

The Union Switch & Signal Co.

Swissvale, Pa.

A CATALOGUE AND PRICE LIST

OF

**Interlocking and
Signaling Devices**

MADE BY

**THE
UNION SWITCH & SIGNAL Co.
OF PITTSBURGH, PA.**

**Owners of the Westinghouse System of Electro-Pneumatic
Block Signaling and Interlocking.**

**Also Designers, Manufacturers and Erectors of Pneumatic, Electro-
Pneumatic, Electric, Electro-Mechanical, and Purely
Mechanical Appliances for Railway Protection.**

**Automatic, Semi-Automatic and Manually Operated
Block Signals.**

**Electro-Pneumatic, Electric and Mechanical Interlockings to
suit conditions.**

Plans and Estimates on Application.

**General Office and Works
SWISSVALE, PA.**

**New York
Central Bldg.**

**Chicago
Monadnock Bldg.**

**St. Louis
Frisco Bldg.**

**Montreal
Sovereign Bank Bldg.**

SECTION XI

ELECTRIC LOCKS
ELECTRIC SLOTS
HAND RELEASES AND
TIME LOCKS

REPRINT OF THE FIRST EDITION, 1904

The Union Switch & Signal Company's Publishing Department,
Swissvale, Pa.

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PREFACE

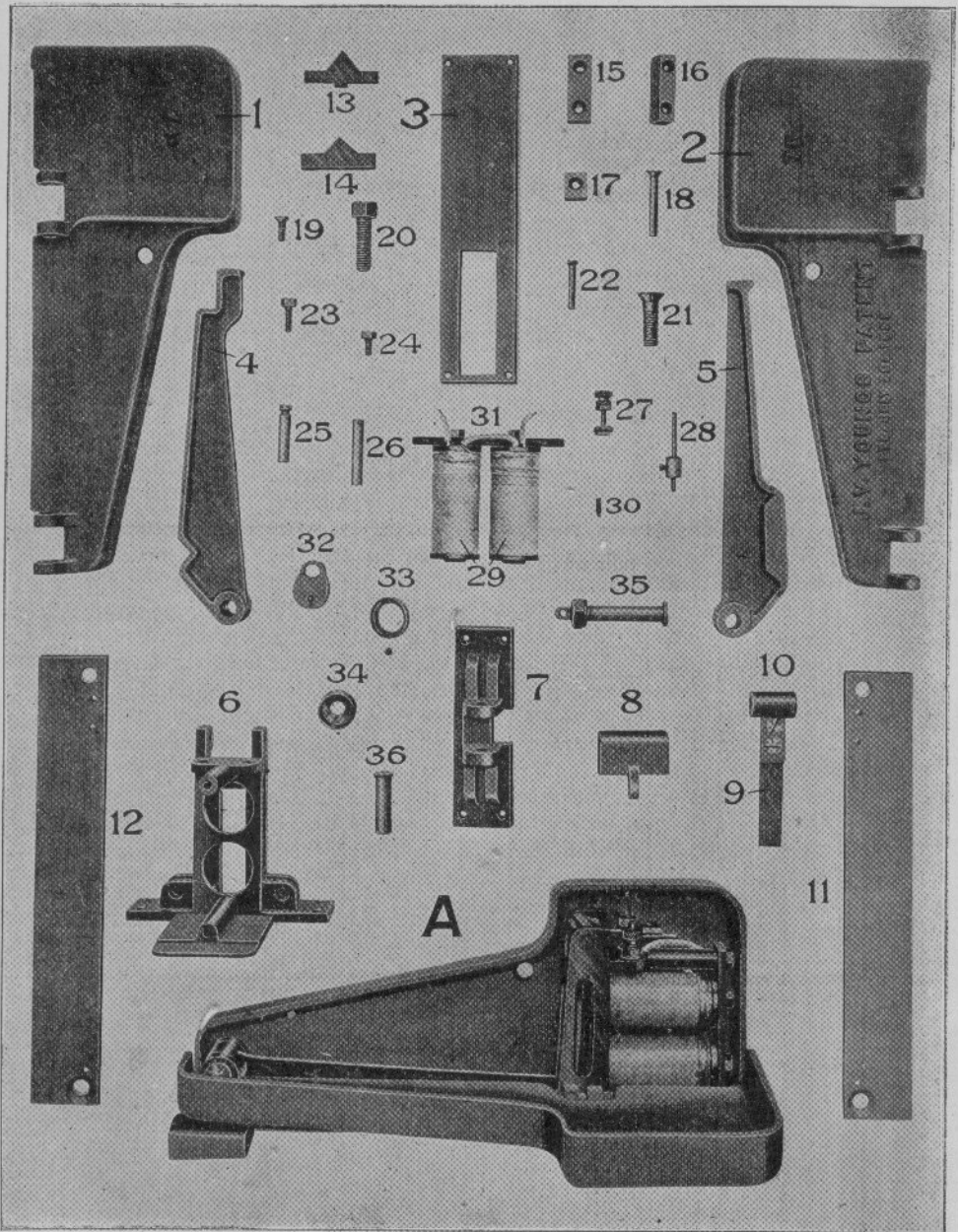
This section of our Catalogue treats of the detail and application of those adjuncts in general use wherein certain refinements are supplemental to a mechanical interlocking plant.

The electric locks regulate automatically such functions as are brought under their control. The hand releases, mechanical or electrical, allow of the manipulation of the interlocking by cutting out the electric locking and temporarily introducing a compensating feature in order that the machine may be set normal, but before any further routing may be done the hand release must be placed normal, whereby the electric locking is again effective. The electric slot automatically controls the movement of a signal arm to which it is an intermediary. The time lock provides a mechanical means of controlling the routing for a predetermined period, so that once a signal has been placed normal the switches can not be moved until a set time period has elapsed.

From those who are not familiar with the application of any of these devices we would invite inquiry with a statement of the existing conditions, together with what is desired to be accomplished.

The Union Switch and Signal Co.

Swissvale, Pa., Nov., 1904.



MODEL No. 1 ELECTRIC LOCK

MODEL No. 1 ELECTRIC LOCK

Applicable to a Stevens, or an Improved Saxby & Farmer interlocking machine. (See Plate 1101).

Locking is not included in these prices and should be ordered separately.

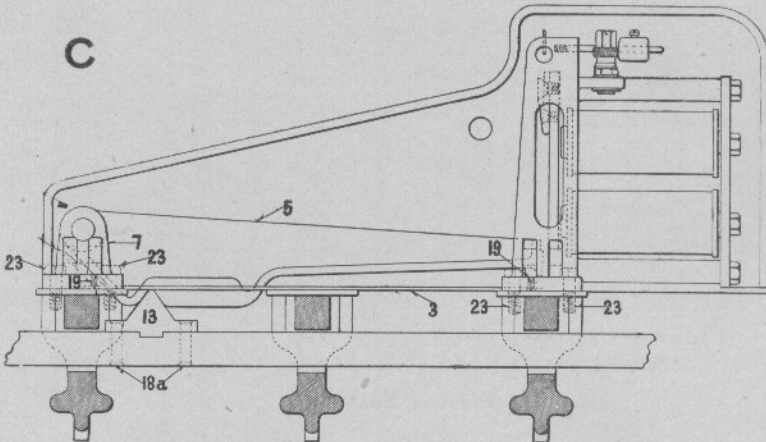
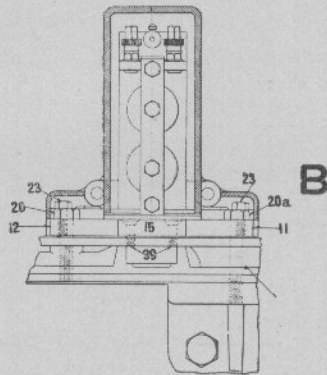
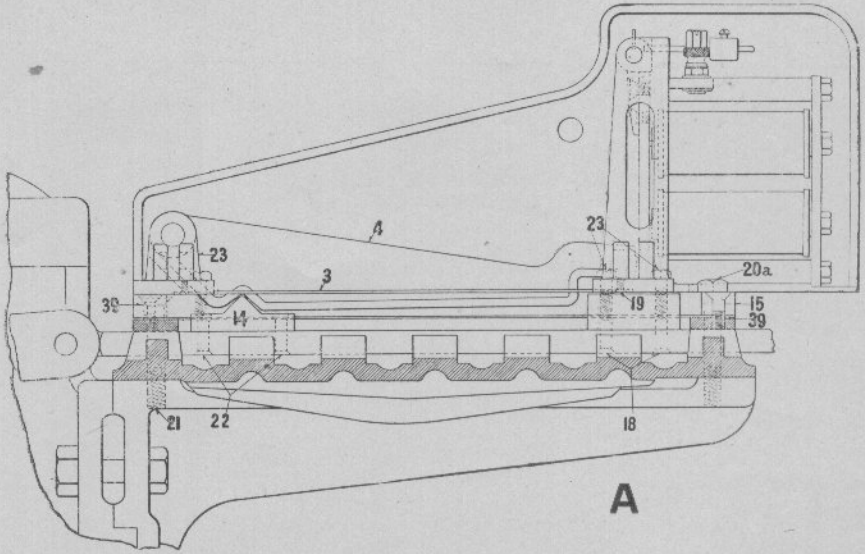
ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Model No. 1.1 Electric Lock complete, for application to a Stevens machine.....	44 00
A1	No. A with the necessary fastenings, and fillers for a Stevens machine.....	44 50
B	Model No. 1.2 Electric Lock complete, for application to an I. S. & F. machine.....	44 00
B1	No. B with the necessary fastenings for an I. S. & F. machine.....	44 50
1	Right Hand Cover for mechanism.....	2 44
2	Left Hand Cover for mechanism.....	2 44
3	2 ⁵ / ₁₆ " x 9 ³ / ₁₆ " No. 14 Sheet Iron Plate, slotted, for connecting No. 6 and No. 7 (for use on an I. S. & F. machine).....	60
3a	No. 3 for use on a Stevens machine.....	60
4	Brass Locking Lever for a Stevens machine....	2 10
5	Brass Locking Lever for an I. S. & F. machine..	2 10
6	Brass Magnet Bracket	7 90
7	Brass Fulcrum Bracket for No. 4 or No. 5.....	1 60
8	Cast Iron Cap.....	45
9	Norway Iron Armature.....	30
9a	No. 9 and No. 10, with two 1/2"x1/4"-20 Flat Head Machine Screws for fastening No. 9 to No. 10	1 25
10	Brass Pivot Bracket for No. 9.....	54
11	Right Hand Supporting Strip (1/2"x2" x 13 ³ / ₁₆ " iron) for use on a Stevens machine.....	60
12	Left Hand Supporting Strip (1/2"x2" x 13 ³ / ₁₆ " iron) for use on a Stevens machine.....	60
13	C. R. S. Dog for use on an I. S. & F. machine..	42
14	C. R. S. Dog for use on a Stevens machine....	46
15	C. R. S. Filler for use on a Stevens machine....	12
16	C. R. S. Dog for use on a Stevens machine....	12
17	C. R. S. Filler for use on a Stevens machine....	08
18	1/4"x13/8" Flat Head Rivet for fastening No. 16 to tappet of a Stevens machine.....	01
18a	1/4"x11/8" Flat Head Rivet for fastening No. 13 to longitudinal locking bar.....	01
19	1/4"-No. 6-32 Flat Head Brass Screw for securing No. 3 to No. 6 or No. 7.....	01

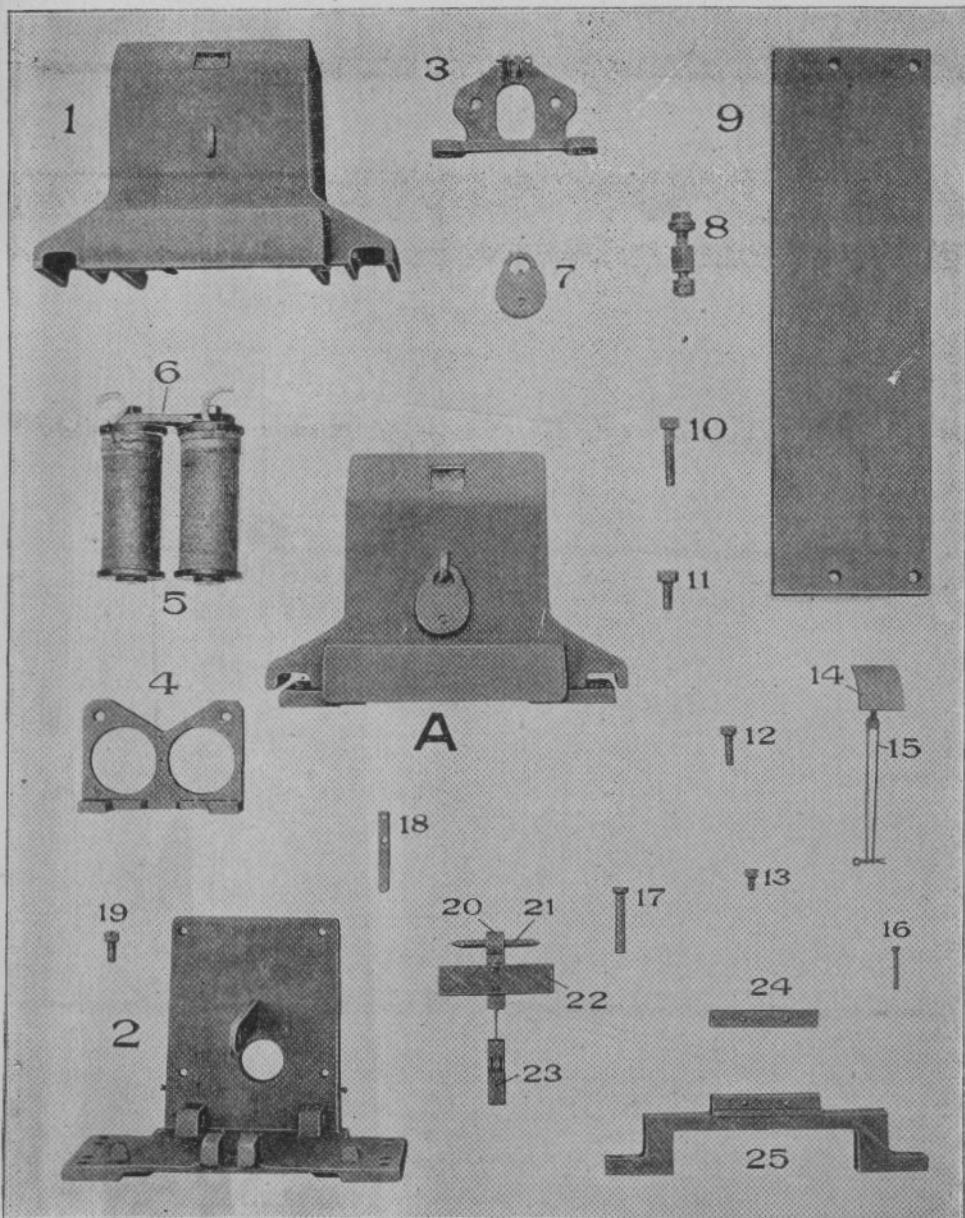
MODEL No. 1 ELECTRIC LOCK

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
20	$\frac{3}{8}$ "x $1\frac{3}{4}$ " Hexagon Head Tap Bolt for securing No. 11 or No. 12 to Stevens machine.....	03
20a	$\frac{3}{8}$ "x $2\frac{1}{2}$ " Hexagon Head Tap Bolt for securing No. 11 or No. 12 to Stevens machine.....	06
21	$\frac{3}{8}$ "x $1\frac{3}{4}$ " Flat Head Tap Bolt for securing No. 11 or No. 12 to Stevens machine.....	06
21a	$\frac{3}{8}$ "x $2\frac{1}{2}$ " Flat Head Tap Bolt for securing No. 11 or No. 12 to Stevens machine.....	06
22	$\frac{1}{4}$ "x $\frac{7}{8}$ " Fillister Head Rivet for fastening No. 14 to tappet.....	01
23	$\frac{1}{4}$ "x $\frac{3}{4}$ " Hexagon Head Tap Bolt for fastening A or B to machine.....	05
24	$\frac{1}{2}$ "x $\frac{1}{4}$ "-20 Hexagon Head Tap Bolt for fastening No. 31 to No. 6 or No. 29.....	05
25	$\frac{3}{8}$ "x $1\frac{3}{4}$ " Turned Pin for fastening No. 1, No. 2 or No. 8 to No. 6 or No. 7.....	03
26	$\frac{3}{8}$ "x2" Turned Pin for No. 10.....	03
27	Standard Brass Binding Post with Hexagon Nut; Thumb Nut; Brass Washers and Mica Washers, complete as illustrated.....	18
28	Brass Counterweight with No. 30 Brass Rod and $\frac{1}{4}$ "-No. 6-32 Fillister Head Brass Set Screw, complete as illustrated.....	12
29	Magnets (specify resistance) with 1 of No. 31 and 2 of No. 24.....	5 50
30	$\frac{1}{2}$ "-No. 10-32 Headless Set Screw for securing No. 25.....	03
30a	$\frac{3}{8}$ "-No. 10-32 Headless Set Screw for securing No. 25.....	03
31	Norway Iron Back Strap.....	30
32	Bohannon Padlock.....	85
33	Brass Cup Washer for No. 35.....	09
34	Brass Cap for No. 33.....	09
35	Special Turned Pin and Eye Bolt with Nut for securing No. 1 to No. 2.....	32
36	$\frac{1}{2}$ "x $1\frac{3}{4}$ " Round Head Turned Pin for No. 4 or No. 5.....	08
37	$\frac{11}{16}$ "-No. 46 Bronze Pin for securing No. 26 to No. 6.....	01
38	Hard Rubber Bushing for No. 6 and No. 27.....	03
39	$\frac{1}{4}$ "x $\frac{3}{4}$ " Flat Head Machine Screw for fastening Nos. 16 and 17 to Stevens Locking Plate....	02



A. Application of Model No. 1 Lock to Stevens Machine
 B. End View of A
 C. Application of Model No. 1 Lock to I. S. & F. Machine



MODEL No. 2 ELECTRIC LOCK
 (Style "B" Electric Lock)

MODEL No. 2 ELECTRIC LOCK
(Style "B" Electric Lock)

Applicable to the Improved Saxby & Farmer interlocking machine on either longitudinal or cross locking. A mechanical hand release may be used in connection with the electric lock when applied to longitudinal locking bar.

If for a machine in service, furnish dog sheet and state whether the necessary change in locking is desired. The change in locking is not included in the prices of locks in this list, and should be ordered separately.

ORDER BY PLATE, LETTER OR NUMBER

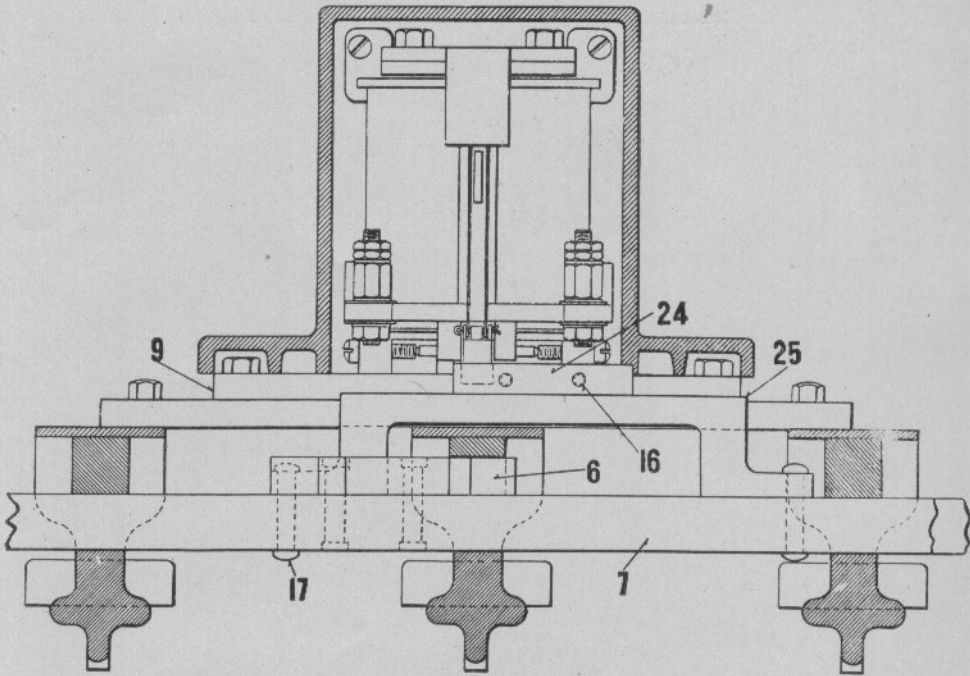
No.		List Price
A	Model No. 2.1 Electric Lock complete as illustrated	24 80
AI	Model No. 2.1 Electric Lock complete as per A with (1-9; 4-10; 4-11; 2-16; 2-17; 1-24; and 1-25). For use without mechanical hand release	29 50
B	Model No. 2.2 Electric Lock complete as per A. For use with mechanical hand release using No. 23a in place of No. 23.....	26 10
BI	Model 2.2 Electric Lock complete as per B with (1-9; 4-10; 4-11; 2-16; 2-17; 1-24; and 1-25). For use with mechanical hand release.....	30 80
CI	Model No. 2.1 Electric Lock for application to cross-locking complete as per A with (1-9a; 4-10; 4-11; 1-26; 2-27; 1-28; and 2-29).....	28 00
1	Cast Iron Cover complete with Glass for indicator opening, Clamps, Screws and 1/8" Stud as illustrated.....	2 40
2	Cast Iron Base with Staple and 1/8" Side Pins, as illustrated for A.....	4 15
2a	No. 2 Slotted for B.....	4 30
3	Brass Upper Bracket for No. 5 and split cotter..	1 00
4	Brass Lower Bracket for No. 5.....	1 00
5	Electro-Magnet (specify resistance) with Back Strap and Hexagon Head Tap Bolts.....	5 50
6	Norway Iron Back Strap for No. 5.....	30
7	Bohannon Pad Lock.....	85
8	Binding Post for No. 5 complete with Nuts and Washers	18
9	3/8"x3 1/4"x10" Supporting Strip for No. 2.....	90
9a	1/4"x7"x7" Supporting Plate for No. 2 of CI.....	1 50
10	1/4"x1" Tap Bolt for fastening No. 9 to No. 19 of Plate 154, Section I.....	03
11	1/4"x3/4" Cap Screw for fastening No. 2 to No. 9.	03

