKMAN'S COMPARTMENT IS DESIRED. WHEN FURNISHED A LOUVRE FOR VENTILATION SHALL BE PROVIDED IN GABLE OVER DOOR AS INDICATED AT G.

REDRAWN FROM UNAPPROVED PLAN S-538- DATED APRIL 13, 1947 AND REVISED

1 SHEET

S-538-E

THE PENNSYLVANIA RAILROAD

STANDARD

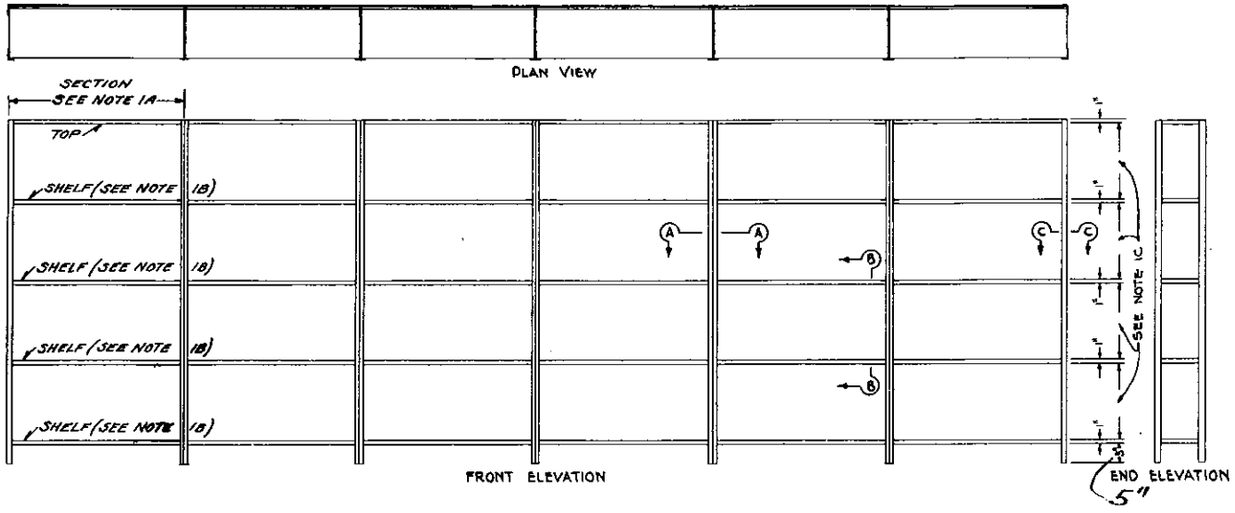
INSTRUMENT HOUSES

STEEL INSULATED

OFFICE OF CHIEF ENGINEER, PHILA., PA., APRIL 28, 1948.

Approved
Assistant Chief Engineer - T, C, & S

Approved
Chief Engineer



SPECIFICATIONS:-

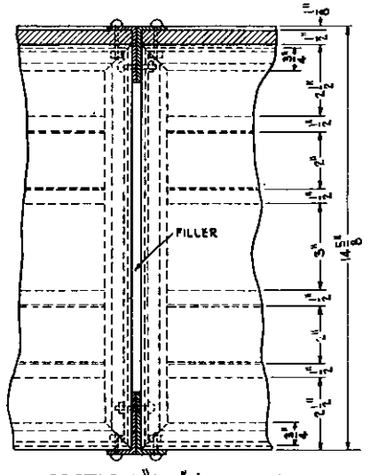
INSTRUMENT RACKS SHALL BE BUILT IN SECTIONS OF 3 OR 4 FT. UNLESS OTHERWISE SPECIFIED.

PROVISION SHALL BE MADE AT ENDS OF SECTION FOR SECURELY BOLTING TO ADJOINING SECTIONS. WHERE SECTIONS ARE BOLTED TOGETHER FILLER SHALL BE PROVIDED FOR ANY OPENING AT JUNCTION OF SHELVES TO PREVENT SMALL OBJECTS FALLING THROUGH.

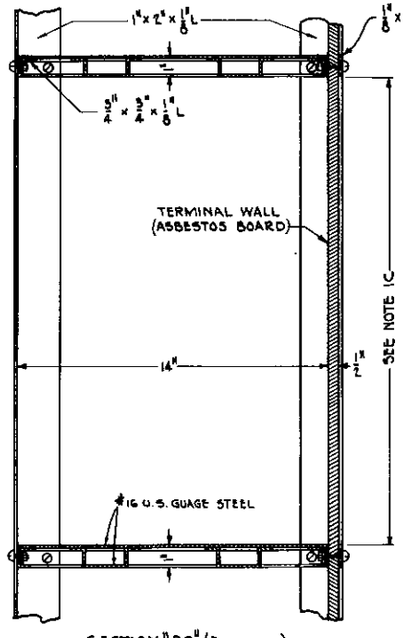
THE ENTIRE BACK SHALL CONSIST OF ONE-HALF INCH HARD ASBESTOS BOARD SECURED DIRECTLY AGAINST SHELVES. SPLICES IN ASBESTOS SHALL BE MADE IN BACK OF SHELVES.

ALL METAL SURFACES SHALL BE GIVEN ONE COAT OF RED OXIDE AND TWO COATS OF OLIVE GREEN PAINT. ASBESTOS SHALL NOT BE PAINTED.

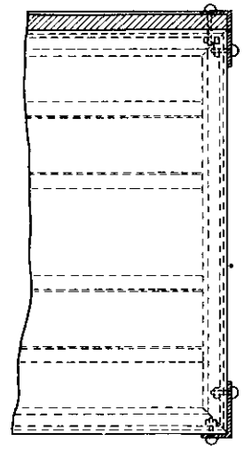
WORKMANSHIP SHALL BE OF THE BEST, ALL SHELVES, ETC BEING PROPERLY IN ALIGNMENT AND RIGIDLY FIXED IN PLACE.