MODEL No. 2 ELECTRIC LOCK

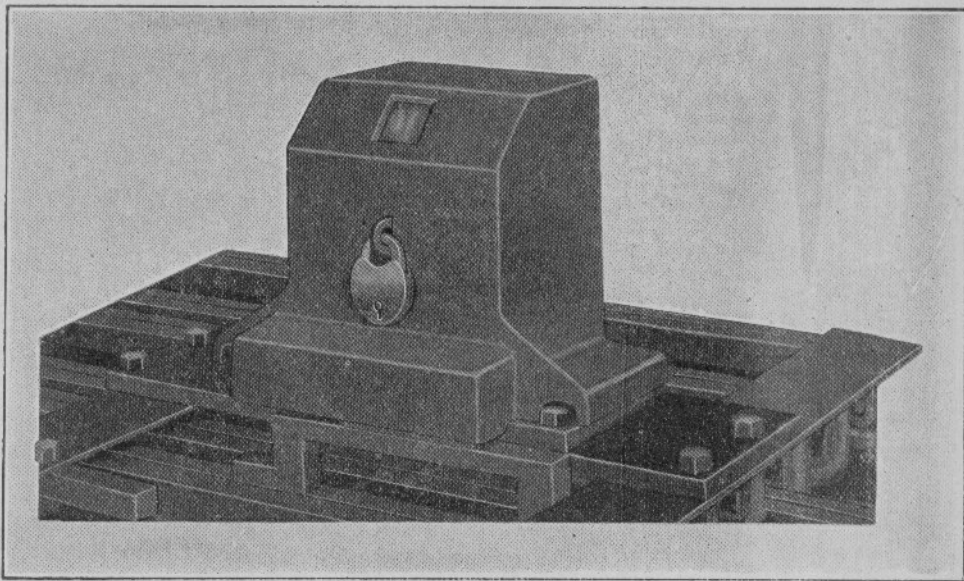
(Style "B" Electric Lock)

ORDER BY PLATE, LETTER OR NUMBER

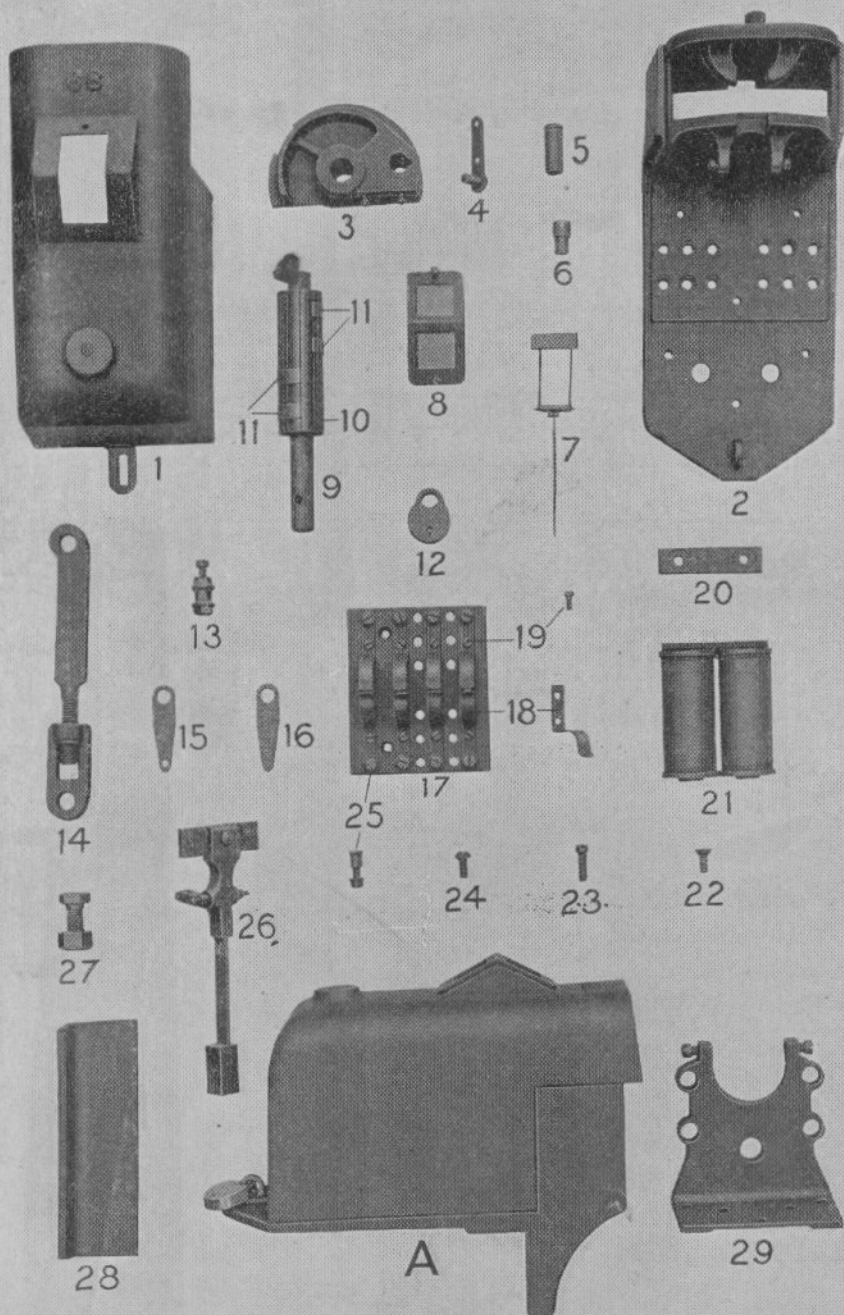
No.		List Price
12	$\frac{11}{16}$ "-No. 12-32 Fillister Head Brass Bearing Screw for No. 21.....	01
13	$\frac{1}{4}$ "-No. 4-40 Fillister Head Brass Screw for securing No. 18 to No. 2.....	01
14	Phosphor Bronze Indicator Card with Brass Arm and Rivet.....	60
15	Pair of Phosphor Bronze Links and Split Cotter for connecting No. 14 to No. 23.....	35
16	$\frac{1}{8}$ "x $\frac{3}{4}$ " Rivet for fastening No. 24 to No. 25....	01
17	$\frac{1}{4}$ "x $1\frac{1}{4}$ " Rivet for fastening No. 25 to locking...	01
18	Phosphor Bronze Spring for No. 23.....	18
19	$\frac{1}{2}$ "-No. 12-32 Fillister Head Brass Screw for fastening No. 3 and No. 4 to No. 2.....	01
20	Brass Armature Bar with rivets.....	54
20a	No. 20 with No. 21.....	60
20b	No. 20a with No. 22.....	1 00
20c	No. 20b with No. 23.....	1 90
20d	No. 20b with No. 23a.....	3 20
21	Steel Armature Shaft for No. 20.....	05
22	Norway Iron Armature with two $\frac{13}{32}$ " No. 4-32 Fillister Head Brass Screws.....	10
23	Lock Piece with Phosphor Bronze Lever and Rivets for ordinary use.....	74
23a	No. 23 with Roller and Shaft for "B" (used with mechanical hand release).....	2 10
24	Guard Plate for No. 25.....	34
25	C. R. S. Locking Dog for A or B.....	3 20
25a	No. 25 with (1-24; 2-16; and 2-17).....	3 60
26	C. R. S. Locking Dog for C1, not illustrated....	30
27	$\frac{1}{4}$ "x $1\frac{3}{4}$ " Fillister Head Rivet for fastening No. 26 to locking, not illustrated.....	01
28	No. 10 Phosphor Bronze Spring for C1, not illus.	1 00
29	$\frac{1}{4}$ "x $\frac{1}{2}$ " Cap Screw for fastening No. 28 to machine, not illustrated.....	05



Nos. 9, 16, 17, 24 and 25 refer to Plates 1105 and 1106
and 7 to Plate 1141



Application of Model No. 2 Electric Lock to an I. S. & F.
Interlocking Machine



MODEL No. 3 ELECTRIC LOCK
 (The Union Electric Lock)

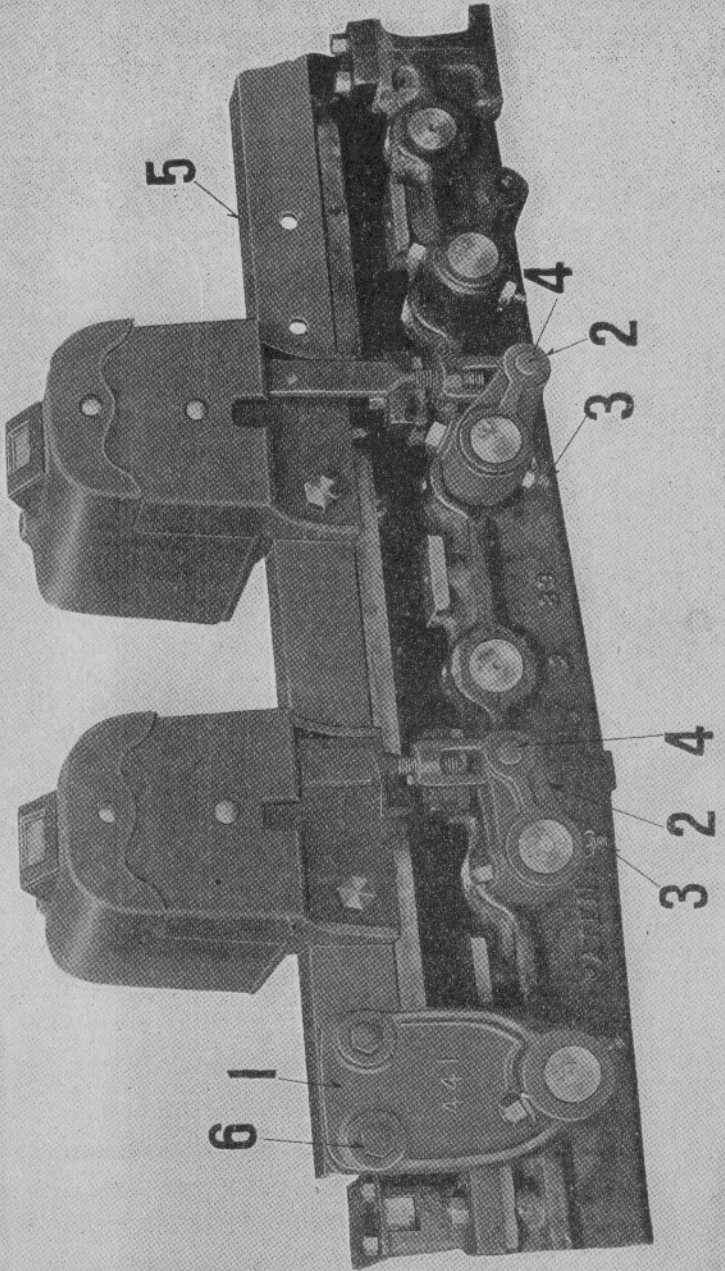
MODEL No. 3 ELECTRIC LOCK
(The Union Electric Lock)

When ordering Model No. 3 Electric Lock, specify the type of machine with which it is to be used.

The fittings for attaching the lock are not included in this list and should be ordered separately. These fittings will vary according to the type of machine to which the lock is to be attached.

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Model No. 3.1 Electric Lock, complete as illustrated	
1	Cast Iron Cover, as illustrated.....	44 00
2	Cast Iron Base, as illustrated.....	2 00
3	Segmental Locking Dog with two $\frac{3}{8}$ "-No. 8-32 Fillister Head Brass Screws.....	4 90
4	Phosphor Bronze Strip with Steel Pin for fasten- ing No. 3 to No. 9.....	1 10
5	$\frac{1}{2}$ "x $1\frac{1}{4}$ " Round Head Turned Pin for connecting No. 3 to No. 14.....	10
6	$\frac{1}{2}$ "x $\frac{7}{8}$ " Steel Stud for No. 2.....	05
7	Indicator, complete as illustrated.....	05
8	Indicator Frame, Celluloid Shield and two $\frac{1}{4}$ "- No. 6-32 Fillister Head Brass Screws, as il- lustrated	89
9	$\frac{5}{8}$ "x $6\frac{3}{4}$ " C. R. S. Shaft.....	1 00
10	$1\frac{1}{4}$ "x $3\frac{3}{4}$ " Hard Rubber Drum for No. 9.....	16
11	Phosphor Bronze Contact Spring for No. 10....	1 52
12	Bohannon Padlock.....	04
13	Brass Binding Post with Nuts, Brass Washers, Mica Washers, Bushing and $\frac{1}{2}$ "-No. 12-24 Fillister Head Brass Screw, complete as il- lustrated	85
14	Wrought Iron Link with Malleable Screw Jaw for No. 3.....	18
15	Phosphor Bronze Contact Spring with Platinum Disc	30
16	Phosphor Bronze Contact Spring with Platinum Point	72
17	Hard Rubber Base.....	58
18	Phosphor Bronze Contact Spring for No. 17....	85
19	$\frac{3}{8}$ "-No. 8-32 Fillister Head Brass Screw for se- curing No. 18 to No. 17.....	72
20	Back Strap for No. 21.....	01
21	Electro-Magnet (specify resistance) with Back Strap	30
22	$\frac{5}{8}$ "x $\frac{3}{4}$ "-20, Flat Head Screw for securing No. 20 to No. 21.....	5 50
23	$\frac{3}{4}$ "-No. 12-32 Fillister Head Brass Screw for se- curing No. 17 to No. 2.....	01
24	$\frac{1}{2}$ "- $\frac{1}{4}$ "-20 Round Head Screw for securing No. 29 to No. 2.....	01
25	Brass Binding Post with Bushing, Brass Washer, and $\frac{1}{2}$ "-No. 10-32 Fillister Head Brass Screw as illustrated, for fastening No. 18 to No. 17...	18
26	Armature and Counterweight complete as illus- trated	2 35
27	$\frac{1}{2}$ "x $1\frac{1}{4}$ " Bolt with Nut for fastening No. 28 to the machine frame and No. 2 to No. 28.....	05
28	$1\frac{3}{8}$ "x2" Angle Iron for supporting A, per lineal foot.....	18
29	Brass Magnet Bracket with two $\frac{1}{8}$ "- $\frac{1}{4}$ "-32 Fil- lister Head Brass Trunnion Screws, as illus- trated	2 10

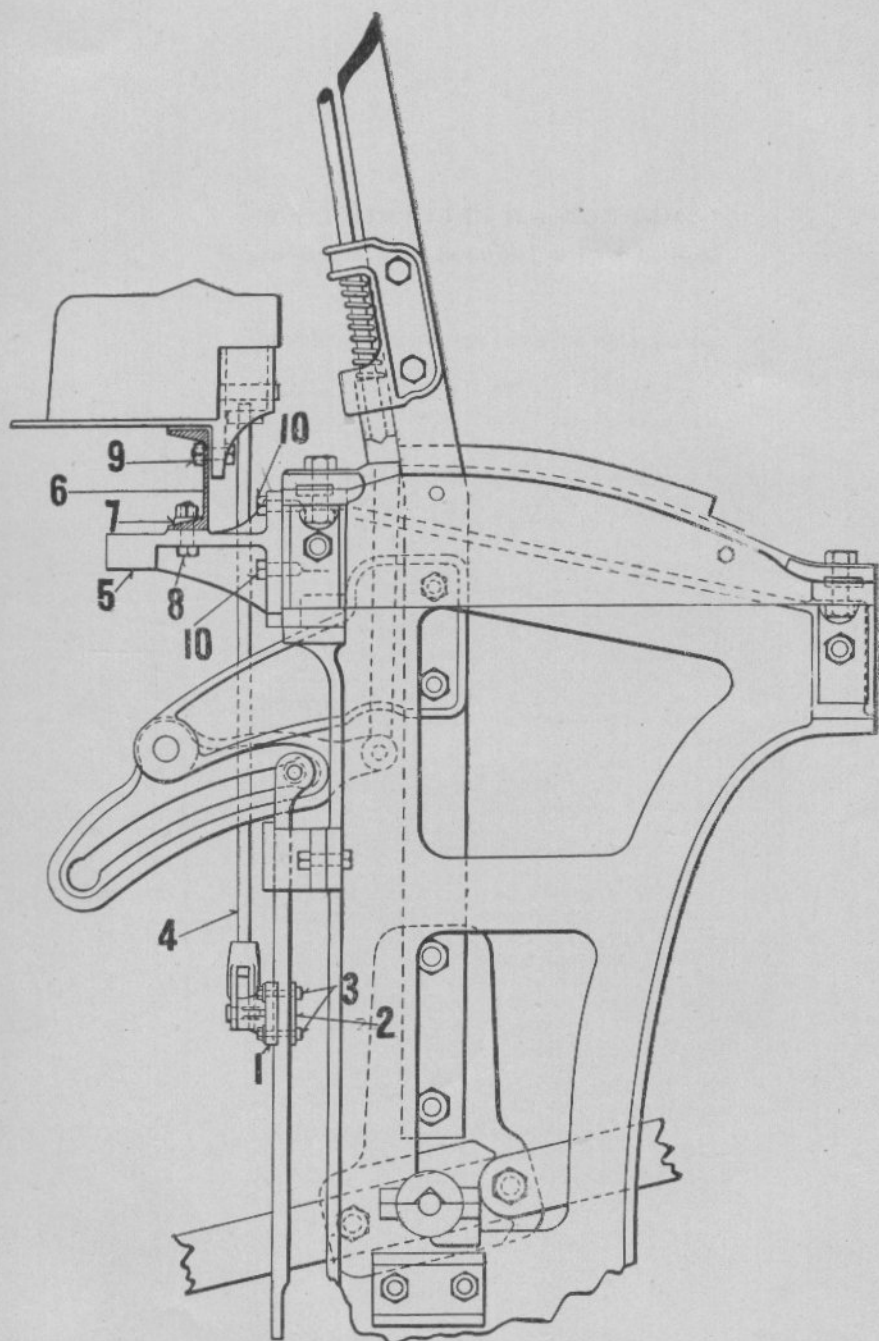


MODEL No. 3 ELECTRIC LOCK
(Applied to an I. S. & F. Machine)

MODEL No. 3 ELECTRIC LOCK
(Applied to an I. S. & F. Machine)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Fittings complete for attaching Model No. 3 Electric Lock to an I. S. & F. machine (2-1, 1-2, 3-3, 1-4,) and (18½" of 28, 6-27 Plate 1110)	5 62
A1	Model No. 3 Electric Lock with fittings for application to an I. S. & F. machine (1-A and 1-A Plate 1110).....	49 62
1	Cast Intermediate Bracket for supporting angle iron No. 28, Plate 1110.....	1 26
1a	Cast End Bracket for supporting angle iron. No. 28, Plate 1110. (State whether left hand or right hand is desired).....	1 70
2	Cast Arm for connecting No. 14, Plate 1110, to extended locking shaft.....	88
3	¾"x2¾" Tap Bolt with Hexagon Nut, Washers and Cotter for fastening Nos. 1 and 2 to extended locking shafts.....	12
4	½"x2" Round Head C. R. S. Pin for No. 2.....	08
5	See No. 28, Plate 1110.....	
6	See No. 27, Plate 1110.....	

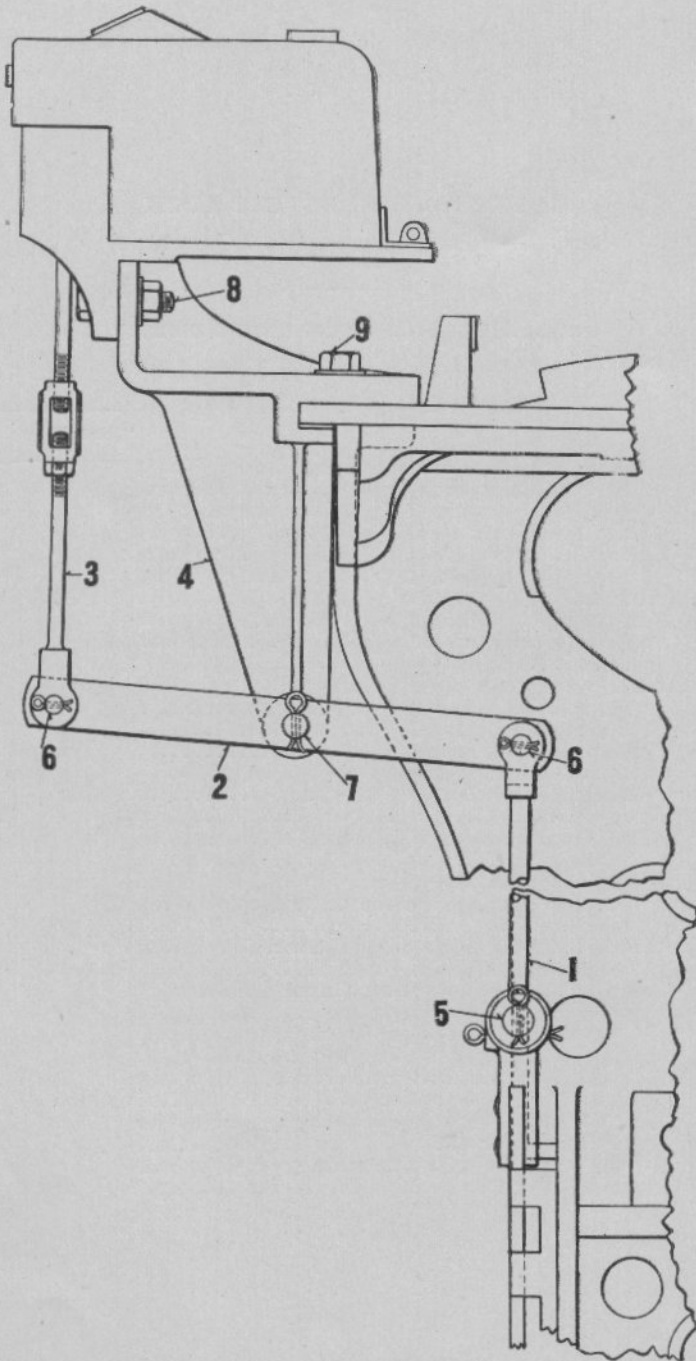


MODEL No. 3 ELECTRIC LOCK
(Applied to a Johnson No. 1 Machine)

MODEL No. 3 ELECTRIC LOCK
 (Applied to a Johnson No. 1 Machine)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Fittings complete for attaching Model No. 3 Electric Lock to a Johnson No. 1 Machine when lock is at end of machine frame, (1-1a, 1-4, 1-5, 1-5a, 2 feet of 6, 2-7, 4-8, 4-9, 6-10).....	7 80
A1	Fittings as per A, when lock is in middle of machine frame (1-1a, 1-4, 2-5a, 2 feet of 6, 2-7, 4-8, 4-9, 8-10).....	8 00
B	Fittings and Model No. 3 Electric Lock complete for attaching to a Johnson No. 1 Machine. (1-A, 1-A Plate 1110).....	51 80
B1	Fittings and Model No. 3 Electric Lock complete for attaching to middle of a Johnson No. 1 Machine. (1-A1, 1-A Plate 1110).....	52 00
1	Cast Tappet Bar Bracket.....	32
1a	Cast Tappet Bar Bracket with Clamp, Bolts, Nuts and Washers, (1-1, 1-2, 2-3).....	54
2	Wrot Clamp.....	14
3	$\frac{3}{8}$ "x2" Machine Bolts with Hexagon Nut and Cut Washer.....	07
4	Wrot Link with Screw Jaw, Pin and Cotter on one end and Eye on the other (replaces No. 14 Plate 1110).....	1 50
5	Cast Bracket for supporting channel iron at left hand end of machine frame.....	1 28
5a	Cast Bracket for supporting channel iron at right hand end of machine frame.....	1 44
6	4" Channel 6.25 pounds per lineal foot, per foot..	68
7	Special Wrot Taper Washer for No. 8.....	28
8	$\frac{1}{2}$ "x1 $\frac{5}{8}$ " Machine Bolt with Hexagon Nut for fastening No. 6 to No. 5.....	06
9	$\frac{1}{2}$ "x1 $\frac{3}{8}$ " Machine Bolt with Hexagon Nut for fastening lock to No. 6.....	06
10	$\frac{1}{2}$ "x1 $\frac{1}{4}$ " Tap Bolt for fastening 5 or 5a to machine frame.....	03

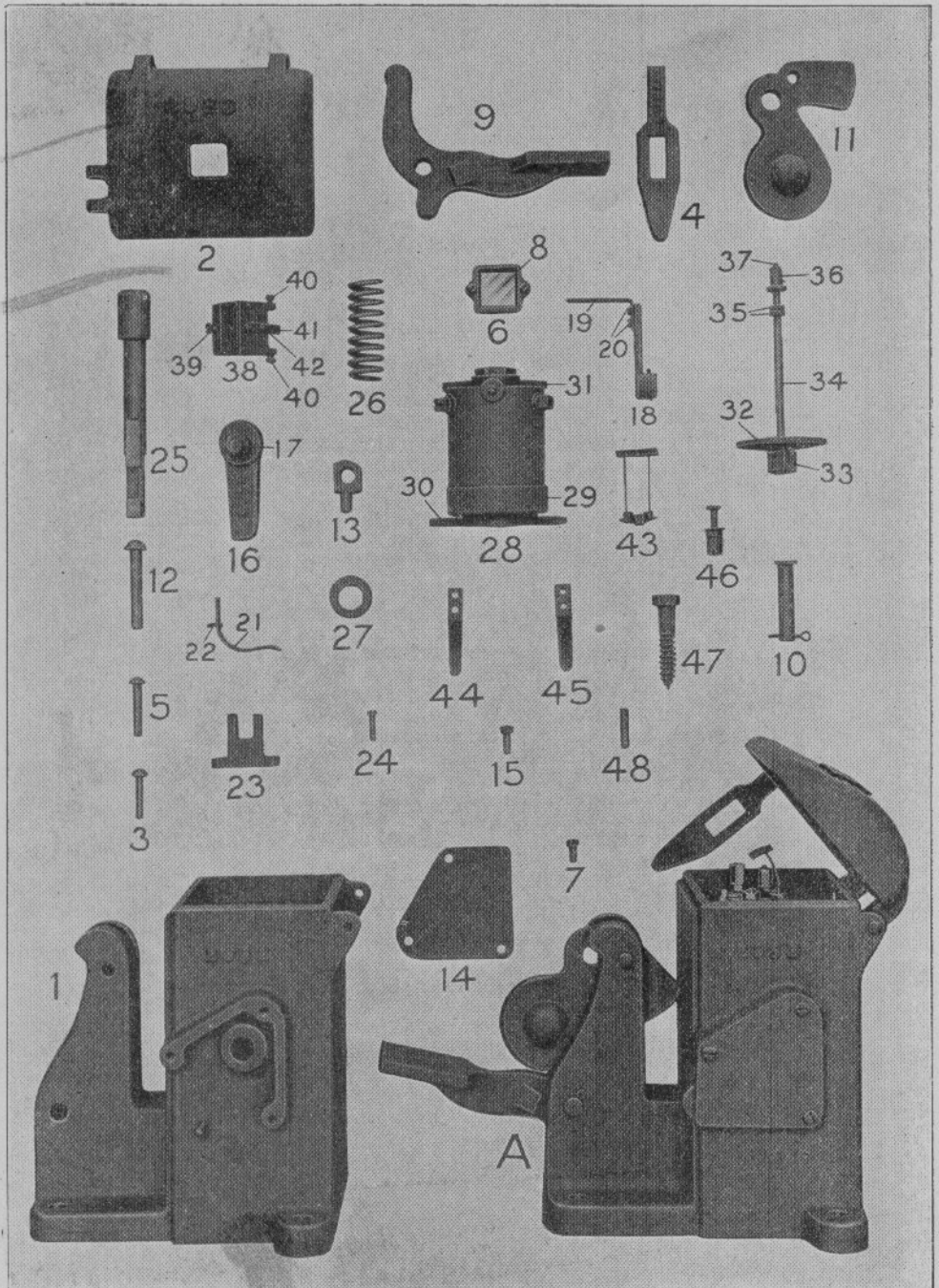


MODEL No. 3 ELECTRIC LOCK
(Applied to a National Machine)

MODEL NO. 3 ELECTRIC LOCK
(Applied to a National Machine)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Fittings complete for applying Model No. 3 Lock to a National Machine. (1-1, 1-2, 1-3, 1-4, 1-5, 2-6, 1-7, 2-8, 2-9).....	11 70
B	Fittings and Model No. 3 Lock for application to a National Machine. (1-A, 1-A Plate 1110)...	55 70
1	Rod with Eye on one end and Solid Jaw on the other, for connecting No. 2 to tappet.....	2 80
2	Wrot Lever.....	35
3	Adjustable Link with Solid Jaw on one end, Eye on the other, and Adjusting Screw with Jamb Nuts	5 34
4	Cast Bracket.....	1 38
5	$\frac{3}{4}$ "x $3\frac{1}{16}$ " Pin with Cotter for fastening No. 1 to tappet	12
6	$\frac{1}{2}$ "x $1\frac{3}{8}$ " Pin with Cotter for fastening Nos. 1 and 3 to No. 2.....	09
7	$\frac{5}{8}$ "x2" Stud with Cotter for supporting No. 2....	11
8	$\frac{1}{2}$ "x $1\frac{1}{2}$ " Machine Bolt with Nut for fastening lock to No. 4.....	07
9	$\frac{1}{2}$ "x $1\frac{1}{4}$ " Tap Bolt for fastening No. 4 to machine frame	03



MODEL No. 4 ELECTRIC LOCK
(Switch Stand Electric Lock)

MODEL No. 4 ELECTRIC LOCK

(Switch Stand Electric Lock)

Applicable to the Low and High Rotary Switch Stands, Models 5, 6, 7 and 8. (Plates 6520 and 6530 of Second Edition, Section No. 6.)

Lag screws or padlock are not included in this list; if desired order separately. Model No. 4.1 differs from Model No. 4.2 in the substitution of a Cam for the Treadle of Model 4.1.

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Model No. 4.1 Electric Lock, complete as illustrated	52 80
B	Model No. 4.2 Electric Lock, complete as A.....	52 80
1	Box as illustrated.....	8 60
2	Door for No. 1.....	96
3	1/4"x1 3/8" Button Head Rivet for fastening No. 2 to No. 1.....	01
4	Hasp for No. 2.....	40
5	1/4"x1 1/2" Button Head Rivet for fastening No. 4 to No. 2.....	01
6	Indicator Opening Frame.....	36
7	3/8"-No. 6-32 Fillister Head Brass Screw for fastening No. 6 to No. 2.....	03
8	Celluloid Shield for No. 6.....	14
9	Treadle	66
9a	Cam for Model No. 4.2 to replace No. 9 of Model No. 4.1.....	60
10	1/2"x2 1/4" Round Head Pin with Cotter for No. 9 or No. 9a.....	11
11	Latch	1 C2
12	3/8"x2 1/4" Button Head Rivet for fastening No. 11 to No. 1.....	03
13	Staple	15

MODEL No. 4 ELECTRIC LOCK
(Switch Stand Electric Lock)

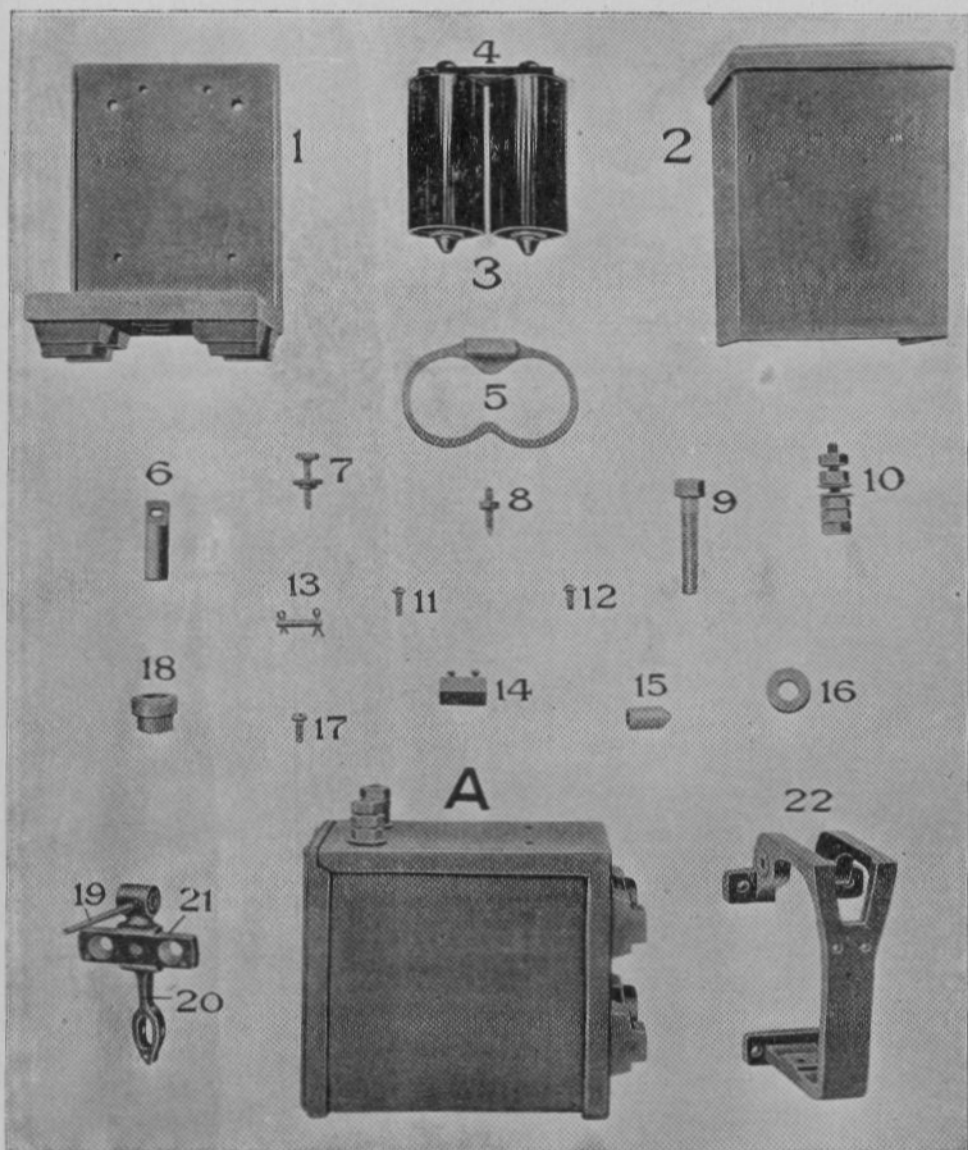
ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
14	Cover Plate for No. 1.....	70
15	$\frac{9}{16}$ "- $\frac{1}{4}$ "-32 Fillister Head Brass Screw for fastening No. 14, No. 30 and No. 31 to No. 1....	03
16	Outside Arm with $\frac{1}{8}$ "x $1\frac{1}{8}$ " Dowel Pin.....	39
17	Turned Pin for No. 16 and No. 18.....	18
18	Inside Arm with $\frac{2}{3}$ "x $1\frac{3}{8}$ " Dowel Pin.....	61
19	No. 14 Phosphor Bronze Locking Strip.....	22
20	$\frac{1}{4}$ "-No. 8-32 Fillister Head Brass Screw for securing No. 19 to No. 18.....	03
21	Steel Spring for No. 16.....	78
22	$\frac{1}{8}$ "x $\frac{7}{16}$ " Button Head Rivet for securing No. 21 to No. 1.....	01
23	Brass Plunger Guide.....	30
24	$\frac{7}{8}$ "-No. 10-32 Fillister Head Brass Screw for fastening No. 23 to No. 1.....	03
25	Steel Plunger.....	1 94
26	Coil Spring for No. 25.....	32
27	Punched Steel Washer for No. 25.....	14
28	Iron Clad Magnet with back strap and binding posts complete as illustrated.....	17 46
29	Magnet Cap.....	1 14
30	Lower Magnet Bracket.....	72
31	Upper Magnet Bracket.....	72
32	Armature.....	1 65
33	Case Hardened Steel Dog with Dowel Pin.....	32

MODEL No. 4 ELECTRIC LOCK
(Switch Stand Electric Lock)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
34	Brass Armature Stem.....	88
35	$\frac{3}{8}$ " Brass Nut for No. 34.....	03
36	Brass Sleeve with Dowel Pin, for No. 34.....	18
37	$\frac{3}{16}$ "x $\frac{3}{8}$ " Fiber Pin for No. 34 and for dowel for fastening No. 44 and No. 45 to No. 1.....	18
38	Brass Bracket for Indicator.....	99
39	$\frac{3}{8}$ "-No. 10-32 Flat Head Screw for fastening No. 38 to No. 1.....	03
40	$\frac{5}{16}$ "-No. 10-32 Fillister Head Brass Trunion Screw for No. 38.....	03
41	No. 20 Phosphor Bronze Spring for Indicator Crank.....	30
42	$\frac{1}{8}$ "-No. 6-32 Fillister Head Brass Screw for fastening No. 41 to No. 38.....	03
43	Brass Indicator Crank with Phosphor Bronze Indicator Card and German Silver Arms, complete as illustrated.....	65
44	No. 16 Phosphor Bronze Spring with Platinum Point.....	82
45	No. 26 Phosphor Bronze Spring with Platinum Disc.....	86
46	Brass Binding Post complete as illustrated, with Hard Rubber Brushing, Brass Washer, Mica Washers, Nut and Lock Nut.....	21
17	$\frac{1}{2}$ "x $2\frac{1}{2}$ " Lag Screw.....	03
8	Steel Pin.....	02
9	Mica Plate Washer for Nos. 44 and 45.....	10



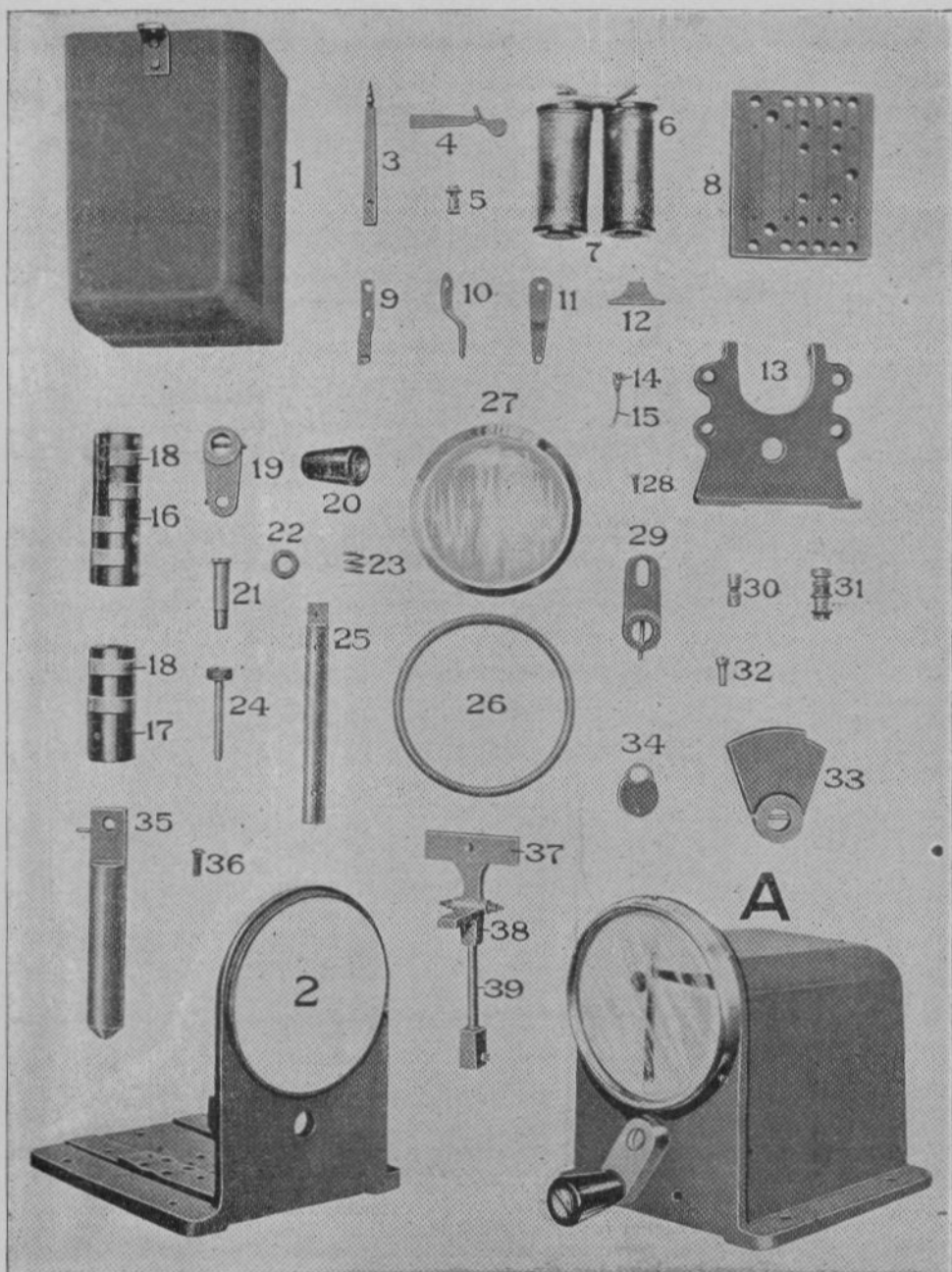
MODEL No. 5 ELECTRIC LOCK
 (National Electric Lock)

MODEL No. 5 ELECTRIC LOCK
(National Electric Lock)

Applicable to a National Interlocking Machine.

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Electric Lock, Model No. 5.1 complete, as shown	18 50
1	Base Casting.....	1 75
2	Cover Casting.....	84
3	Magnets with Backstrap and two $\frac{1}{4}$ "x $\frac{3}{4}$ " Round Head Machine Screws. (State resistance required)	7 10
4	Back Strap for Magnets.....	30
5	Brass Bracket for Magnets.....	75
6	$\frac{1}{2}$ "x1 $\frac{3}{4}$ " Slotted Plunger.....	33
7	$\frac{7}{8}$ "-No. 8-32 Adjusting Screw with nut for plunger	12
8	1 $\frac{1}{4}$ "-No. 10-32 Trunnion Screw with nut.....	06
9	$\frac{3}{8}$ "x2" Hexagonal Head Machine Screw for securing No. 1 to interlocking machine.....	07
10	Binding Post with nuts and washers.....	18
11	$\frac{5}{8}$ "-No. 10-32 Round Head Machine Screw for securing No. 3 to No. 22.....	01
12	$\frac{1}{2}$ "-No. 10-32 Round Head Machine Screw for securing No. 22 to No. 1.....	01
13	$\frac{5}{16}$ "x1" Shaft with split spring cotters for No. 20	03
14	Brass Counterweight with two $\frac{5}{16}$ "-No. 4-36 round head machine screws for armature....	18
15	Releasing Plunger to be used with screw hand release	09
16	$\frac{3}{8}$ " Plate Washer for No. 8.....	01
17	$\frac{1}{2}$ "-No. 8-32 Round Head Machine Screw for securing No. 2 to No. 1.....	01
18	Brass Bushing for No. 6.....	46
19	No. 6 Brass Rod for counterweight.....	02
20	Brass Lever for armature.....	1 50
21	Norway Iron Armature with one $\frac{1}{2}$ "-No. 14-20 Fillister Head Machine Screw for fastening No. 21 to No. 20, and $\frac{1}{8}$ "x $\frac{5}{16}$ " Brass Pins....	1 00
21a	Armature with Lever and Counterweight complete (1-21, 1-20, 1-19, 1-14).....	2 70
22	Brass Bracket for supporting Magnet and Armature Lever.....	2 88
23	Fiber Bushing for No. 10.....	02
24	$\frac{5}{8}$ "-No. 8-32 Round Head Brass Machine Screw for securing No. 5 to No. 22.....	02



MODEL No. 6 ELECTRIC LOCK

With Electrically Locked Circuit Controller and Indicator

MODEL No. 6 ELECTRIC LOCK
(With an Electrically Locked Circuit Controller
and Indicator)

The application of this lock may be seen on Plate 1126 which shows a two lever dwarf machine with a Model No. 6 Lock on each lever. The lock levers are shown normally to the left and designated as left hand.

A similar lock may be placed at a point from which a switch is to be controlled for the purpose of indicating the position of the switch as well as controlling the lock on the switch stand.

There are many situations where the inter-control of functions is desired, that are covered by this lock.