SECTION "AA" (ENLARGED)



SECTION "BB" (ENLARGED)



SECTION "CC" (ENLARGED)

NOTE:-

1.- REQUISITIONS FOR INSTRUMENT RACKS SHALL STATE:-
(A) THE NUMBER AND LENGTH OF SECTIONS.
(B) THE NUMBER OF SHELVES IN EACH. (TOP NOT CONSIDERED A SHELF)
(C) THE DISTANCE BETWEEN SHELVES. (18" OR 21")
(D) WHETHER OR NOT THE RACKS ARE TO BE ERECTED ON THE GROUND BY THE MANUFACTURER OR SHIPPED KNOCKED DOWN TO BE ASSEMBLED BY P.R.R. FORCES. WHERE ERECTED BY MANUFACTURER STARTING AND COMPLETION DATES SHALL BE GIVEN.

2. WHERE CONDITIONS ARE SUCH THAT STANDARD LENGTH SECTIONS CANNOT CONVENIENTLY BE USED A SKETCH SHALL BE ATTACHED TO EACH COPY OF REQUISITION SHOWING THE DESIRED ARRANGEMENT.

REVISIONS
B- Feb. 5, 1937. Approved: A.H. Rudd
C- JAN. 13, 1938. c.o. APPROVED N.C. Stanton

1 SHEET

S-540-C

THE PENNSYLVANIA RAILROAD
STANDARD

INSTRUMENT RACKS

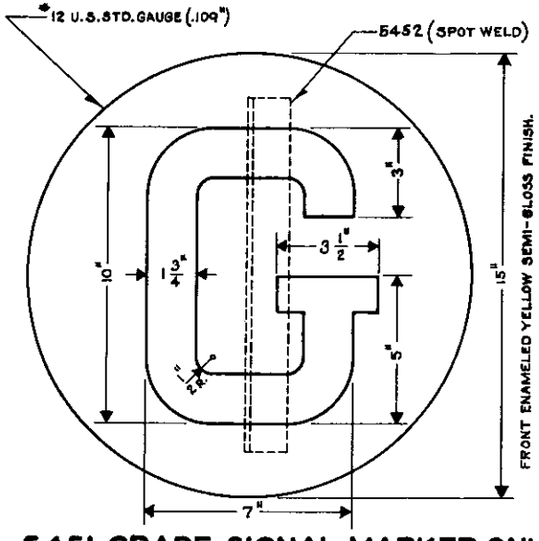
(FOR INTERLOCKING STATIONS)

Office of Chief Signal Engineer, Phila., Pa., June 25, 1934.

Approved
A.H. Rudd
Chief Signal Engineer

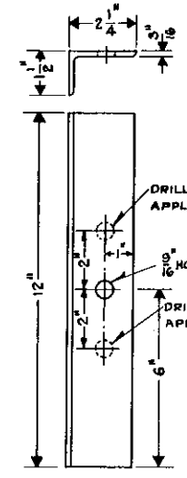
Approved
Chief Engineer

GHL



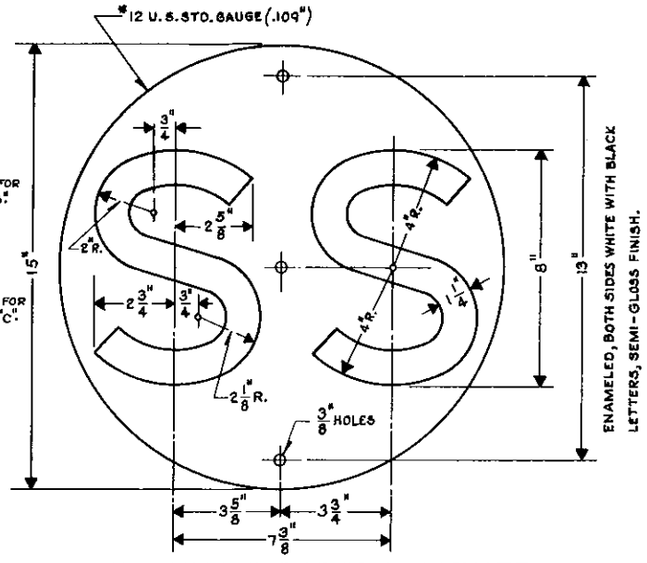
5451 GRADE SIGNAL MARKER ONLY.