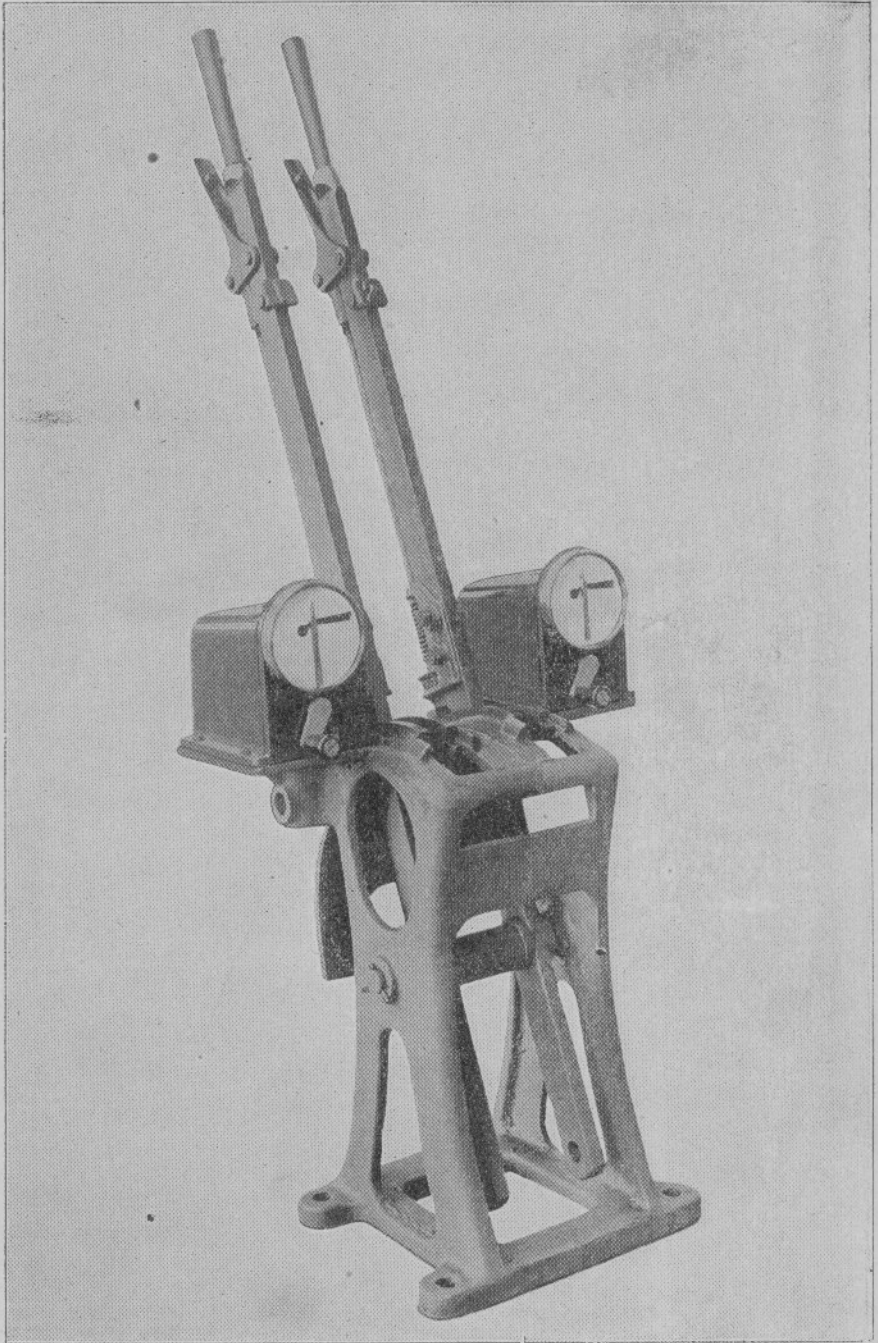
ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Model No. 6.1 Electric Lock, complete as shown for towers or telegraph stations (left hand) ..	56 00
AI	Model No. 6.2 Electric Lock, as per A (right hand)	56 00
B	Model No. 6.3 Electric Lock, Circuit Controller and Indicator (right hand) for dwarf machine	58 41
BI	Model No. 6.3 Electric Lock, Circuit Controller and Indicator (left hand) for dwarf machine	58 41
I	Cover Casting.....	1 75
2	Base Casting for AI.....	5 66
2a	Base Casting for B.....	5 66
2b	Base Casting for BI.....	5 66
3	Indicator Post.....	46
4	Indicator Blade with shaft.....	30
5	Binding Post for No. 8.....	18
6	Back Strap for magnets.....	30
7	Magnets (give resistance required), with back strap	5 50
8	Rubber Base for Circuit Controller.....	1 85
9	No. 24 Phosphor Bronze Contact Spring for No. 16 and No. 18.....	08
10	No. 22 Phosphor Bronze Contact Spring with platinum point.....	68
11	No. 22 Phosphor Bronze Contact Spring with platinum disc.....	72
12	Bracket for supporting No. 4.....	62
13	Spectacle Casting.....	2 04
14	Clamp for indicator shaft.....	30

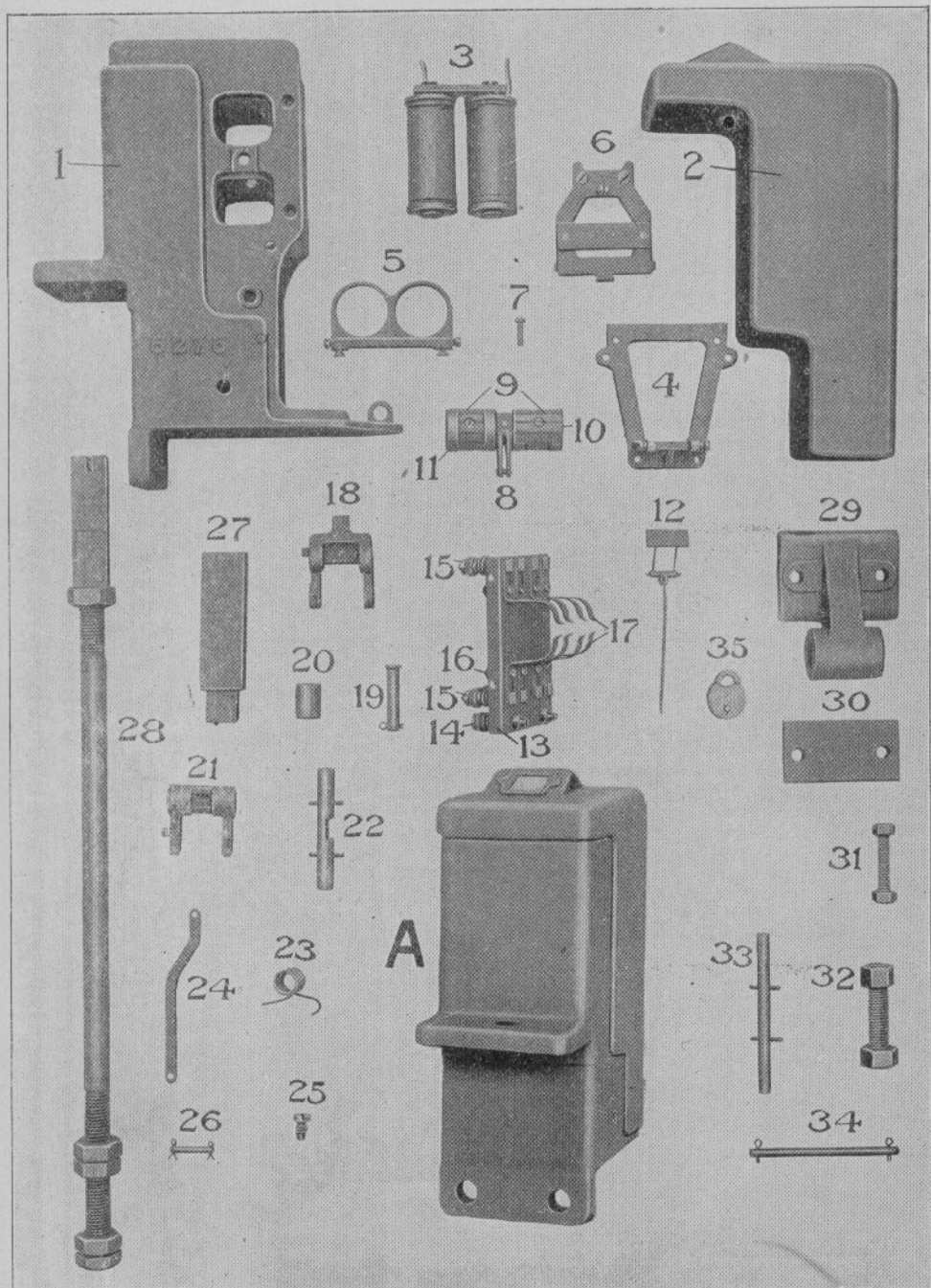
MODEL No. 6 ELECTRIC LOCK
(With an Electrically Locked Circuit Controller
and Indicator)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
15	Link connecting No. 4 and No. 39.....	12
16	Rubber Roller for Circuit Controller for A or A1	1 52
17	Rubber Roller for Circuit Controller for B or B1	1 38
18	Phosphor Bronze Contact Strip for No. 16 and No. 17.....	04
19	Crank Arm for Handle.....	1 04
20	Hard Rubber Handle for No. 19.....	1 10
21	Pin for securing No. 20 to No. 19.....	62
22	Washer for No. 20.....	06
23	Spiral Spring for No. 24.....	18
24	Lock Pin for Handle.....	42
25	Shaft for Circuit Breaker.....	46
26	Retaining Ring for No. 27.....	30
27	Glass Cover for Indicator.....	55
28	$\frac{3}{16}$ "- $\frac{1}{4}$ " Fillister Head Screw for securing No. 9 to No. 8.....	01
29	Crank Arm for B and B1.....	1 30
30	Pin for securing No. 29 to No. 35.....	12
31	Binding Post for No. 13 with nuts and washers..	18
32	Bearing Screw for No. 38.....	03
33	Locking Dog.....	96
34	Bohannon Pad Lock.....	85
35	Tappet for B or B1.....	84
36	$\frac{1}{4}$ " x $\frac{3}{8}$ " Round Head Machine Screw for secur- ing No. 13 to No. 2.....	01
37	Armature	30
38	Armature Bar.....	1 40
38a	Armature Bar with bronze strip and lock piece..	2 10
39	No. 15 Phosphor Bronze Strip with lock piece..	70
40	Rubber Ring.....	06



MODEL No. 6 ELECTRIC LOCK
(Applied to a Two Lever Dwarf Interlocking Machine)



MODEL No. 7 ELECTRIC LOCK

MODEL No. 7 ELECTRIC LOCK

This lock may be applied to any of the standard types of interlocking machines.

The detailed fittings Nos. 28, 29 and 30 shown on Plate 1130 are for connecting Model No. 7 Lock to a Johnson No. 1 machine.

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Model No. 7.1 Electric Lock, complete as illustrated	72 25
1	Case with Staple and Spring Stops, as illustrated	7 95
2	Cover with Hasp and Indicator, as illustrated...	3 05
3	Electro-Magnets (state resistance) with Back Straps and two 1"- $\frac{1}{4}$ "-20 Flat Head Screws..	10 90
4	Brass Back Strap Bracket with two $\frac{3}{8}$ "-No. 10-32 Fillister Head Brass Screws; tapped for No. 12.....	2 20
5	Brass Magnet Bracket with two $\frac{7}{16}$ "-No. 10-32 Flat Head Brass Screws and two $\frac{7}{8}$ "-No. 12-32 C. R. S. Headless Trunnion Screws with Set Nuts.....	1 33
6	Brass Armature Bar with Norway Iron Armature, Steel Stop, one $\frac{3}{16}$ "-No. 4-40 Fillister Head Brass Screw, two $\frac{5}{16}$ "-No. 10-32 Round Head Screws and two $\frac{1}{4}$ "-No. 10-32 Round Head Screws.....	3 10
	$\frac{11}{16}$ "-No. 10-32 Round Head Screw.....	02
	Brass Arm with one $\frac{7}{16}$ " x $\frac{3}{16}$ " Fillister Head Bearing Screw.....	1 20

MODEL No. 7 ELECTRIC LOCK

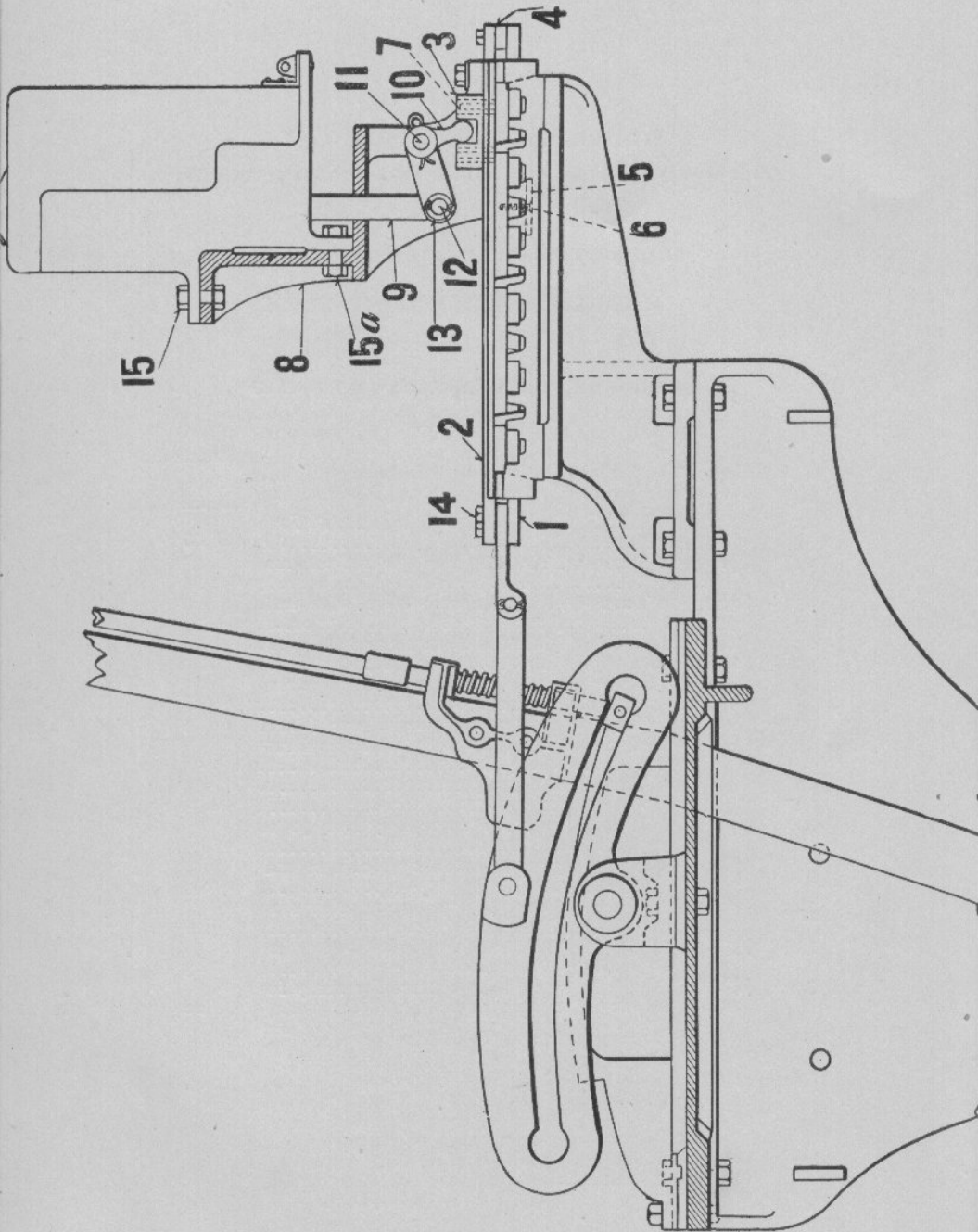
ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
9	1 1/4" x 1 1/16" Hard Rubber Roller with one 3/8"-No. 8-32 Round Head Screw.....	1 22
10	5/8" x 3 1/8" C. R. S. Shaft with No. 28 x 1 1/8" Stub Steel Pins.....	45
11	Phosphor Bronze Contact Spring for No. 9.....	04
12	Indicator with Connecting Link, as illustrated...	89
13	Slate Base for Contact Springs and Binding Posts	2 89
14	Brass Terminal Post with Washers, Nuts, Thumb Nut, and one 1/4"-No. 4-40 Fillister Head Brass Screw.....	18
15	Brass Binding Post with Nut, Thumb Nut and Washers	18
16	3/4"-No. 8-32 Fillister Head Brass Screw with Nut and Washer for securing No. 17 to No. 13...	03
17	Phosphor Bronze Contact Spring.....	72
18	Malleable Iron Plunger Lever with two Steel Lugs	1 12
10	3/8" x 1 7/8" Round Head Turned Pin with Cotter for No. 18.....	05
20	3/4" x 1 1/8" C. R. S. Roller for No. 19.....	22
21	Cast Locking Lever.....	1 05

MODEL No. 7 ELECTRIC LOCK

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
22	1/2"x3 5/8" C. R. S. Shaft with two No. 28x1" Stub Steel Pins.....	66
23	Spring-11 Turns of No. 26 Music Wire, as illustrated	34
23a	Spring-11 Turns of No. 26 Music Wire, with ends parallel	34
24	Brass Connecting Link for Nos. 28 and 8.....	70
25	Steel Trunnion Screw.....	10
26	3/8"x1 1/4" Steel Shaft with cotters for securing No. 24 to No. 28.....	06
27	Cast Tube for guarding connecting wires.....	25
28	Cold Rolled Steel Plunger with nuts, as illustrated	1 98
29	Cast Iron Tappet Bar Bracket.....	92
30	Back Strap for No. 29.....	32
31	3/8"x2" Bolt with nut for fastening No. 30 to No. 29.....	04
32	5/8"x2" Bolt with nut for fastening No. 1 to machine	09
32a	5/8"x2 3/4" Bolt with nut for fastening No. 1 to machine	09
33	3/8"x4 3/4" C. R. S. Shaft with cotters for securing No. 21 to No. 1.....	23
34	1/4"x4 3/8" C. R. S. Shaft with cotters for strap for No. 18.....	22



MODEL No. 7 ELECTRIC LOCK
 (Applied to a Johnson No. 2 Machine)

MODEL No. 7 ELECTRIC LOCK
(Applied to a Johnson No. 2 Interlocking Machine)

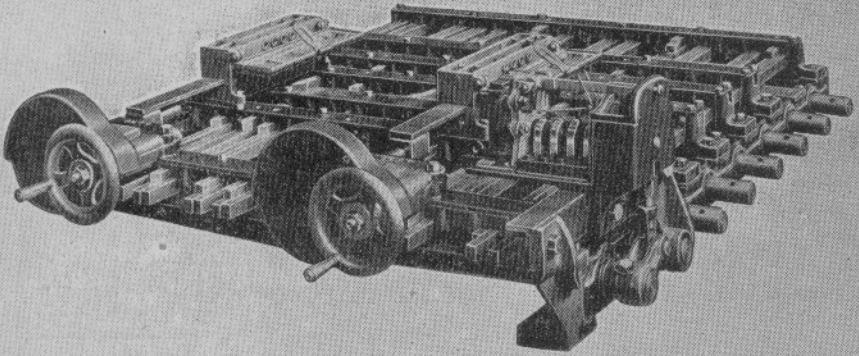
ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Fittings complete for applying Model No. 7 Electric Lock to a Johnson No. 2 Machine. (1-1, 1-2, 1-3, 1-4, 1-5, 2-6, 4-7, 1-8, 1-9, 1-10, 1-11, 1-12, 1-13, 2-14, 1-15, 2-15a).....	10 15
B	Model No. 7 Electric Lock with fittings complete for applying to a Johnson No. 2 Machine, as illustrated. (1-A; 1-A, Plate 1130).....	82 75
1	$\frac{1}{2}$ "x2"x15 $\frac{3}{4}$ " Tappet for a 4 way locking plate (add 21 cents for each additional 2 way of plate up to a 10 way inclusive).....	84
2	$\frac{1}{2}$ "x2"x15 $\frac{3}{4}$ " Bar for a 4 way locking plate—carries No. 3—(add 21 cents for each additional 2 way of plate up to a 10 way inclusive).....	87
3	C. R. S. Dog.....	48
4	$\frac{1}{2}$ "x1"x2" Filler for Nos. 1 and 2.....	16
5	$\frac{3}{8}$ "x $\frac{7}{8}$ "x2" Plate for underneath locking plate..	15
6	$\frac{5}{16}$ "x $\frac{7}{8}$ " Flat Head Machine Screw for No. 5 (two of No. 6 required unless lock is on end of machine, when one of No. 6 and one of No. 6a are used).....	02
6a	$\frac{5}{16}$ "x1 $\frac{1}{4}$ " Flat Head Machine Screw for No. 5 (when lock is located at end of machine)....	03
7	$\frac{1}{4}$ "x1 $\frac{5}{8}$ " Countersunk Head Rivet for No. 3.....	01
8	Cast Supporting Bracket.....	3 52
9	C. R. S. Plunger.....	90
10	Cast Crank.....	60
11	$\frac{5}{8}$ "x4 $\frac{3}{4}$ " C. R. S. Pin with cotter for No. 10....	08
12	$\frac{1}{2}$ "x1 $\frac{1}{2}$ " C. R. S. Pin with cotter for fastening No. 9 to No. 10.....	10
13	Washer for No. 12.....	02
14	$\frac{3}{8}$ "x1 $\frac{1}{2}$ " Hexagon Head Tap Bolt for fastening No. 1 to No. 2.....	03
14a	$\frac{5}{16}$ "x1 $\frac{7}{8}$ " Hexagon Head Tap Bolt for fastening No. 8 to locking plate.....	02
14b	$\frac{5}{16}$ "x2" Hexagon Head Tap Bolt for fastening No. 8 to locking plate.....	02
15	$\frac{5}{8}$ "x1 $\frac{5}{8}$ " Hexagon Head Machine Bolt with Hexagon Nut for fastening lock to No. 8.....	09
15a	$\frac{5}{8}$ "x1 $\frac{3}{4}$ " Hexagon Head Machine Bolt with Hexagon Nut for fastening lock to No. 8.....	07

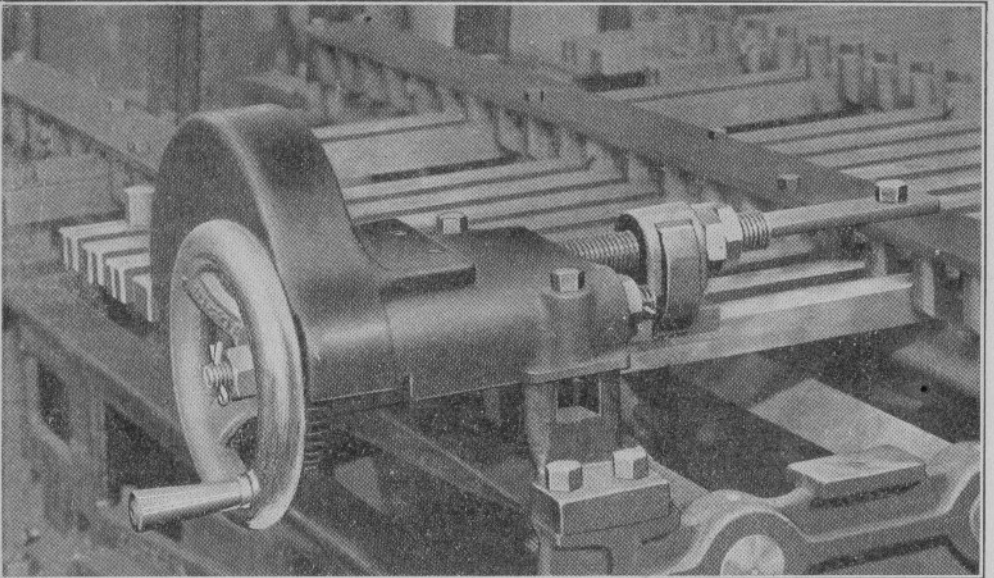
MODEL No. 7 ELECTRIC LOCK
 (Applied to a Standard Interlocking Machine)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Fittings complete for applying Model No. 7 Electric Lock to a Standard Machine. (1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-7, 1-8, 1-9, 2-10, 1-11, 2-12, 3-13).....	9 20
B	Fittings and Model No. 7 Electric Lock complete for applying to a Standard Machine. (1-A; 1-A, Plate 1130).....	81 45
1	Cast Link Bracket.....	66
2	C. R. S. Lock Link.....	1 22
3	Connecting Link from Rocker to No. 2.....	50
4	3/4" Solid Jaw, threaded end with Steel Plunger and Hexagon Nut (replaces No. 28, Plate 1130).....	1 88
5	5/8"x1 3/4" Pin with cotter for fastening No. 4 to No. 2.....	10
6	5/8"x1 1/2" Stud with cotter for fastening No. 3 to No. 2.....	06
7	3/4"x2 1/4" Pin with cotter for fastening No. 3 to Rocker of machine.....	1 05
8	5/8"x2 1/8" Stud with cotter for fastening No. 2 to No. 1.....	10
9	Cast Lock Bracket.....	3 05
10	1/2"x1 1/2" Hexagon Head Machine Bolt with Hexagon Nut for fastening No. 1 to machine frame.....	06
11	1/2"x1 3/4" Hexagon Head Machine Bolt with Hexagon Nut for fastening No. 9 to machine frame.....	06
12	5/8"x2" Hexagon Head Tap Bolt for fastening No. 9 to machine frame.....	07
13	5/8"x1" Hexagon Head Tap Bolt for fastening lock to No. 9.....	04



MODEL No. 2 ELECTRIC HAND RELEASE
(Applied to an I. S. & F. Machine)



MODEL No. 2 MECHANICAL HAND RELEASE
(Applied to an I. S. & F. Machine)

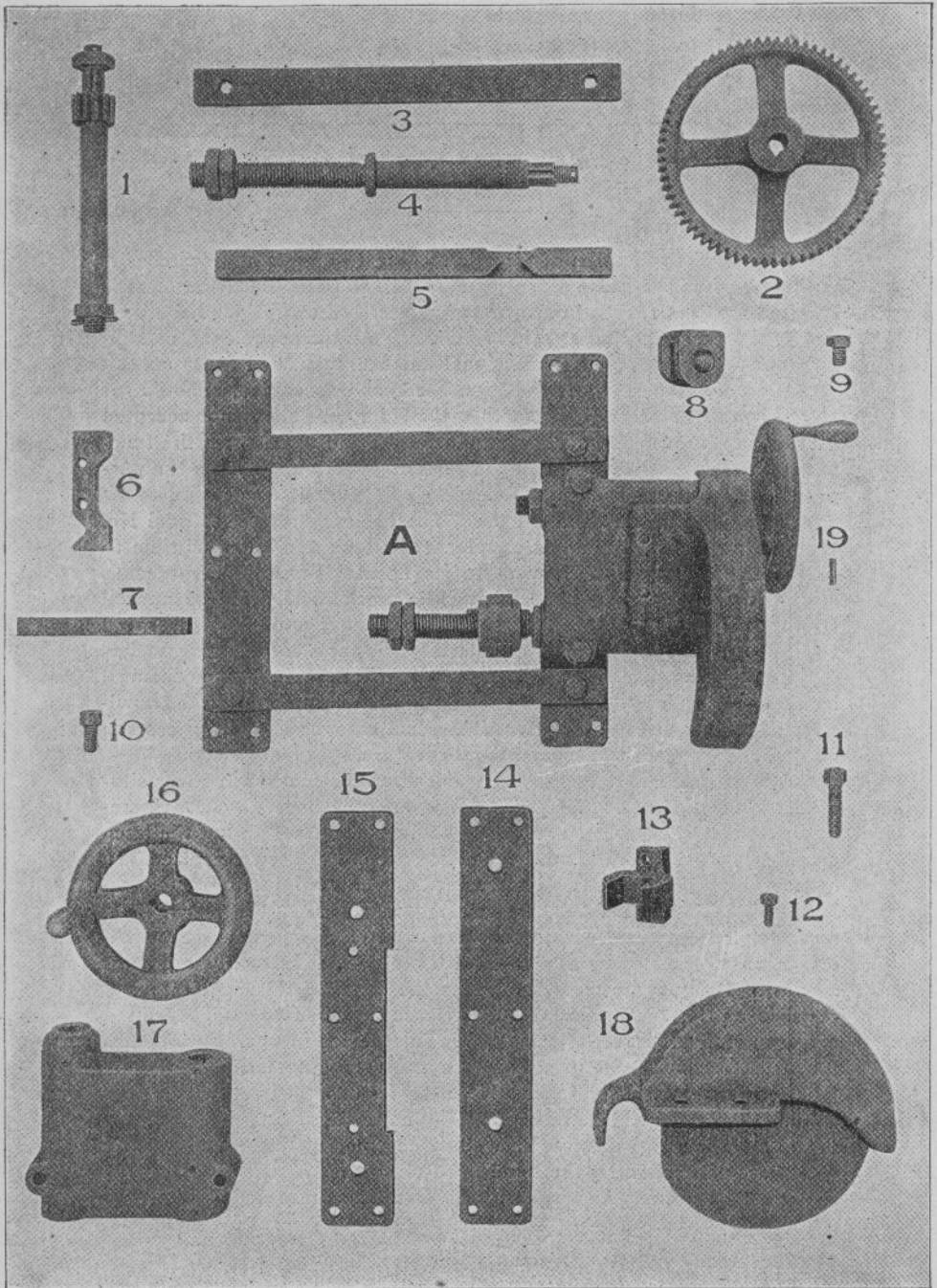
MECHANICAL AND ELECTRIC HAND RELEASES (Models No. 1 and No. 2)

The usual application of electric locking to derails and switches is such that after the home signal of a route has been given the electric locking becomes effective until certain prescribed conditions have been fulfilled; principally that a train has entered a track section (an unlocking section) and that the home signal has been returned to its normal position before the releasing section becomes unoccupied. Should for any reason a route be desired other than that given but not accepted by a train a means must be mechanically applied to perform the function of a train passing through the releasing section. This is the purpose of the Mechanical Hand Release.

Two types are in common use: The ordinary release, Model No. 1, requiring about 10 seconds to release the lock and an equal time to return the releasing mechanism to its normal position, in order to release the signals that were meanwhile mechanically locked normal by the operation that released the electric lock; and the slow speed type, Model No. 2, requiring about 2 minutes for a complete operation.

In applying the hand release certain changes in the mechanical locking are required which can be determined only upon definite knowledge of the requirements of each individual case, so that no prices can be quoted covering this indeterminate feature.

A later type of release has been put upon the market to cover situations wherein electric locks are applied to signal lever latches, whereby a signal may be taken away after having been cleared, but the latch can not be placed normal until the electric lock has been energized. In order to energize the lock a train must have entered upon a certain releasing section and before it has cleared this section the signal lever must be placed normal. In the absence of a train movement a mechanical means for releasing a latch is at times desired in order to change a route. This apparatus is known as the Electric Hand Release and consists of the Mechanical Hand Release attached to and operating a circuit controller (see Plate 1140). This device in operation, breaks the circuit of all conflicting automatic and semi-automatic signals and releases the electrically locked latches. In order to set up another route the release must be returned to its normal position, which makes the electric locking effective as well as completing the signal circuits, which are controlled by the hand release. Either Model No. 1 or No. 2 Hand Release may be used for the Electric release depending upon the speed desired.



MODEL No. 2 MECHANICAL HAND RELEASE
(Slow Speed Release)

MECHANICAL HAND RELEASE
(Models No. 1 and No. 2)

Model No. 1 requires about 20 seconds to release and make while Model No. 2 takes 2 minutes. Shaft No. 4 is connected direct to the hand wheel No. 16, in Model No. 1, the gear wheel No. 2 being eliminated.

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Model No. 2.1 Slow Speed Mechanical Hand Release (2 minute release), complete as illustrated	31 80
B	Model No. 1.1 Mechanical Hand Release (20 second release), similar to A except that the locking bar is driven direct from the hand-wheel shaft without the introduction of the gear wheel No. 2 and the shaft and pinion No. 1.....	26 00
C	Model No. 2.2 Slow Speed Electric Hand Release, similar to A without the straps No. 3.....	32 20
CI	Model No. 2.2 Slow Speed Electric Hand Release with Circuit Controller and connections complete (see Plate 1140).....	44 40
D	Circuit Controller for Electric Hand Release, complete with Box; Cover; Hasp and Staple; Fibre, Mica and Paper Insulations; Phosphor Bronze Contact Springs; Connecting Plates for Binding Posts; Binding Posts, Slide and Contact Block.....	12 20

MECHANICAL HAND RELEASE

(Models No. 1 and No. 2)

ORDER BY PLATE, LETTER OR NUMBER

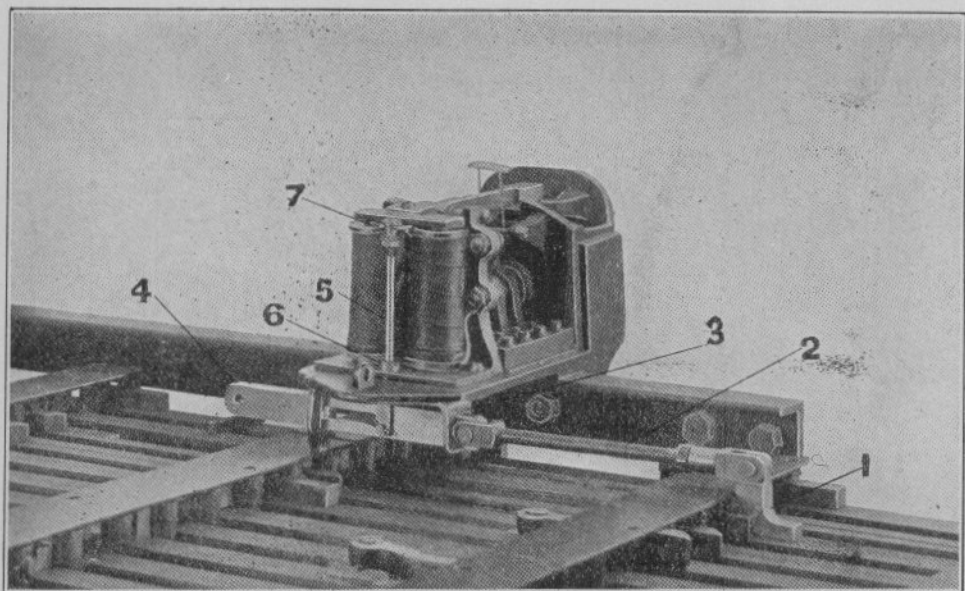
No.		List Price
1	C. R. S. Shaft with Pinion, Nuts and Cotter, as illustrated (for Model No. 2 Release).....	3 15
2	Cast Gear Wheel (for Model No. 2 Release)....	4 35
3	$\frac{1}{4}$ "x1"x1 $\frac{3}{4}$ " Iron Strap.....	14
4	C. R. S. Shaft with Nuts and Cotter, as illustrated (use with Model No. 1 or No. 2 Release)	3 05
5	C. R. S. Lifting Dog for A or B.....	1 85
6	Special C. R. S. Dog for A or B (rivets to No. 7)	42
7	$\frac{1}{2}$ "x $\frac{3}{4}$ " C. R. S. Locking Bar for A or B, per lineal ft.....	27
7a	$\frac{1}{4}$ "x1 $\frac{1}{2}$ "x1 $\frac{3}{4}$ " C. R. S. Slide Bar for C.....	1 02
8	Brass Driving Nut for No. 4 when used on a mechanical hand release.....	2 00
8a	Brass Driving Nut for No. 4 when used on an electric hand release.....	2 00
9	$\frac{3}{8}$ "x $\frac{1}{2}$ " Hexagon Head Tap Bolt for fastening No. 3 to machine frame.....	05
10	$\frac{3}{8}$ "x $\frac{3}{4}$ " Hexagon Head Tap Bolt for fastening No. 18 to No. 17.....	05
11	$\frac{5}{16}$ "x1 $\frac{1}{2}$ " Hexagon Head Tap Bolt for fastening No. 17 to No. 15.....	06
12	$\frac{1}{4}$ "x $\frac{3}{4}$ " Hexagon Head Tap Bolt for fastening Nos. 14 and 15 to locking brackets.....	05
13	Wrot Yoke for No. 8.....	3 75

MECHANICAL HAND RELEASE

(Models No. 1 and No. 2)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
13a	C. R. S. Yoke for No. 8a.....	42
14	Inside Cover Plate for locking bracket.....	75
15	Outside Cover Plate for locking bracket and supporting plate for No. 17.....	75
16	5" Cast Hand Wheel with handle for A, B or C..	2 58
17	Bearing for No. 1 and No. 4 of Model No. 2 Hand Release.....	3 85
17a	Bearing for No. 4 of Model No. 1 Hand Release.	2 00
18	Gear Case for Model No. 2 Hand Release.....	55
19	1/4"x3/4" Dowel Pin for securing Nos. 2 and 16 to Nos. 1 and 4.....	03
20	1/4"x1 9/16" Flat Head Rivet for securing No. 13a to No. 7a.....	01
20a	1/4"x1 3/8" Flat Head Rivet for securing No. 13 to No. 7.....	01
21	1/4"x1 1/4" Fillister Head Rivet for securing No. 6 to No. 7.....	01
22	1/4"x1"x7 3/4" C. R. S. Stop for C.....	39
23	1/2"-No. 20-1/4" Round Head Machine Screw for fastening No. 22 to No. 7a.....	01
24	Fibre Contact Holder with Fibre Plate; two 1/2"-No. 10-32 Fillister Head Screws and two 1/8"x1 3/4" Round Head Rivets, complete for C1	45

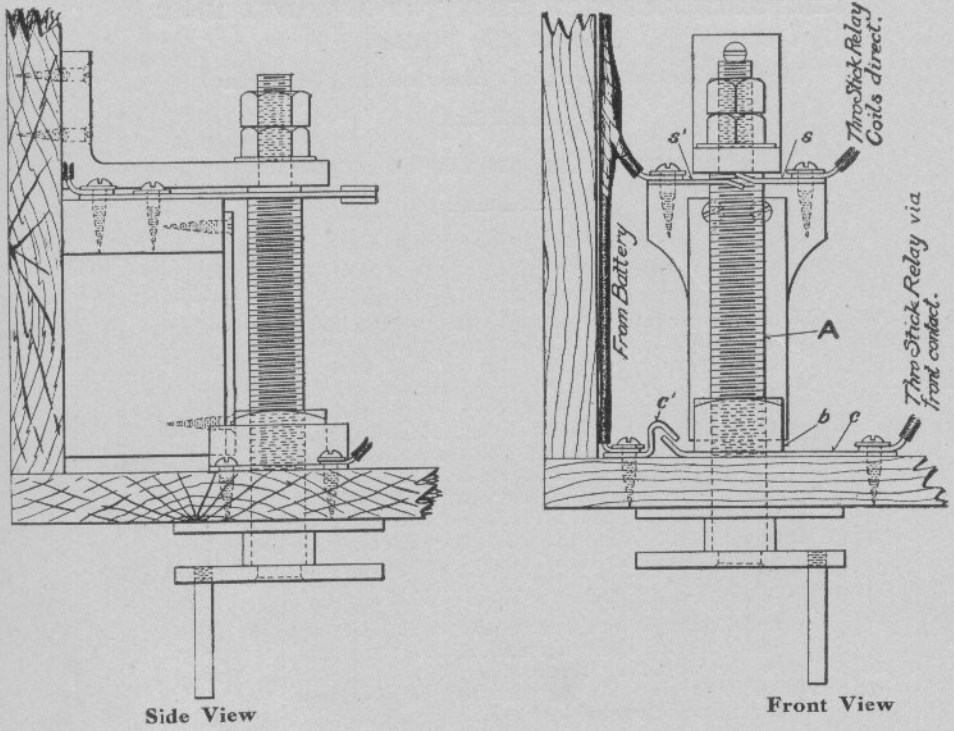


RELEASING ATTACHMENT FOR A MODEL No. 3 ELECTRIC LOCK
(Applied to an I. S. & F. Interlocking Machine)

**RELEASING ATTACHMENT FOR A MODEL No. 3
ELECTRIC LOCK
(Applied to an I. S. & F. Interlocking Machine)**

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Fittings complete for the Releasing Attachment of a Model No. 3 Electric Lock. (1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-7).....	9 22
B	Model No. 3 Electric Lock with fittings complete for use with a Mechanical Hand Release. (1-A, Plate 1141; 1-A).....	59 50
1	Wrot Lug with two 1/4" Countersunk Head Rivets	68
2	3/8" C. R. S. Adjustable Link with Pins and Cot- ters	2 44
3	Motion Plate Guide (Sheet Brass) with two 3/8" No. 20x1/4" Flat Head Brass Screws.....	1 24
4	5/8" x 7/8" x 7 3/8" C. R. S. Motion Plate.....	2 64
5	1/4" Brass Operating Rod with Screw Jaw, Pin and Cotter on one end and Adjusting Nut and Jamb Nut on the other end.....	1 50
6	Brass Bushing.....	20
7	Phosphor Bronze Spring with Rivets for fasten- ing to armature of lock.....	56



MODEL No. 3 ELECTRIC HAND RELEASE
 (Located in Relay Box in First Story of Tower)

ELECTRIC HAND RELEASE
Model No. 3

This device is used where a cheaper type of apparatus is desired for the release of electric locks than that employing Models No. 1 or No. 2.

By revolving the threaded shaft A, a nut b is made to rise, which after a few turns of the shaft, will allow the contact springs c and c1 to close. When the nut has traveled to the top of the shaft it closes the normally open springs s and s1 which completes a circuit through the locking relay coils and the circuit controllers attached to the signal levers. This energizes the locking relay just as if the track relay had dropped its armature and completed the circuit.

In order to compel the return of the nut to its normal position the contacts s, s1 and c, c1 must both be opened, as otherwise the batteries will have two complete circuits for their current, one through the locks, the front contact of the locking relay, the locking relay coils and the circuit controllers on the signal levers and a second path via the contact c, c1, the front contact of the locking relay, etc., as above, shunting the locks. This will prevent the armatures of the locks from being raised and compel the opening of the contact c, c1 in order to get the full current through the locks, whereupon the locks will pick up and release the functions controlled by the electric locking.

This release is designed to be placed in the relay box in the lower story of the interlocking cabin and necessitates the signalman's going down stairs to release his locks. This as well as the screwing up and down of the traveling nut consumes a certain amount of time and secures the desired time interval before a route may be changed.