A. A. R. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2A-5451.



5452 ANGLE.

O. H. STEEL

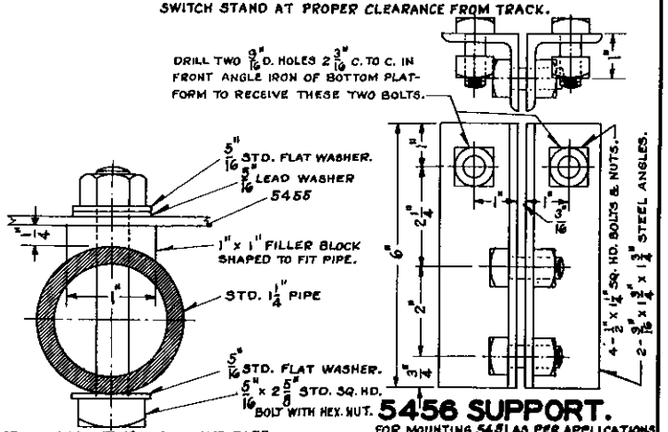


5455 SPRING SWITCH MARKER.

A. A. R. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2A-5455.

NOTE:-

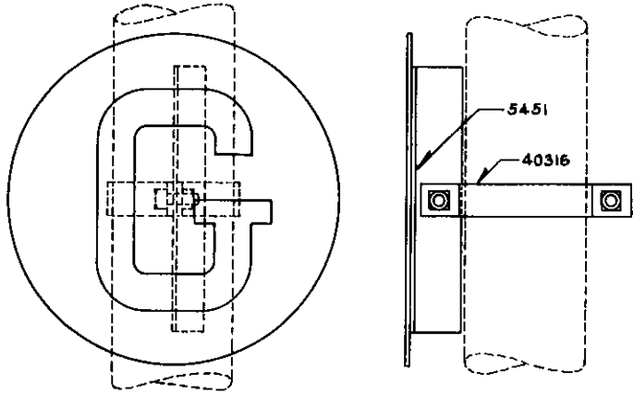
1. MARKERS 5451 AND 5455 SHALL BE VITREOUS ENAMELED IN ACCORDANCE WITH A.A.R. SIG. SEC. SPECIFICATION # 155-41.
2. SUPPORT 5454 SHALL BE THOROUGHLY CLEANED, GIVEN A COAT OF RED OXIDE PRIMER AND ONE COAT OF A GOOD GRADE BLACK PAINT.
3. MATERIAL SHALL BE IN ACCORDANCE WITH A.A.R. SIG. SEC. SPECIFICATION # 155-41. (THICKNESS OF METAL AS SHOWN HEREON).
4. IN SPECIAL LOCATIONS MARKER 5455 MAY BE MOUNTED ON SWITCH STAND AT PROPER CLEARANCE FROM TRACK.



DETAIL OF MOUNTING FOR MARKER 5455.

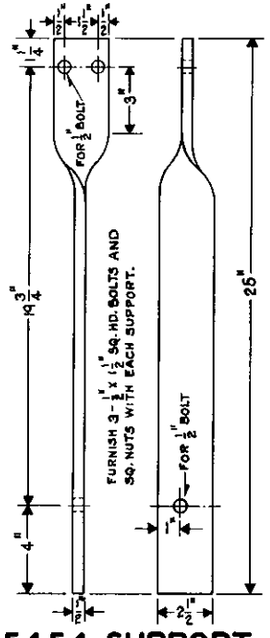
5456 SUPPORT.

FOR MOUNTING 5451 AS PER APPLICATIONS B & C. STORES CAT. REF. NO. 2A-5456.



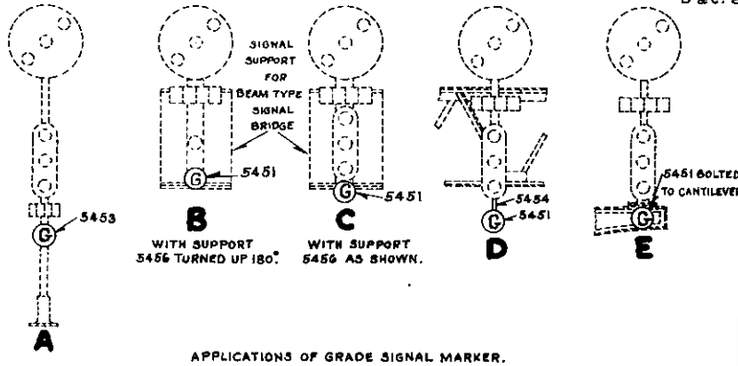
5453 GRADE SIGNAL MARKER COMPLETE.

A. A. R. SIG. SEC. M-1934.
STORES CAT. REF. NO. 2A-5453.

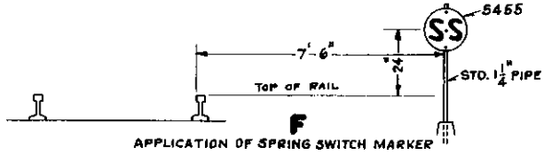


5454 SUPPORT.

O. H. STEEL
STORES CAT. REF. NO. 2A-5454.
(FOR APPLICATION D)



APPLICATIONS OF GRADE SIGNAL MARKER.



APPLICATION OF SPRING SWITCH MARKER

REVISIONS

REDRAWN FROM APPROVED PLAN S-545-F, DATED AUG. 28, 1927, LAST REVISED JULY 31, 1935 AND REVISED TO SHOW - 5451 FORMERLY 5456 & CHANGED TO AGREE WITH A.A.R. FORMER PLAN INCLUDED A 24" DIA. "G" MARKER. CLAMP 40316 INDICATED IN 5455 FORMERLY 4882. SUPPORT 5454 FORMERLY 5457 WHICH WAS WITHOUT TWIST. SUPPORT 5456 AND APPLICATION F ADDED. APPLICATIONS OF MARKERS RE-ARRANGED. NOTES CHANGED.

1 SHEET

S-545-G

THE PENNSYLVANIA RAILROAD

STANDARD

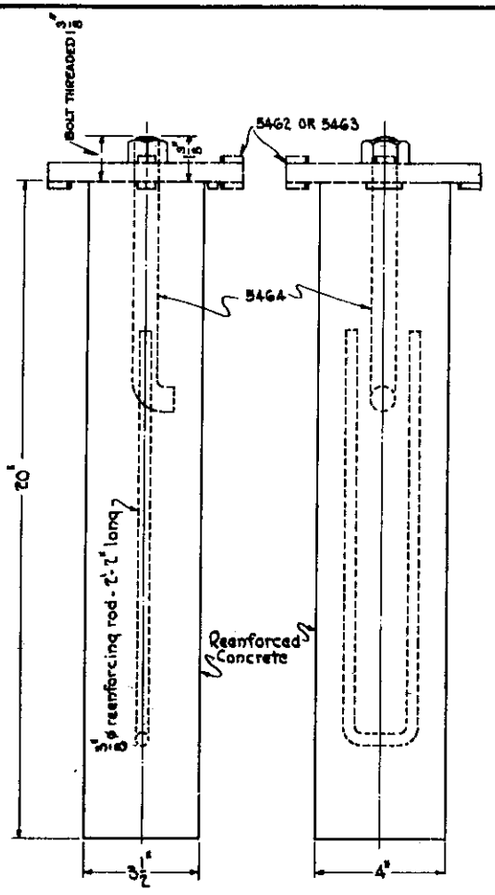
MARKERS

FOR GRADE SIGNAL AND SPRING SWITCH.