ORDER BY PLATE AND LETTER

No.		List Price
A	Model No. 3.1 Electric Hand Release, complete as illustrated, for use in relay box.....	14 30

MODEL No. 1 MECHANICAL TIME LOCK

Fittings should be ordered separately, specifying size of locking bracket

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Model No. 1 Mechanical Time Lock, as illustrated	76 00
1	Cover for Indicator with Cap and Glass, as illustrated	5 84
2	Cover for Mechanism.....	7 20
2a	Cover for Indicator and Mechanism (1-2 and 1-1).....	13 04
3	Frame for Mechanism.....	11 50
4	Steel Ratchet Wheel (16 teeth).....	1 34
5	Steel Escapement Wheel (16 teeth).....	1 60
6	Steel Pinion Wheel (12 teeth, 8 pitch).....	1 38
7	Steel Pinion Wheel (12 teeth, 16 pitch).....	78
8	Brass Main Gear Wheel (72 teeth, 16 pitch).....	4 44
8a	Brass Main Gear Wheel (72 teeth, 16 pitch) with Stud, Cotter and Pawl.....	6 00
8b	Main Gear Wheel (72 teeth, 16 pitch) with Stud, Cotter, Pawl and Spring, and round head brass screws.....	6 46
9	Front Half, Clamp for Lever with Stud, Cotter and Washer.....	2 00
10	Back Half, Clamp for Lever.....	70
10a	Clamp for Lever with Stud, Washer, Cotter and Bolts (1-9, 1-10 and 2-11).....	2 22
11	$\frac{3}{8}$ "x3" Bolt with nut for 10a.....	08
12	Steel Lifting Rod $2\frac{1}{4}$ " long.....	3 00
13	Steel Cross Locking Dog with Roller and Stop (specify length).....	2 00
14	Steel Vertical Locking Ear and Rack (8 pitch) with Stop.....	5 70
15	$\frac{1}{8}$ " Brass Washer for No. 23.....	06

MODEL No. 1 MECHANICAL TIME LOCK

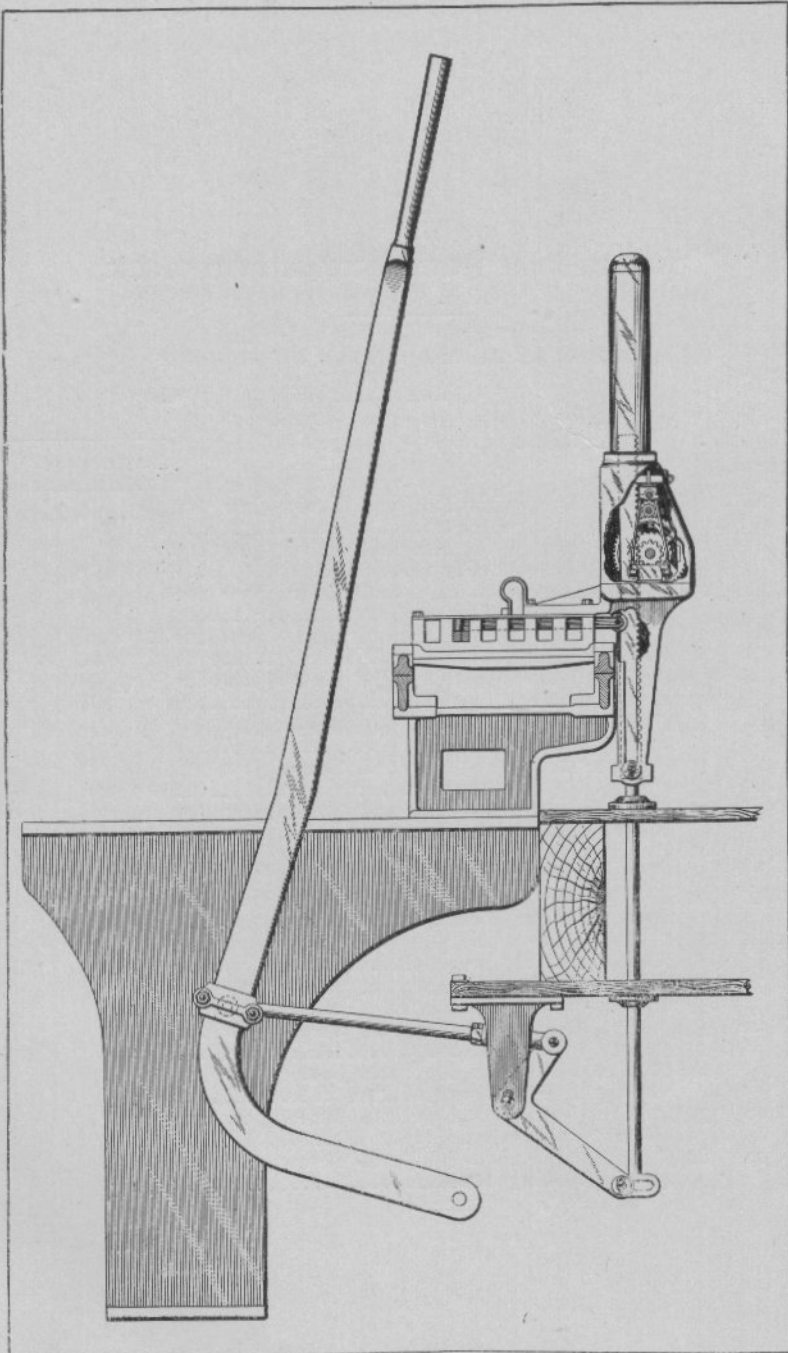
ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
16	Steel Roller for No. 13.....	10
17	Hexagon Head Trunnion Screw for No. 19.....	48
18	Hexagon Head Trunnion Screw for No. 24.....	14
19	Ratchet Shaft with Dowel Pin for Nos. 5 and 7..	18
20	Bohannon Padlock for No. 21.....	85
21	Eye Bolt for securing No. 2 to No. 3.....	64
22	Pendulum Rods with Hanger Thumb-nuts and Dowel Pins.....	1 62
23	Pendulum Weight.....	60
23a	Pendulum Complete (1-22 and 1-23).....	2 22
24	Shaft with Escapement Pawl.....	1 84
24a	Shaft for Escapement Pawl.....	30
25	Shaft for Main Gear.....	20
26	1/4"x1 1/4" Cap Screw for securing A to machine..	06
27	No. 14 Phosphor Bronze Spring for No. 13.....	72
28	Roller Shaft with Washers and Cotters for No. 14	08
28a	Roller Shaft with Rollers, Washers and Cotters (1-28 and 2-29).....	48
29	Roller for No. 28.....	08
30	3 1/4"x4" Lag Screw for securing No. 37 to Beam..	09
31	3/4"x3 3/8" Pin with Cotters for No. 37.....	12
32	5/8"x1 7/8" Pin with Cotter for No. 39.....	10
33	5/8"x2 3/8" Pin with Cotters for No. 12.....	10
34	4 3/4"x8 3/4" Special Crank for No. 37.....	3 44
35	1 1/2" No. 15 Wood Screw for securing No. 36....	01
36	Guide for Lifting Rod.....	22
37	Crank Stand.....	96
37a	Crank Stand with Crank, pin and cotters (1-34, 1-31 and 1-37).....	4 50
38	1/2"x2 3/4" Bolt with nut for securing No. 37 to floor	06
39	3/4" Screw Jaw.....	33
40	Eye Bolt and Nut for 4-way locking bracket....	50

MODEL No. 1 MECHANICAL TIME LOCK

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
40a	16 $\frac{7}{8}$ " Eye Bolt with Nut and Screw Jaw for 4-way locking bracket.....	90
40b	20 $\frac{3}{8}$ " Eye Bolt with Nut and Screw Jaw for 6-way locking bracket.....	94
40c	23 $\frac{3}{8}$ " Eye Bolt with Nut and Screw Jaw for 8-way locking bracket.....	98
40d	27 $\frac{3}{8}$ " Eye Bolt with Nut and Screw Jaw for 10-way locking bracket.....	1 02
40e	30 $\frac{7}{8}$ " Eye Bolt with Nut and Screw Jaw for 12-way locking bracket.....	1 06
40f	34 $\frac{3}{8}$ " Eye Bolt with Nut and Screw Jaw for 14-way locking bracket.....	1 10
40g	36 $\frac{1}{8}$ " Eye Bolt with Nut and Screw Jaw for 15-way locking bracket.....	1 14
40h	37 $\frac{7}{8}$ " Eye Bolt with Nut and Screw Jaw for 16-way locking bracket.....	1 18
40i	41 $\frac{3}{8}$ " Eye Bolt with Nut and Screw Jaw for 18-way locking bracket.....	1 22
40j	44 $\frac{7}{8}$ " Eye Bolt with Nut and Screw Jaw for 20-way locking bracket.....	1 26
40k	54 $\frac{5}{8}$ " Eye Bolt with Nut and Screw Jaw for 24-way locking bracket.....	1 36
40l	61 $\frac{3}{8}$ " Eye Bolt with Nut and Screw Jaw for 28-way locking bracket.....	1 40
40m	65 $\frac{1}{8}$ " Eye Bolt with Nut and Screw Jaw for 30-way locking bracket.....	1 44
40n	68 $\frac{3}{8}$ " Eye Bolt with Nut and Screw Jaw for 32-way locking bracket.....	1 48
40o	75 $\frac{5}{8}$ " Eye Bolt with Nut and Screw Jaw for 36-way locking bracket.....	1 52
40p	82 $\frac{5}{8}$ " Eye Bolt with Nut and Screw Jaw for 40-way locking bracket.....	1 56



MODEL No. 1 MECHANICAL TIME LOCK
(Applied to an I. S. & F. Machine)

MODEL No. 1 MECHANICAL TIME LOCK
(Applied to an I. S. & F. Interlocking Machine)
 (Numbers Refer to Plate 1155)

(By modifying the connections from the machine to the lock, the Time Lock may be applied to any of the standard types of interlocking machines.)

The Time Lock is usually applied to the home signal lever and becomes effective upon placing the signal lever at "normal." The rack or vertical locking bar No. 14 is raised by the lever to which it is attached being reversed, whereupon a locking dog No. 13, in the locking bed of the machine, is forced from its position in the notch of No. 14, which locks the conflicting switch levers until the rack has fallen and the locking dog again at home in the notch. The rack falls by gravity and is regulated by a pendulum and escapement pawl Nos. 23a and 24. The mean time required for releasing a function is one (1) minute. By regulating the weight No. 23, by means of the thumb nuts of No. 22, the time limit may be raised to one and one-quarter (1¼) minutes.

The time lock is peculiarly adapted to outlying interlocking plants, to situations where electric locking track circuits are impracticable, or for such roads as do not care to maintain electrical devices. The operation is positive and compels a hasty signalman to *stop and think*.

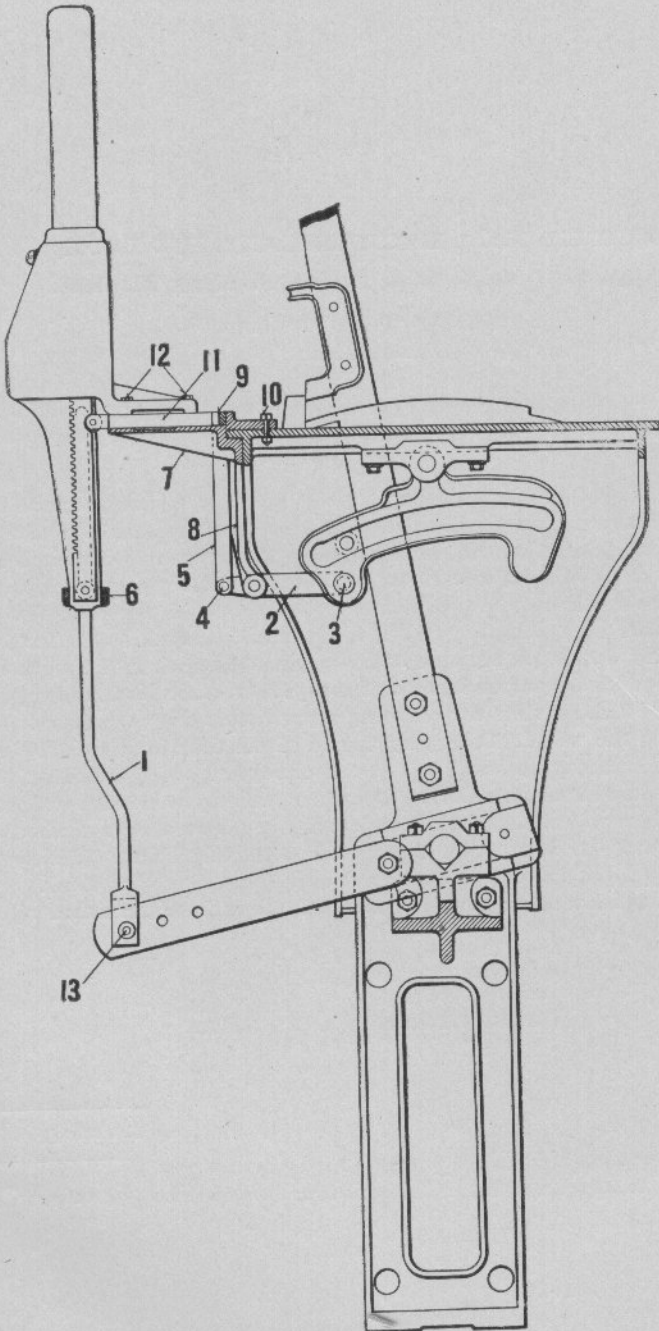
Applications other than those illustrated will be furnished upon request.

ORDER BY PLATE AND LETTER

No.
A

Mechanical Time Lock Model No. 1 for application to an I. S. & F. Machine, as illustrated..

List Price	
94 00	

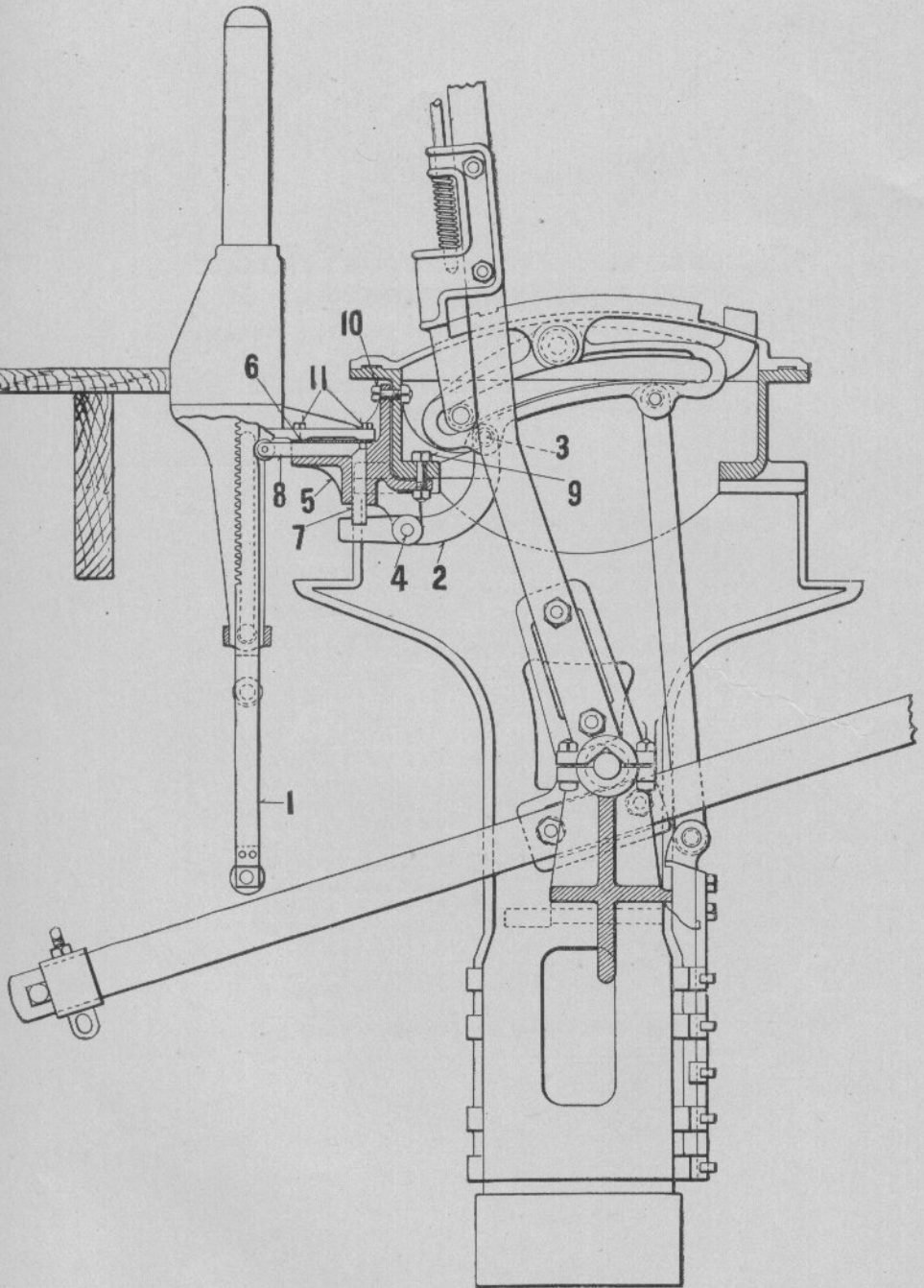


MODEL No. 1 MECHANICAL TIME LOCK
(Applied to a National Machine)

MODEL No. 1 MECHANICAL TIME LOCK
(Applied to a National Machine)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Fittings complete for applying Model No. 1 Time Lock (A, Plate 1155) to a National Interlocking Machine (1-1, 1-13, 1-6, 1-2, 1-3, 1-4, 1-8, 1-7, 5-10, 1-5, 1-9, 1-11, 4-12).....	12 25
B	Fittings and Model No. 1 Time Lock for application to a National Interlocking Machine, as illustrated (1-A; 1-A, Plate 1155).....	83 25
1	$\frac{3}{4}$ "x18" Wrot Jaw.....	2 15
2	Wrot Lever.....	1 70
3	Special C. R. S. Stud with Nut for fastening No. 2 to rocker link.....	90
4	$\frac{1}{2}$ "x1" Pin with Cotter for No. 5.....	06
5	$\frac{3}{4}$ "x $\frac{3}{4}$ "x8 $\frac{1}{2}$ " Locking Bar.....	56
6	Cast Guide for No. 1 with two $\frac{3}{8}$ " Set Screws...	36
7	Cast Bracket for fastening Time Lock to machine frame.....	1 37
8	Cast Bracket for supporting No. 5 and forming guide for locking.....	1 23
9	$\frac{3}{4}$ "x $\frac{3}{4}$ " Cross Locking, per foot.....	28
10	$\frac{1}{2}$ "x1 $\frac{1}{2}$ " Bolt with Nut for fastening Nos. 7 and 8 to machine.....	06
11	See No. 13, Plate 1155.....	1 08
12	$\frac{1}{4}$ "x1 $\frac{1}{4}$ " Cap Screw for securing Lock to Bracket No. 7.....	07
13	$\frac{3}{8}$ "x1 $\frac{3}{4}$ " Pin with Cotter for fastening No. 1 to tail lever.....	06

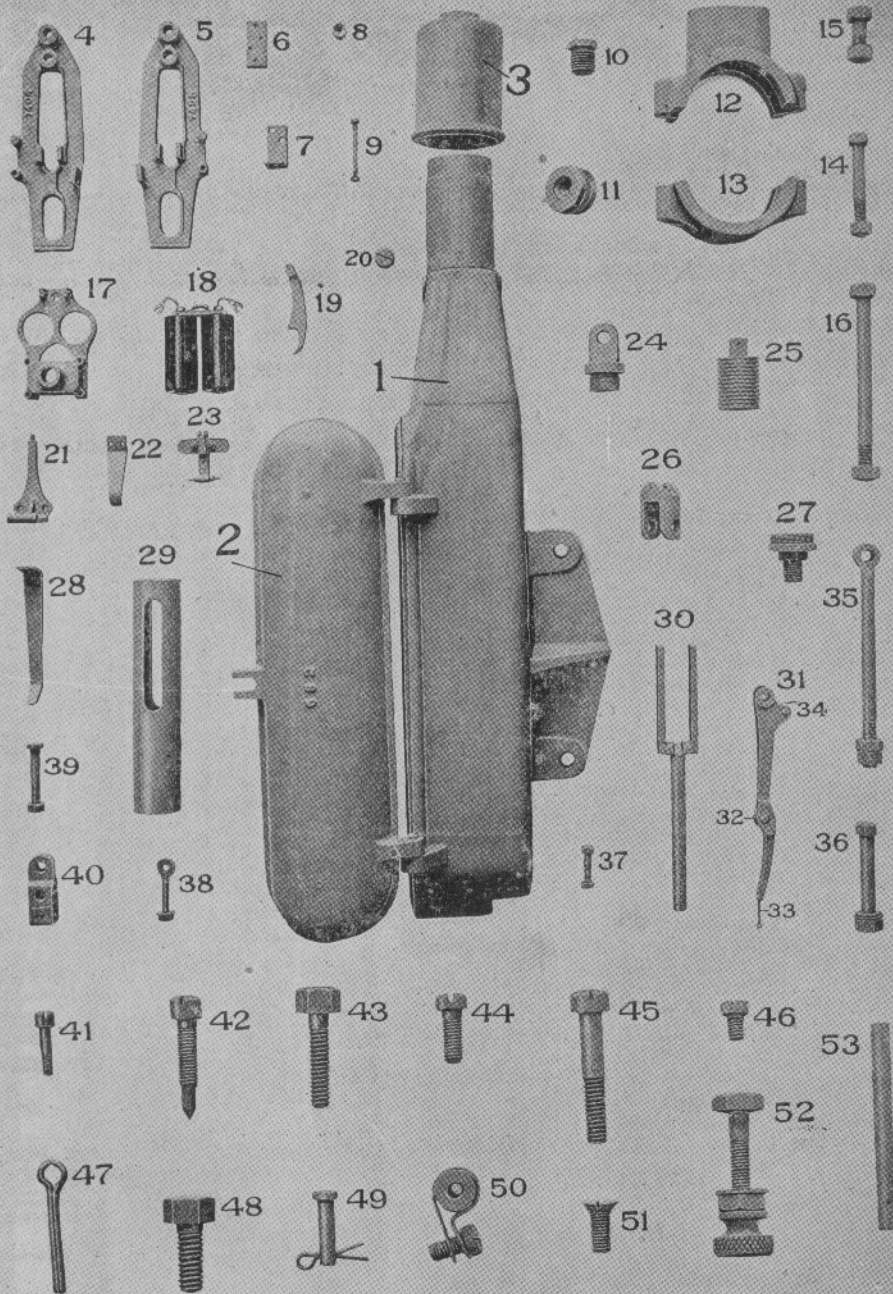


MODEL No. 1 MECHANICAL TIME LOCK
(Applied to a Standard Interlocking Machine)

MODEL No. 1 MECHANICAL TIME LOCK
(Applied to a Standard Interlocking Machine)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Fittings complete for applying Model No. 1 Time Lock to a Standard Interlocking Machine (1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-7, 1-8, 1-9, 1-10, 4-11)	14 70
B	Fittings and Model No. 1 Time Lock for application to a Standard Interlocking Machine, as illustrated (1-A; 1-A, Plate 1155).....	90 70
1	C. R. S. Vertical Locking Bar and Rack (replaces No. 14, Plate 1155) with Roller, Roller Support, Stud, Cotter and Rivets, complete..	8 98
2	Wrot Locking Lever.....	65
3	3/4"x2 1/4" Rocker Pin with Cotter.....	10
4	3/4"x1 7/8" Locking Lever Pin with Cotter.....	09
5	Cast Bracket.....	2 05
6	Sheet Steel Cover for No. 5.....	10
7	3/4"x3 5/8" C. R. S. Locking Pin.....	30
8	C. R. S. Cross Lock Rod (replaces No. 13, Plate 1155) with Roller, Pin and Rivets.....	1 07
9	1/2"x2 1/4" Tap Bolt with Nut for fastening No. 5 to machine frame.....	06
10	1/2"x1 3/4" Tap Bolt with Nut for fastening No. 5 to machine frame.....	06
11	1/4"x1 1/4" Tap Bolt for fastening Lock to No. 5..	02



MODEL No. 3 ELECTRIC SLOT
 (For Manually Operated Signals)