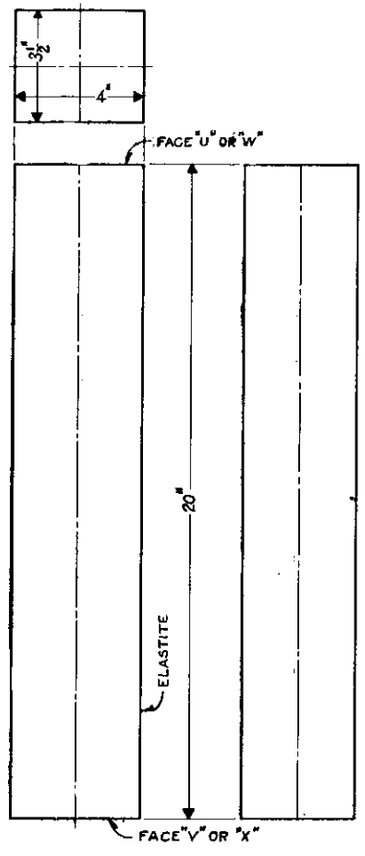
OFFICE OF CHIEF ENGINEER, PHILA., PA., JULY 8, 1942.

Approved
H. F. Stanton
Assistant Chief Engineer-Signals

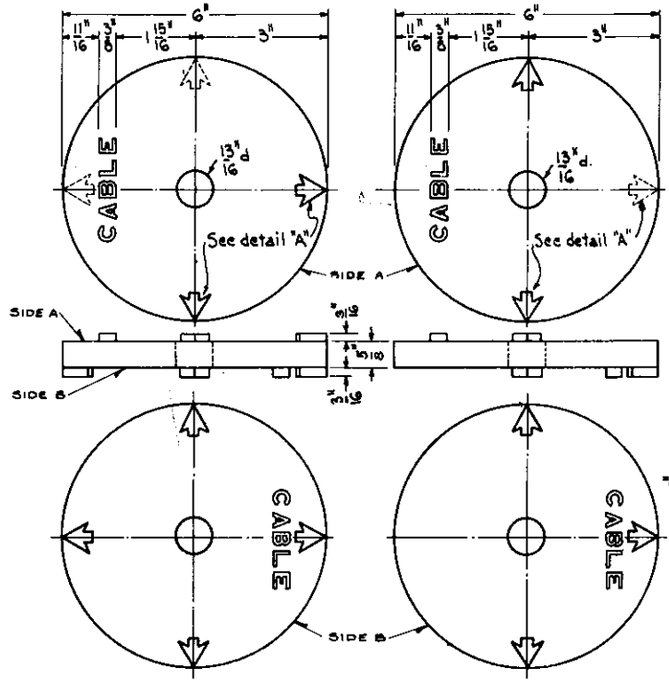
Approved
M. Huggins
Chief Engineer.



5461-MARKER COMPLETE WITHOUT PLATE.
REENFORCED CONCRETE.
STORES CAT. REF. NO. 2A-1515

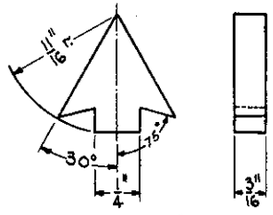


5466-MARKER FACES "U" & "V".
STORES CAT. REF. NO. 2A-1418
5467-MARKER FACES "W" & X.
STORES CAT. REF. NO. 2A-1423
ELASTITE.

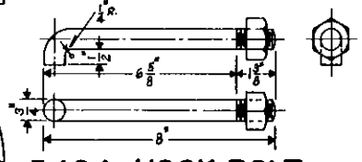


5462-PLATE CAST IRON
STORES CAT. REF. NO. 2A-1743.

5463-PLATE CAST IRON
STORES CAT. REF. NO. 2A-1744.

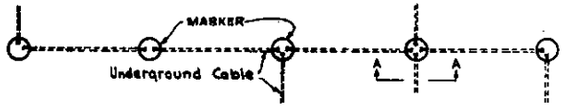


Detail "A"



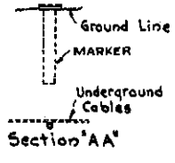
5464-HOOK BOLT. GALVANIZED
O.H.S.

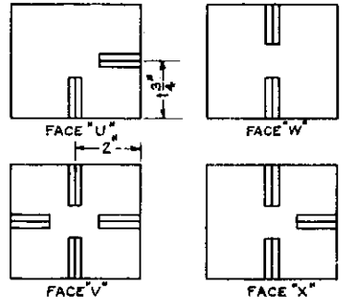
NOTE:-
1. ORDER 5461, 5462 AND 5463 SEPARATELY.
2. PLATES 5462 AND 5463 SHALL BE GIVEN ONE COAT OF RED OXIDE, THEN ONE COAT OF GOOD GRADE BLACK PAINT.



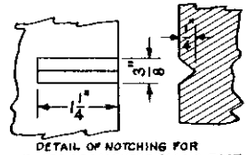
- METHOD OF INSTALLATION

Markers to be arranged to show direction of cable runs as indicated in sketch above.
Maximum distance between markers shall not exceed two hundred feet.
After placing in service, all exposed metal surfaces shall be given a coat of good grade black paint.





FACING OF TOP AND BOTTOM
FOR MARKERS 5466 & 5467.



DETAIL OF NOTCHING FOR
FACES OF MARKERS 5466 & 5467.