MODEL No. 3 ELECTRIC SLOT
(For Manually Operated Signals)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
A	Model No. 3.1 Electric Slot, complete for wood pole	94 00
A1	Model No. 3.2 Electric Slot, complete for iron pole	98 00
1	Mechanism Case	10 88
2	Mechanism Case Door	1 58
3	Shield	1 30
4	Right Hand Malleable Slide Plate	1 32
5	Left Hand Malleable Slide Plate	1 32
6	Hard Rubber Cleat for Binding Posts	40
7	No. 14 Phosphor Bronze Bracket for No. 6.....	42
8	Hard Rubber Bushing for No. 1 and No. 52.....	05
9	$\frac{1}{4}$ "x $3\frac{1}{8}$ " Bolt and Nuts for No. 21.....	03
10	Adjusting Sleeve $1\frac{1}{4}$ "x $1\frac{5}{8}$ "	1 95
11	Bottom Cylinder Head.....	1 24
12	Front Half of Clamp for securing Case to Iron Signal Post.....	1 02
12a	Clamp complete with Cap and Bolts (1-12, 1-13 and 2-14).....	1 95
13	Back Half of Clamp for securing Case to Iron Signal Post.....	60
14	$\frac{5}{8}$ "x $4\frac{1}{2}$ " Bolt for securing No. 12 and No. 13....	12
15	$\frac{3}{4}$ "x $2\frac{1}{4}$ " Bolt for securing No. 1 to No. 12.....	12
16	$\frac{3}{4}$ "x9" Bolt for securing No. 1 to Wood Pole....	21
17	Brass Magnet Spectacle.....	2 25
18	Electro-Magnets with Backstrap and Cap screws, (specify resistance desired).....	6 60
19	Pawl	90

MODEL No. 3 ELECTRIC SLOT
(For Manually Operated Signals)

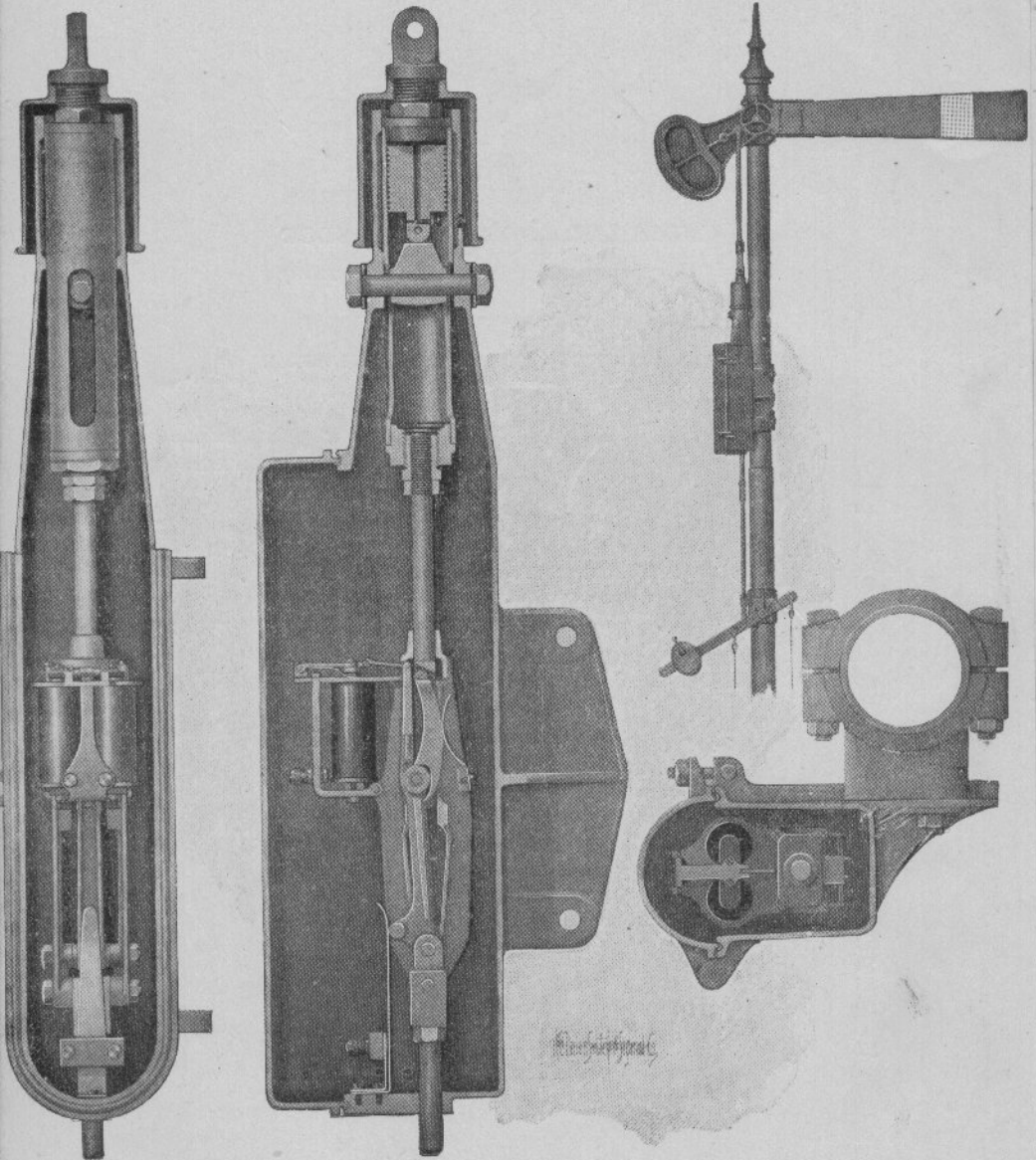
ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
20	Brass Plug to fit $\frac{3}{4}$ " Pipe Tap for No. 1.....	38
21	Malleable Bracket for Magnet.....	1 02
21a	Malleable Bracket for Slow Acting Magnets....	1 02
22	No. 20 Phosphor Bronze Spring for No. 19.....	34
23	Armature Bar with Norway Iron Armature. Spring, and $\frac{1}{2}$ "-No. 8-32 Brass Fillister Head Screws	1 72
24	Eye Piece.....	2 35
25	Brass Piston for Buffer.....	4 50
26	Brass Jaw Piece for No. 25.....	2 16
27	Top Cylinder Head.....	3 50
28	No. 14 Phosphor Bronze Spring for No. 31.....	60
29	$2\frac{3}{8}$ " Brass Cylinder $1\frac{1}{4}$ " long.....	7 80
30	Malleable Iron Fork.....	2 88
31	Malleable Swinging Lever.....	1 54
32	Friction Roller and Pin for lower end of No. 31..	03
33	Phosphor Bronze Link connecting No. 23 to No. 31.....	32
34	Friction Roller and Pin for engaging No. 19....	03
35	$\frac{3}{4}$ " x $10\frac{1}{2}$ " Lifting Rod with Nuts.....	50
36	$\frac{3}{4}$ " x $5\frac{3}{4}$ " Bolt with Washers and Nut for fasten- ing No. 26 to No. 1.....	58
37	$\frac{3}{8}$ " x $1\frac{3}{4}$ " Bolt and Nut for fastening No. 38 to No. 1.....	04
38	Eye Bolt with Nut for securing door.....	35
39	$\frac{1}{2}$ " x $3\frac{1}{4}$ " Bolt for securing No. 4, No. 5 and No. 31 to No. 40.....	09
40	Lower Connecting Piece.....	50
41	$\frac{7}{16}$ "-No. 6-32 Fillister Head Brass Screw for se- curing No. 23 to No. 17.....	03

MODEL No. 3 ELECTRIC SLOT
(For Manually Operated Signals)

ORDER BY PLATE, LETTER OR NUMBER

No.		List Price
42	$\frac{3}{4}$ "-No. 10-32 Fillister Head Brass Screw with Lock Nut for Pin Valve of No. 25.....	05
43	$\frac{1}{4}$ "x $\frac{3}{4}$ " Hexagon Head Cap Screw for securing No. 18 to No. 21.....	04
44	$\frac{1}{2}$ "-No. 10-32 Fillister Head Brass Screw for securing No. 7 to No. 1.....	01
45	$\frac{1}{4}$ "-No. 12-24 Fillister Head Brass Screw for securing No. 17 to No. 4 and No. 5.....	04
46	$\frac{1}{4}$ "-No. 8-32 Fillister Head Brass Screw for securing No. 22 to No. 4 and No. 5.....	01
47	$\frac{1}{8}$ "x $1\frac{1}{8}$ " Cotter for No. 54.....	01
48	$\frac{1}{4}$ "x $\frac{5}{8}$ " Hexagon Head Cap Screw for securing backstrap to magnets.....	04
49	$\frac{3}{32}$ "x $\frac{5}{8}$ " Round Head Turned Pin and Cotter for No. 23.....	08
50	Wire Guide with Hard Rubber Bushing and $\frac{1}{4}$ "-No. 10-32 Fillister Head Brass Screw.....	35
51	$\frac{1}{2}$ "-No. 10-32 Flat Head Screw for No. 29.....	01
52	$1\frac{3}{8}$ "-No. 10-32 Binding Screw with Nuts and Washers	18
53	$\frac{3}{16}$ " x2 $\frac{1}{8}$ " Pin for No. 19.....	04
54	$\frac{5}{8}$ "x2 $\frac{1}{4}$ " Pin for No. 35.....	10
55	Friction Roller for No. 26.....	20
56	$\frac{1}{4}$ "x $1\frac{3}{4}$ " Button Head Rivet for securing No. 2 to No. 1.....	02
57	$\frac{1}{2}$ "x $3\frac{1}{8}$ " Bolt with Nut for fastening No. 40 to No. 4 and No. 5 and No. 31 to No. 40.....	06



MODEL No. 3 ELECTRIC SLOT

(For Manually Operated Signals)

The Slot is here shown applied to pole of iron construction. It is equally as well adapted to posts of wooden construction

SUPPLEMENT NO. 1
TO
1902 CATALOGUE—SECTION NO. 11

ELECTRIC LOCKS
FOR
THROW-OVER SWITCH STANDS

The Union Switch & Signal Co.
Swissvale, Pa.

JUNE, 1908

PREFACE

THIS lock is designed to take the place of our Model 4 Electric Switch Lock and can be used interchangeably with it for locking the New Century, Dead Center or any similar type of throw-over switch stand.

The mechanism is housed in a strong cast iron waterproof case.

The magnets are more efficient so that with the same battery available they can be wound to much higher resistance than those in the Model 4 Lock. When energized, the unlocking of the switch is accomplished by the lifting of the locking dog on end of armature bar out of the notch in locking segment, thereby permitting the raising of the lever latch and the consequent throwing of the switch stand lever. The locking dog operates between two solid cast iron guides and any blow the former may receive is transmitted to the main frame.

The armature carries contact springs which provide for a maximum number of circuits as follows:

Two independent front or two independent back contacts, or—

One independent front and one independent back contact, or—

Two common front and back contacts.

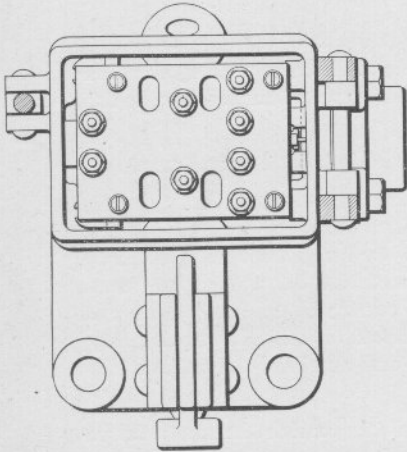
The standard lock will be provided with one common silver contact with graphite front and silver back contact.

A guide for switch lock rod is provided, thereby permitting mechanical locking of the switch by the switch stand lever.

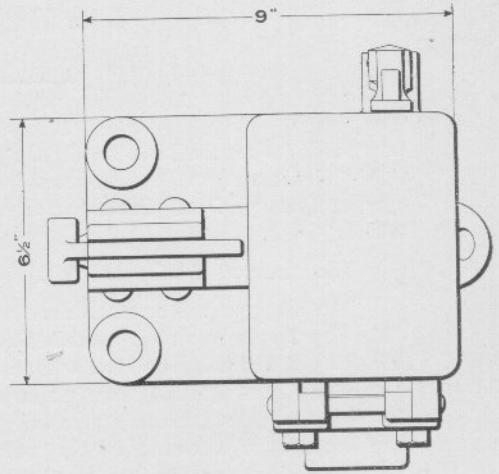
The lever lock rod shown in layouts, Plates 1119 and 1119½, pivoted near the hub of the switch stand, holds the locking segment out of locking position when the switch lever is in any but the normal position.

Plate 1116 shows the lock assembled for left hand application as per layouts, Plates 1119 and 1119½. By removing the four bolts entering in at the bottom, the upper half, together with cover, mechanism and lock rod guide, can be turned through an angle of 180° and bolted together again as before when it will be in shape for right hand application.

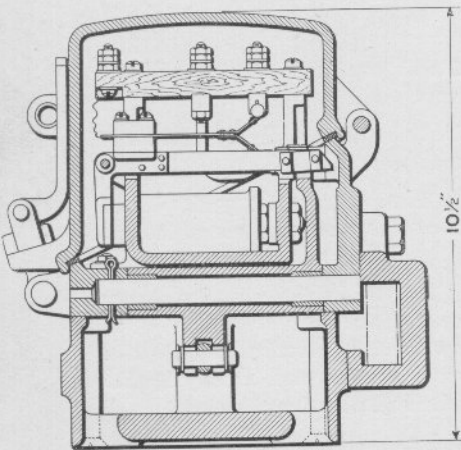
Plate 1117 is same as Plate 1116 with the addition of a key release which consists of a Yale Paracentric Lock applied in a position to lift the locking dog by the turning of the key; the latter, however, cannot be removed without reversing it and the lock bolt to the normal position.



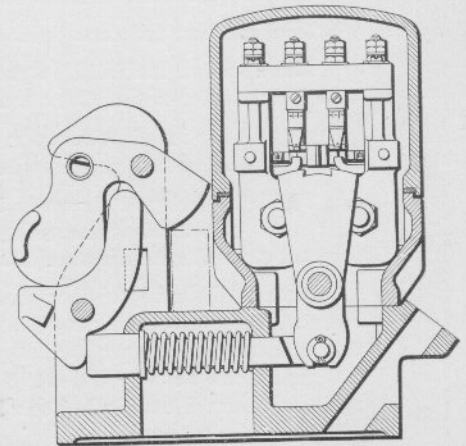
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PLAN VIEW



SECTIONAL FRONT VIEW



SECTIONAL SIDE VIEW

**ELECTRIC SWITCH LOCK WITH HORIZONTAL MAGNETS
(WITHOUT KEY RELEASE)**

**ELECTRIC SWITCH LOCK WITH HORIZONTAL MAGNETS
(WITHOUT KEY RELEASE)**

For application see Plates 1119 and 1119½. For details Plate 1118.

The locks listed below do not include lock rods, and if required must be ordered in addition to the lock. When ordering lock rods give distance from gauge of rail to center of switch stand.

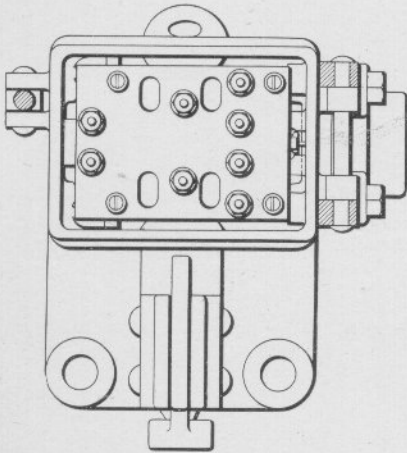
For lock rod see Section 3, Mechanical Catalogue.

Magnets are usually wound to 100 and 250 ohms resistance. When ordering specify resistance.

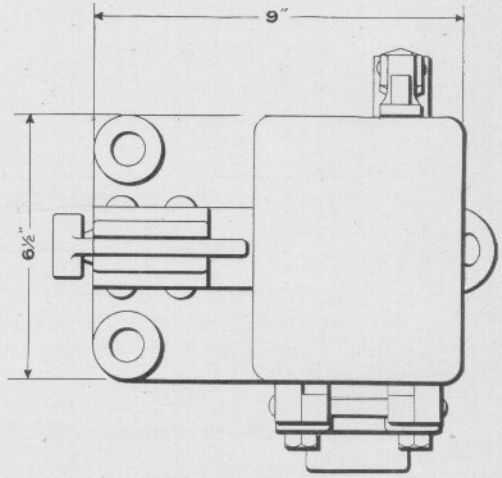
Order by Plate, Letter and Figure

The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

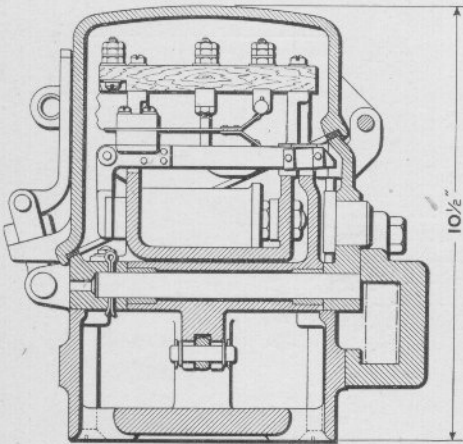
Fig.		Drawing Reference	List Price
A	Electric Switch Lock (without key release) with horizontal magnets, having one common silver contact with graphite front and silver back contact, complete as shown, with lever lock rod, Fig. 8 Plate 1118.....	1-D-1351	56 00
A1	as above, with two common front and back contacts	1-D-1351	60 00
A2	as above, with one independent front or one independent back contact.....	1-D-1351	60 00
A3	as above, with two independent front or two independent back contacts.....	1-D-1351	60 00



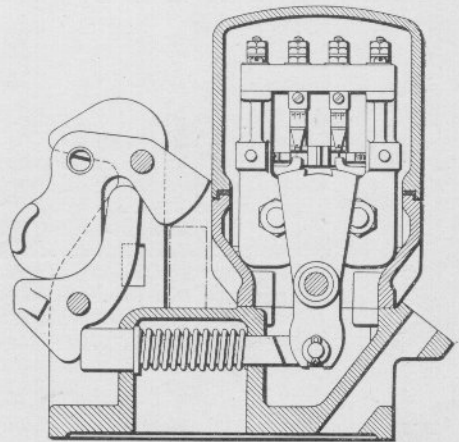
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PLAN VIEW



SECTIONAL FRONT VIEW



SECTIONAL SIDE VIEW

ELECTRIC SWITCH LOCK WITH HORIZONTAL MAGNETS
(WITH KEY RELEASE)

**ELECTRIC SWITCH LOCK WITH HORIZONTAL MAGNETS
(WITH KEY RELEASE)**

For application see Plates 1119 and 1119½. For details Plate 1118.

The locks listed below do not include lock rods, and if required must be ordered in addition to the lock. When ordering lock rods give distance from gauge of rail to center of switch stand.

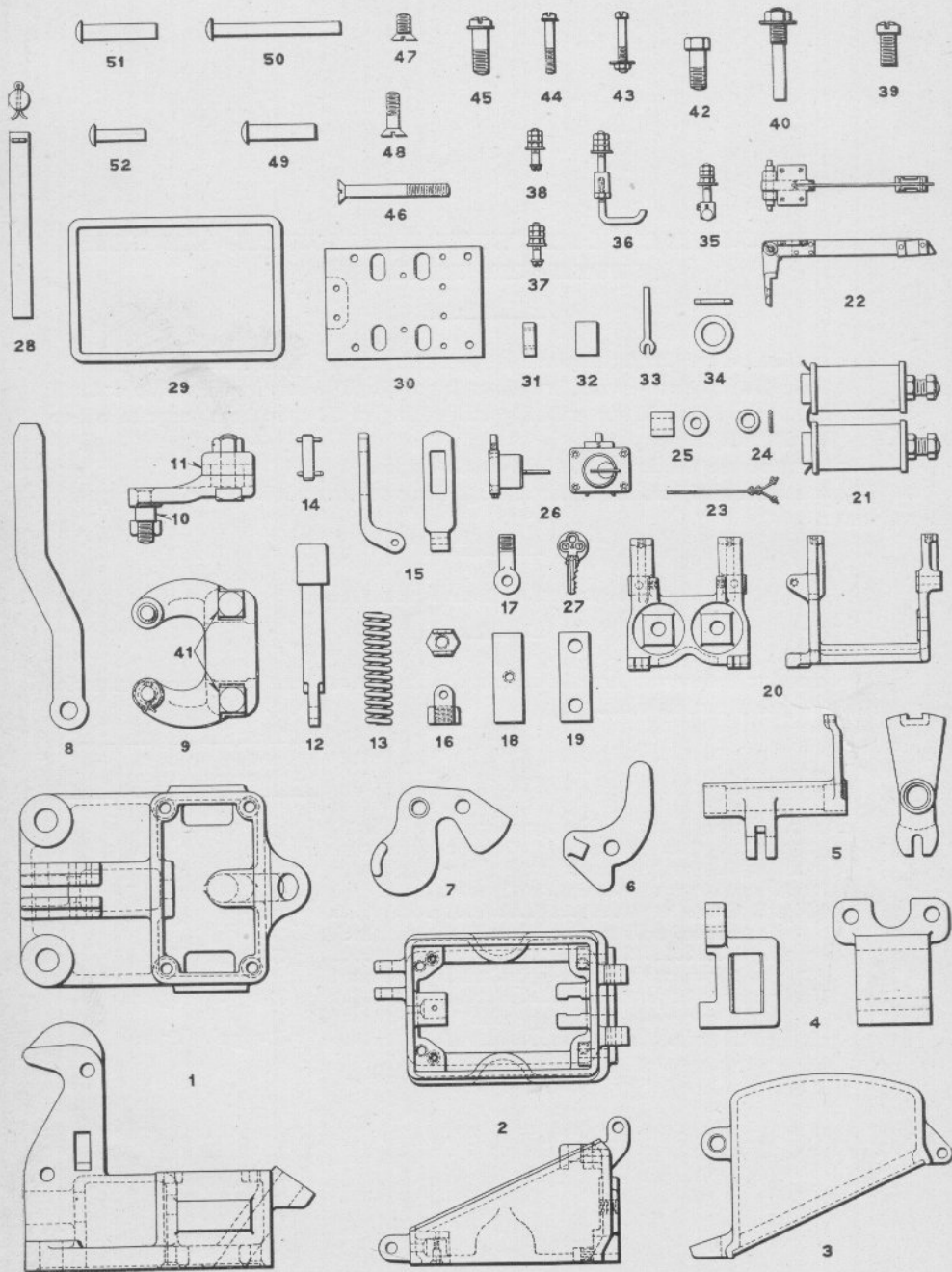
For lock rod see Section 3, Mechanical Catalogue.

Magnets are usually wound to 100 and 250 ohms resistance. When ordering specify resistance.