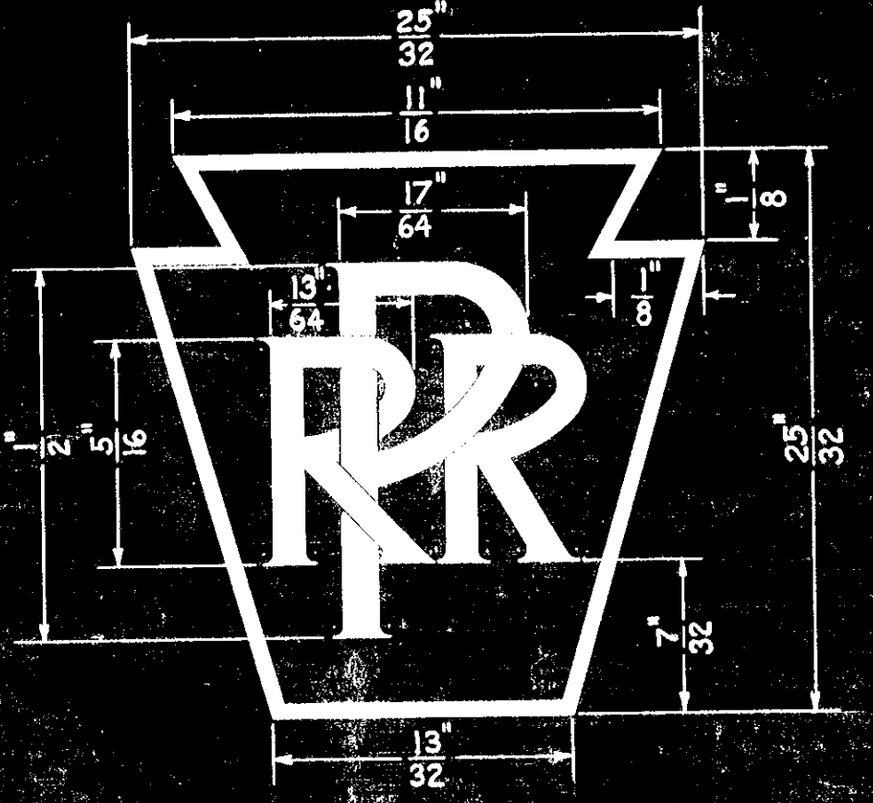
Revisions
B SEPTEMBER 8, 1942
APPROVED N. C. Stanton
C APRIL 14, 1948. MARKER 5461 FORMERLY SHOWN MADE OF ELASTITE OR CONCRETE. ELASTITE MARKER REDESIGNED AND NUMBERED 5466 & 5467. STORES CAT. REF. NO'S. ADDED.
APPROVED N. C. Stanton

1 Sheet S-546-C

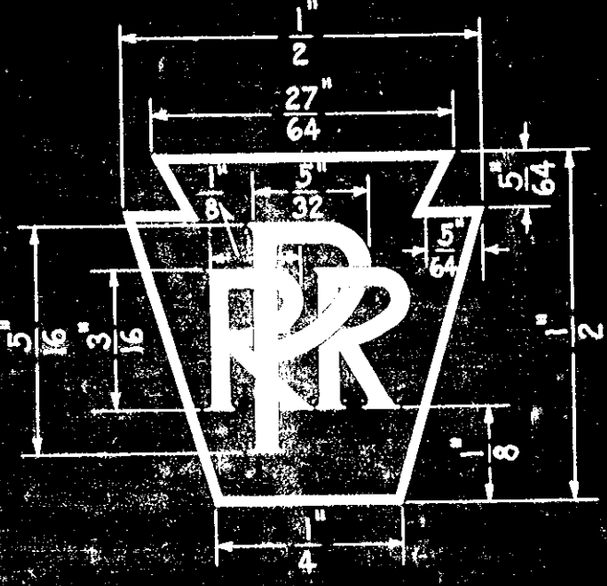
THE PENNSYLVANIA RAILROAD
STANDARD
CABLE MARKER
FOR UNDERGROUND CABLES
Office of Chief Signal Engineer, Phila., Pa., Nov. 11, 1935.

Approved:- A. R. Ridd
Chief Signal Engineer

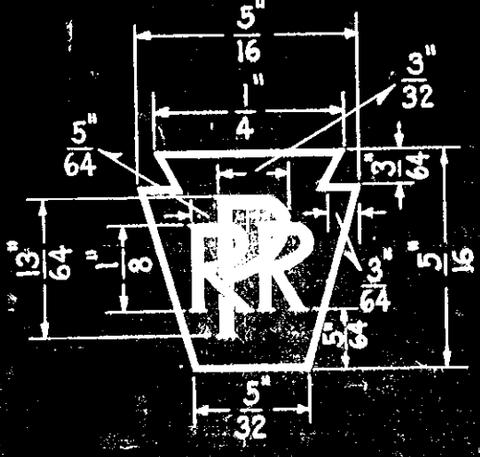
Approved: W. W. Gruggen
Actg. Chief Engineer



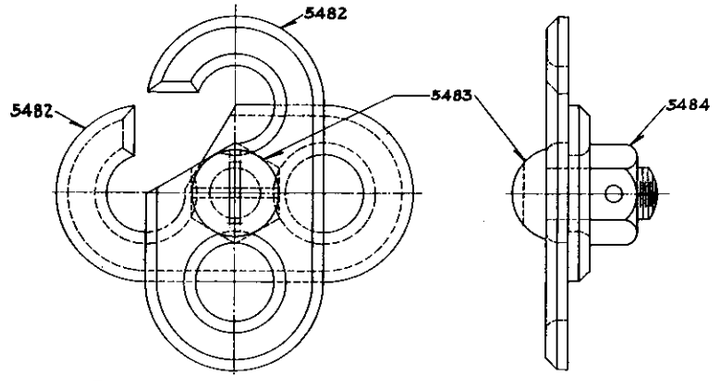
5471 - MONOGRAM.



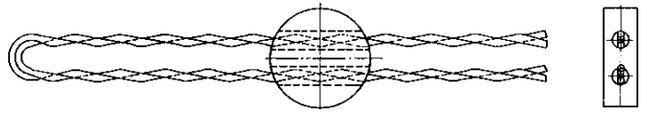
5472 - MONOGRAM.



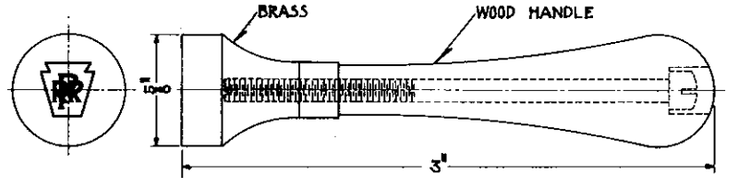
5473 - MONOGRAM



5481 - LOCKING AND SEALING DEVICE

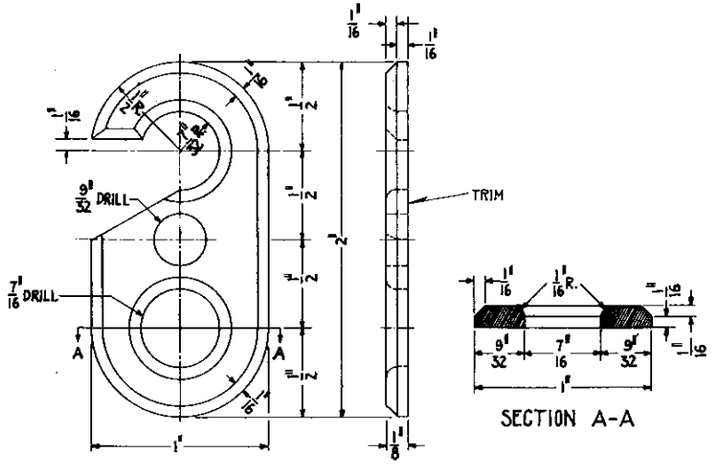


5485 - LEAD SEAL AND WIRE
(SEE NOTES)



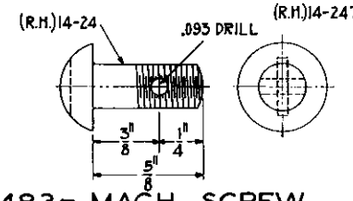
5486 - RELAY SEAL
(SEE NOTES)

5487 - DIE
(SEE NOTES)

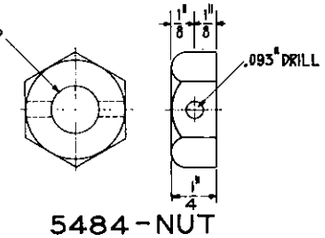


SECTION A-A

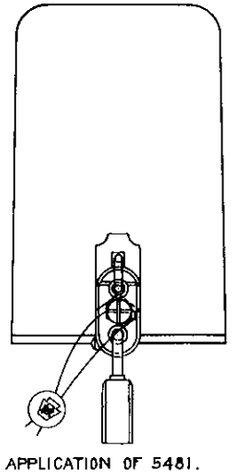
5482 - LOCK PLATE
CAST BRASS.



5483 - MACH. SCREW
BRASS.



5484 - NUT
BRASS.



APPLICATION OF 5481.

NOTES:-
1. 5485 SHALL BE SIMILAR TO #0 PAGE 48 AND 5487 SHALL BE USED IN SEAL PRESS SIMILAR TO #3 PAGE 48, CAT.#28, S.H. QUINT'S SONS CO., 15 S. 4TH. ST., PHILA., PA.
2. MONOGRAM FOR 5486 AND 5487 SHALL BE IN ACCORDANCE WITH 5473 PLAN S-547.

REVISIONS

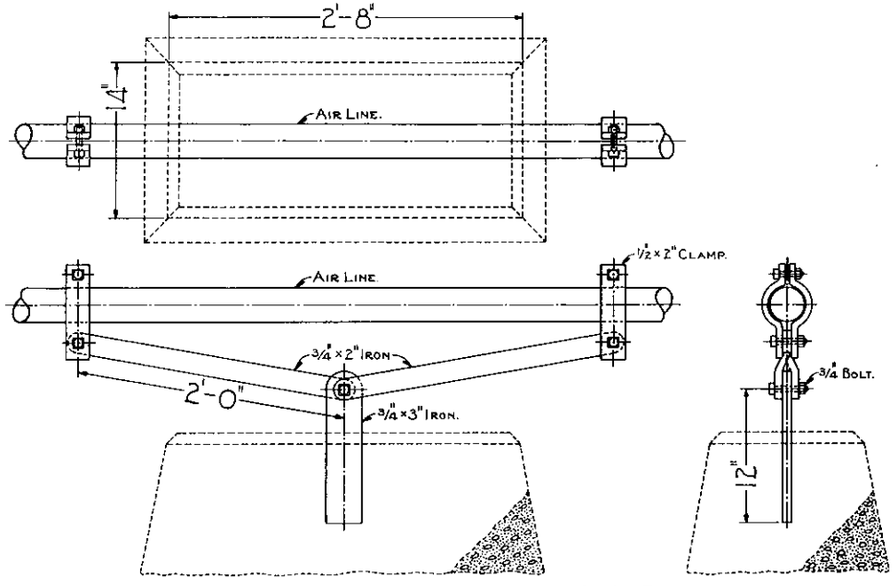
1 SHEET

S.548-A

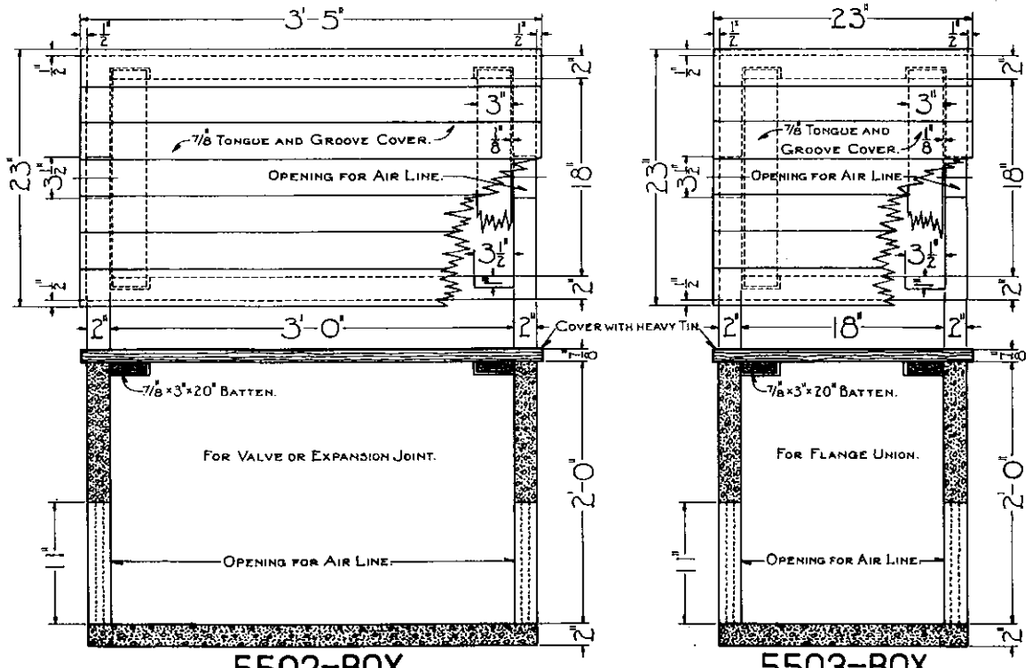
THE PENNSYLVANIA RAILROAD
STANDARD
LOCKING AND SEALING DEVICES
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. JUNE 20 TH. 1927

Approved
Chief Signal Engineer

Approved
Chief Engineer



5501—ANCHOR.



5502—BOX.
HALF SECTION.

5503—BOX.
HALF SECTION.

REVISIONS.

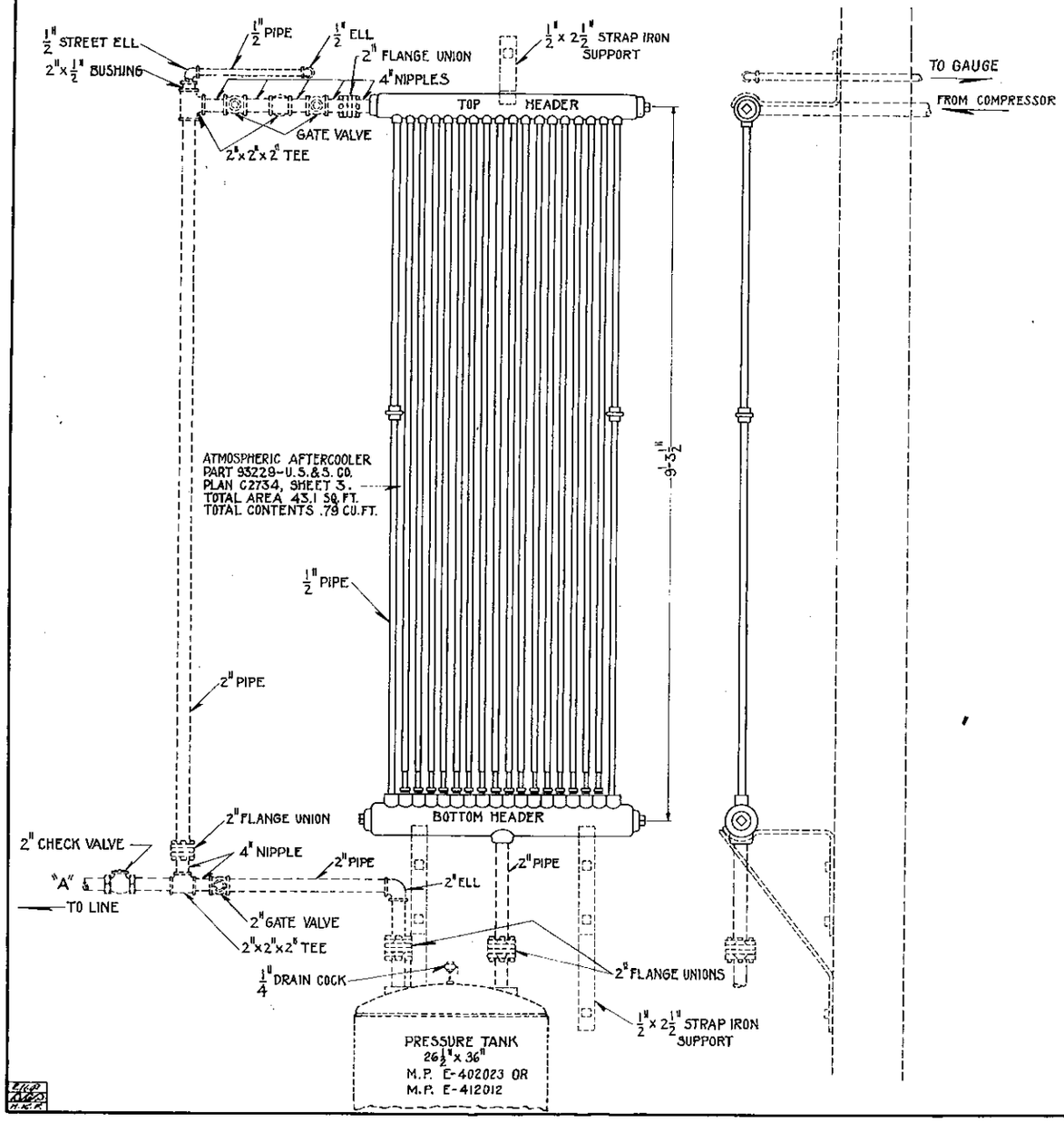
1 SHEET

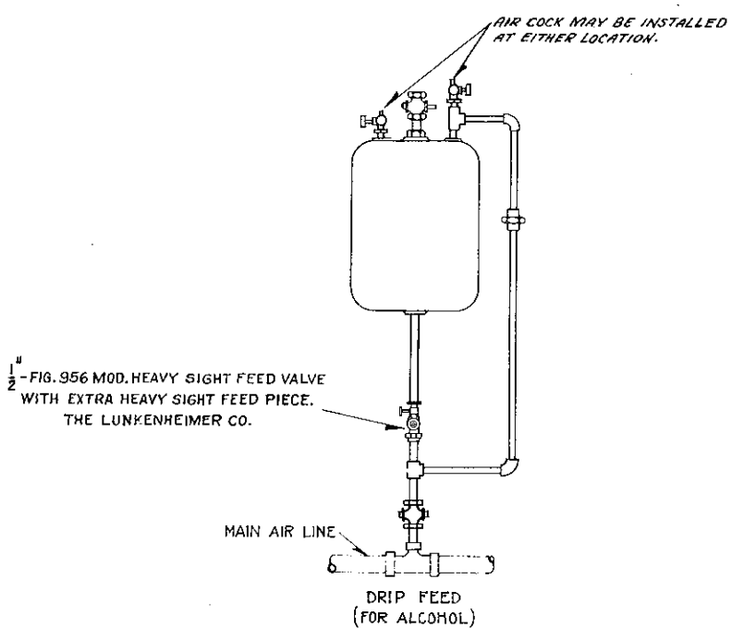
S-550-A

PENNSYLVANIA RAILROAD SYSTEM
STANDARD
ANCHOR AND BOXES
FOR AIR LINE
OFFICE OF CHIEF SIGNAL ENGINEER. PHILA., PA., FEB. 7, 1923

Correct
Chief Signal Engineer

Approved
Chief Engineer





NOTE:-
1.- PLACE DRIP FEED IN MAIN AIR LINE CLOSE TO POINT 'A'.
2.- ATMOSPHERIC AFTERCOOLER SHALL CONSIST OF TOP AND BOTTOM HEADERS WITH 18 CONNECTING 1/2" PIPES, PROPERLY FITTED.
3- AFTERCOOLER SHOWN PROVIDES SUFFICIENT COOLING SURFACE FOR COMPRESSORS HAVING CAPACITY UP TO 50 C.F.M. (PISTON DISPLACEMENT).

REVISIONS
REDRAWN FROM APPROVED PLAN S-555-A DATED 10-23-22 AND REVISED.
C APRIL 23, 1934. APPROVED:- A.H. Rudd
D SEPTEMBER 15, 1937. C.D. APPROVED:- H.S. Stackhouse

1 SHEET

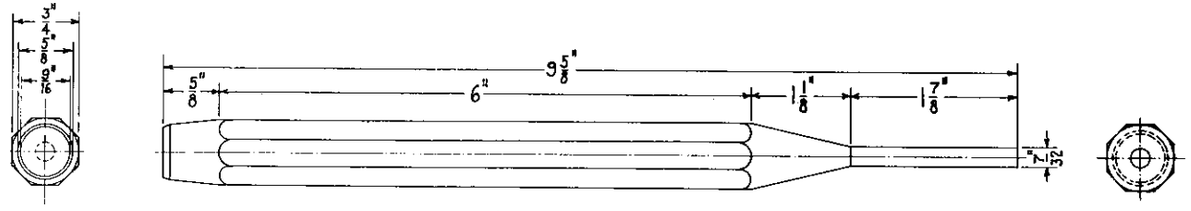
S-555-D

THE PENNSYLVANIA RAILROAD
STANDARD
ATMOSPHERIC AFTERCOOLER AND DRIP FEED

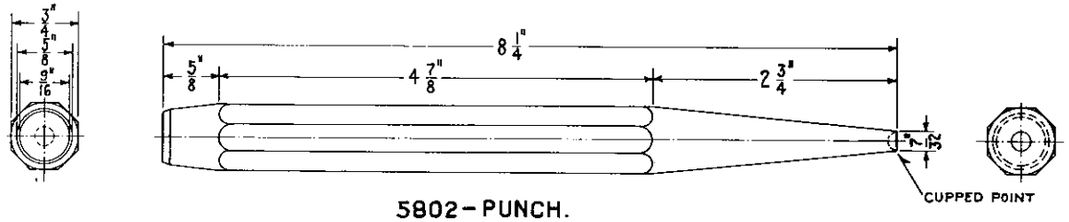
OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA. JUNE 20 1927

Approved A.H. Rudd Chief Signal Engineer

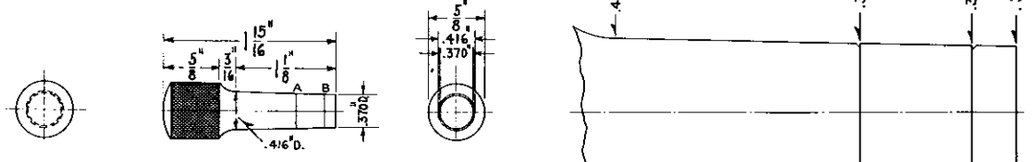
Approved [illegible] Chief Engineer



5801 - DRIFT.



5802 - PUNCH.



5803 - GAUGE.
HARDENED STEEL

5803 ENLARGED.

NOTE:

5801 AND 5802 SHALL BE MADE OF JESSOP TOOL STEEL, OR STEEL OF EQUALLY GOOD GRADE AND TEMPERED SO THEY WILL NOT BEND, BUT NOT HARD ENOUGH TO BREAK; POINTS TEMPERED HARD.

5803 SHALL BE USED FOR GAUGING 3/8" HOLE IN RAIL FOR RAIL BOND TERMINAL, PLAN S-179. GAUGE SHALL ENTER RAIL (FROM SAME SIDE AS DRILL) TO A POINT BETWEEN MARKS A AND B.

REVISIONS

1 SHEET

S-580-A

PENNSYLVANIA RAILROAD SYSTEM
STANDARD

TOOLS AND GAUGE

OFFICE OF CHIEF SIGNAL ENGINEER, PHILA., PA., APRIL 27, 1923.

Approved

Chief Signal Engineer

Approved

Chief Engineer