Order by Plate, Letter and Figure

The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

Fig.		Drawing Reference	List Price
A	Electric Switch Lock (with key release) with horizontal magnets, having one common silver contact with graphite front and silver back contact, complete as shown, with lever lock rod, Fig. 8, Plate 1118.....	3-D-1351	59 00
A1	as above, with two common front and back contacts	3-D-1351	63 00
A2	as above, with one independent front or one independent back contact.....	3-D-1351	63 00
A3	as above, with two independent front or two independent back contacts.....	3-D-1351	63 00



ELECTRIC SWITCH LOCK WITH HORIZONTAL MAGNETS—DETAILS

**ELECTRIC SWITCH LOCK WITH HORIZONTAL MAGNETS
DETAILS**

Magnets are usually wound to 100 and 250 ohms resistance. When ordering specify resistance.

Order by Plate and Figure

The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

Fig.		Drawing Reference	List Price
1	Base	1-C-6967	4 40
2	Frame with hole for lock.....	13-C-6967	4 74
2a	as above, without hole for lock.....	8-C-6967	4 10
3	Cover	3-C-6967	1 66
4	Lock Rod Support.....	16-C-6967	36
5	Sector	9-C-6967	3 40
6	Latch	4-C-6967	20
7	Hand Latch.....	7-B-8369	28
8	Lever Lock Rod.....	17-C-6967	1 68
9	Lever Lock Rod Support, with stud Fig. 10.....	11-C-6967	1 50
9a	as above, with stud, clamp and bolts, (1-9, 1-10a, 1-11, 2-41).....		2 32
10	Stud with nut and cotter.....	47-B-8071	30
10a	Stud only.....	47-B-8071	24
11	Clamp	10-C-6967	66
12	Plunger	2-C-6967	1 10
13	Spring for plunger.....	7-B-7770	12
14	Pin with cotters, for plunger Fig. 12.....	18-B-10209	06
15	Hasp	26-B-8299	10
16	Nut	52-B-8082	34
17	Eye Bolt.....	64-B-8034	10
18	Armature for armature bars Fig. 22 or 22a.....	99-B-8157	56
19	Back Strap.....	78-B-8162	68
20	Magnet Bracket.....	105-B-8075	3 76
21	Magnets with nuts.....	59-B-8133	8 00
22	Armature Bar (U. S. & S. Type).....	133-B-8130	2 34
22a	as above, (P. R. R. Type).....	134-B-8130	2 50
23	Contact Spring.....	503-B-8385	1 60
24	Washer, 7/16", for pin Fig. 14. Price per hundred.	46-B-7828	4 00

**ELECTRIC SWITCH LOCK WITH HORIZONTAL MAGNETS
DETAILS**

Magnets are usually wound to 100 and 250 ohms resistance. When ordering specify resistance.

Order by Plate and Figure

The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

Fig.		Drawing Reference	List Price
25	Bushing for sector Fig. 5.....	94-B-8350	46
26	Special Yale Lock No. 513, with key, Fig. 27.....		3 46
27	Key No. 1592 only, for special Yale Lock.....		50
28	Shaft with cotter.....	5-C-6967	10
29	Gasket for cover.....	276-B-8078	64
30	Terminal Board.....	6-C-6967	50
31	Insulation for contact spring Fig. 23.....	252-B-8750	04
32	Insulating Strip for contact spring Fig. 23.....		01
33	Flexible Connector.....	29-B-8762	14
34	Washer for plunger.....	2-B-8332	06
35	Front Terminal Post, complete, with graphite tip, screw, washers and nuts.....	370-B-8094	64
36	Back Terminal Post, complete, with silver tip, washers and nuts.....	373-B-8094	90
37	Terminal Post, No. 10-32x1-1/4", complete, with washers and nuts.....	228-B-8098	18
38	Terminal Post, No. 10-32x1-1/16", complete, with washers and nuts.....	227-B-8098	18
39	Trunnion Screw, 1/4"-32x9/16", for armature bar..	38-B-8378	04
40	Special Screw, with nut lock and nut, for fastening magnet bracket Fig. 20 to frames Figs. 2 or 2a.....	239-B-8098	14
41	Bolt and Nut, 1/2"x1-3/4", for fastening clamp Fig. 11 to lever lock rod support Fig 9. Price per hundred.....		8 00
42	Tap Bolt, 1/2"x1-3/16", for fastening lock rod support Fig. 4 to frames Figs. 2 or 2a. Price per hundred.....		8 00

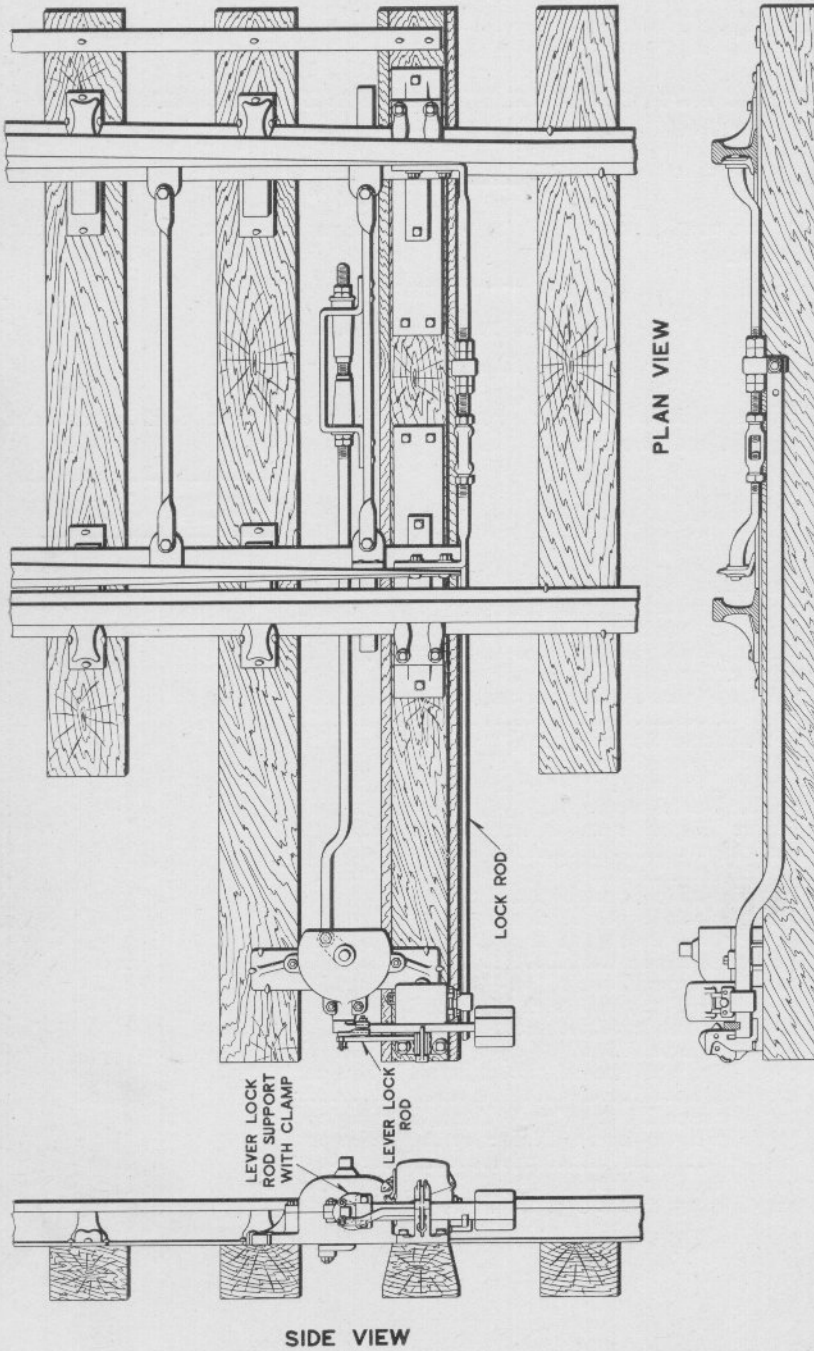
**ELECTRIC SWITCH LOCK WITH HORIZONTAL MAGNETS
DETAILS**

Magnets are usually wound to 100 and 250 ohms resistance. When ordering specify resistance.

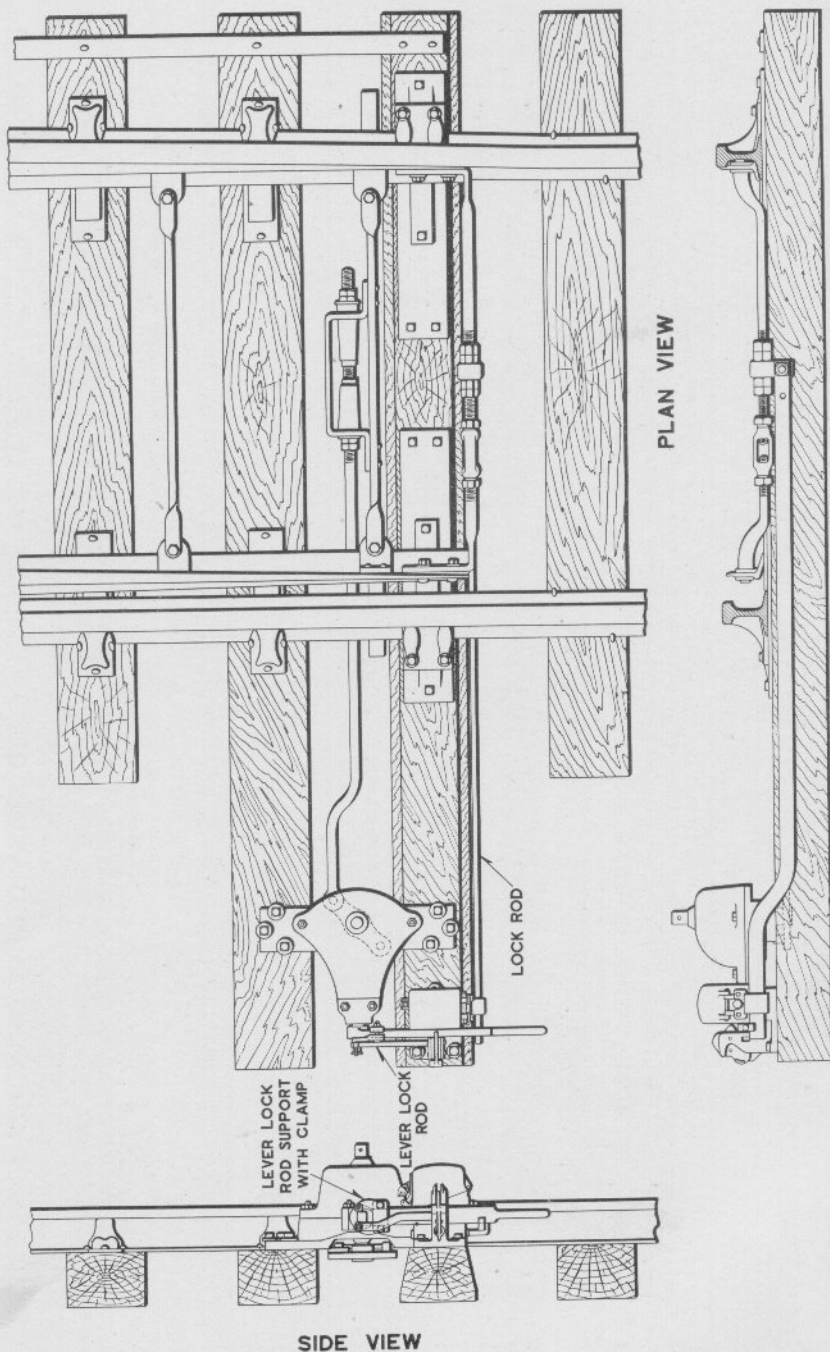
Order by Plate and Figure

The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

Fig.	Description	Drawing Reference	List Price
43	Bolt and Nut, $\frac{1}{4}$ "x2", with nut lock, for fastening magnet bracket Fig. 20 to frames Figs. 2 or 2a. Price per hundred.....		12 00
44	Fil. Hd. Mach. Screw, No. 4-40x15/16", with washer, for fastening contact spring Fig. 23 to armature bars Figs. 22 or 22a. Price per hundred		4 00
45	Fil. Hd. Mach. Screw, $\frac{1}{4}$ "x7/8", with washer, for fastening terminal board Fig. 30 to magnet bracket Fig. 20. Price per hundred.....		4 00
46	Flat Hd. Mach. Screw, $\frac{3}{8}$ "x3-3/4", for fastening frames Figs. 2 or 2a, to base Fig. 1. Price per hundred		10 00
47	Flat Hd. Mach. Screw, No. 8-32x5/8", for fastening lock Fig. 26 to frame Fig. 2. Price per hundred.		2 00
48	Flat Hd. Mach. Screw, No. 12-24x5/16", for fastening armature Fig. 18 to armature bar Fig. 22. Price per hundred.....		2 00
49	Button Hd. Iron Rivet, $\frac{1}{2}$ "x2-1/4", for fastening hand latch Fig. 7 and latch Fig. 6 to base Fig. 1. Price per hundred.....		4 00
50	Button Hd. Iron Rivet, $\frac{3}{8}$ "x4-3/8", for fastening cover Fig. 3 to frames Figs. 2 or 2a. Price per hundred		4 00
51	Button Hd. Iron Rivet, $\frac{3}{8}$ "x1-5/8", for fastening eye bolt Fig. 17 to frames Figs. 2 or 2a. Price per hundred		4 00
52	Button Hd. Iron Rivet, $\frac{1}{4}$ "x1-1/4", for fastening hasp Fig. 15, to nut Fig. 16. Price per hundred.		1 00



LAYOUT SHOWING APPLICATION OF ELECTRIC SWITCH LOCK TO NEW CENTURY SWITCH STAND



LAYOUT SHOWING APPLICATION OF ELECTRIC SWITCH LOCK TO DEAD CENTRE SWITCH STAND

THE UNION SWITCH & SIGNAL COMPANY'S
PUBLISHING DEPARTMENT
Swissvale, Pa.

Press of
MURDOCH, KERR & Co.
Pittsburgh, Pa.

375

SECTION 12.

THE UNION
ELECTRIC SEMAPHORE
AND
THE UNION
DISC SIGNAL

REPRINT OF THE FIRST EDITION

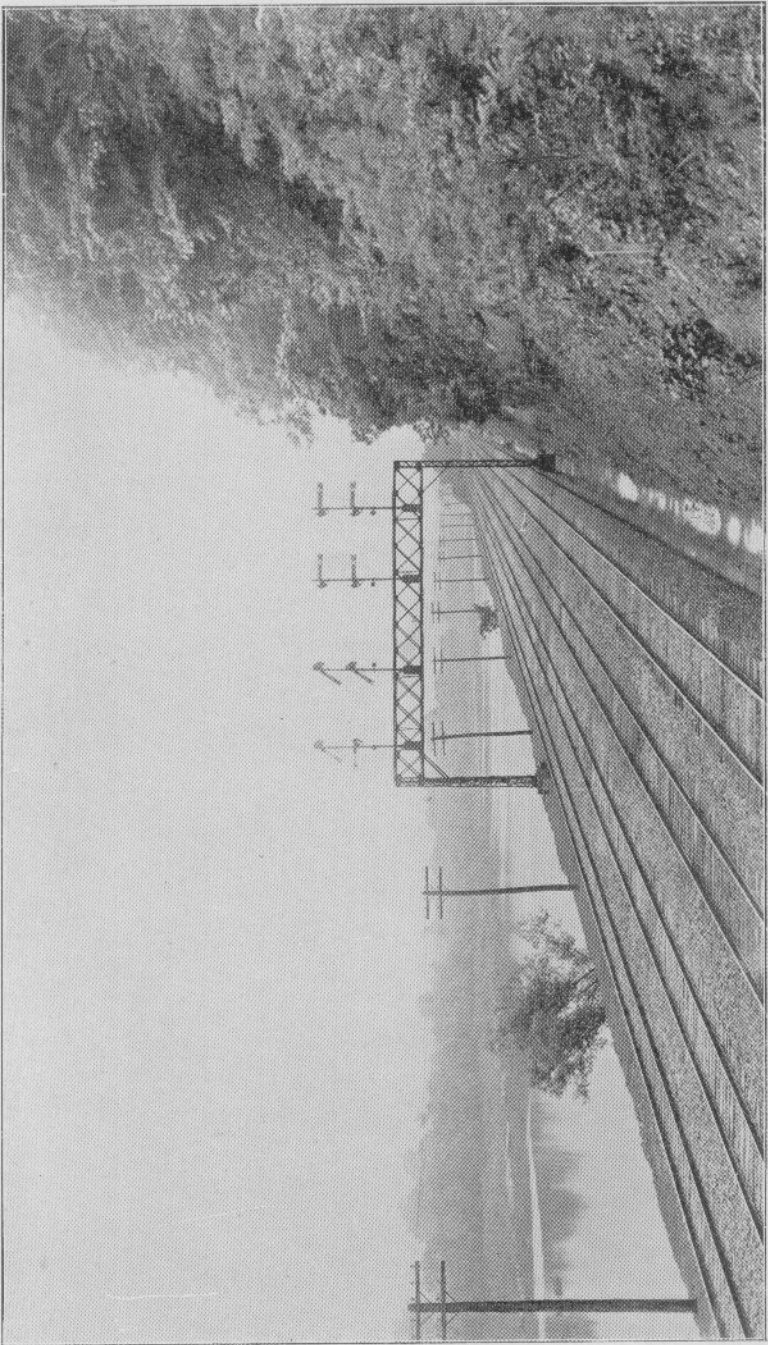
REVISED REPRINT - DECEMBER, 1907.

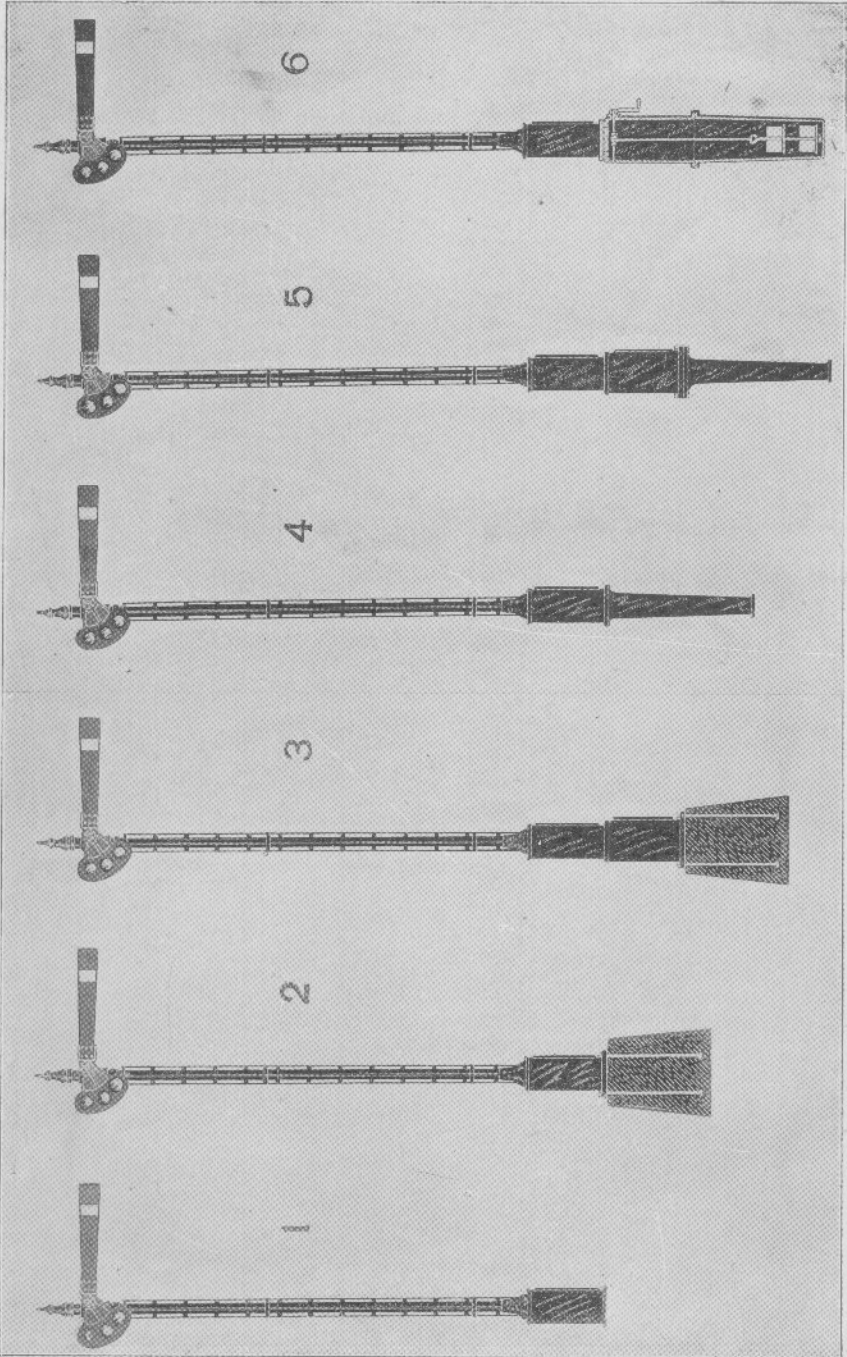
PREFACE TO THE THIRD EDITION.

WHEN the first edition of this Catalogue was issued in March, 1904, we had manufactured and sold 5,100 Electric Semaphores. Since then our sales have more than trebled, and at this date the total number of these signals installed or on order has reached the sum of 26073.

The Union Switch & Signal Co.

Swissvale, Pa., December 10, 1907.





ONE-ARM STYLE B. ELECTRIC SEMAPHORE GROUND SIGNALS

ONE-ARM STYLE B. ELECTRIC SEMAPHORE
GROUND SIGNALS

Order by Plate and Number

No.		List Price
1	One Arm, 60°, Two-Position Home or Distant Signal; no battery case, anchor bolts or foundations	\$367 00
2	One Arm, 60°, Two-Position, Home or Distant Signal with anchor bolts; no battery case or foundation	373 00
3	One Arm, 60°, Two-Position Home or Distant Signal with battery case and anchor bolts; no foundation	426 00
4	One Arm, 60°, Two-Position Home or Distant Signal with cast iron foundation; no battery case	400 00
5	One Arm, 60°, Two-Position Home or Distant Signal, with battery case and cast iron foundation	453 00
6	One Arm, 60°, Two-Position Home or Distant Signal, with cast iron battery well and elevators	598 00

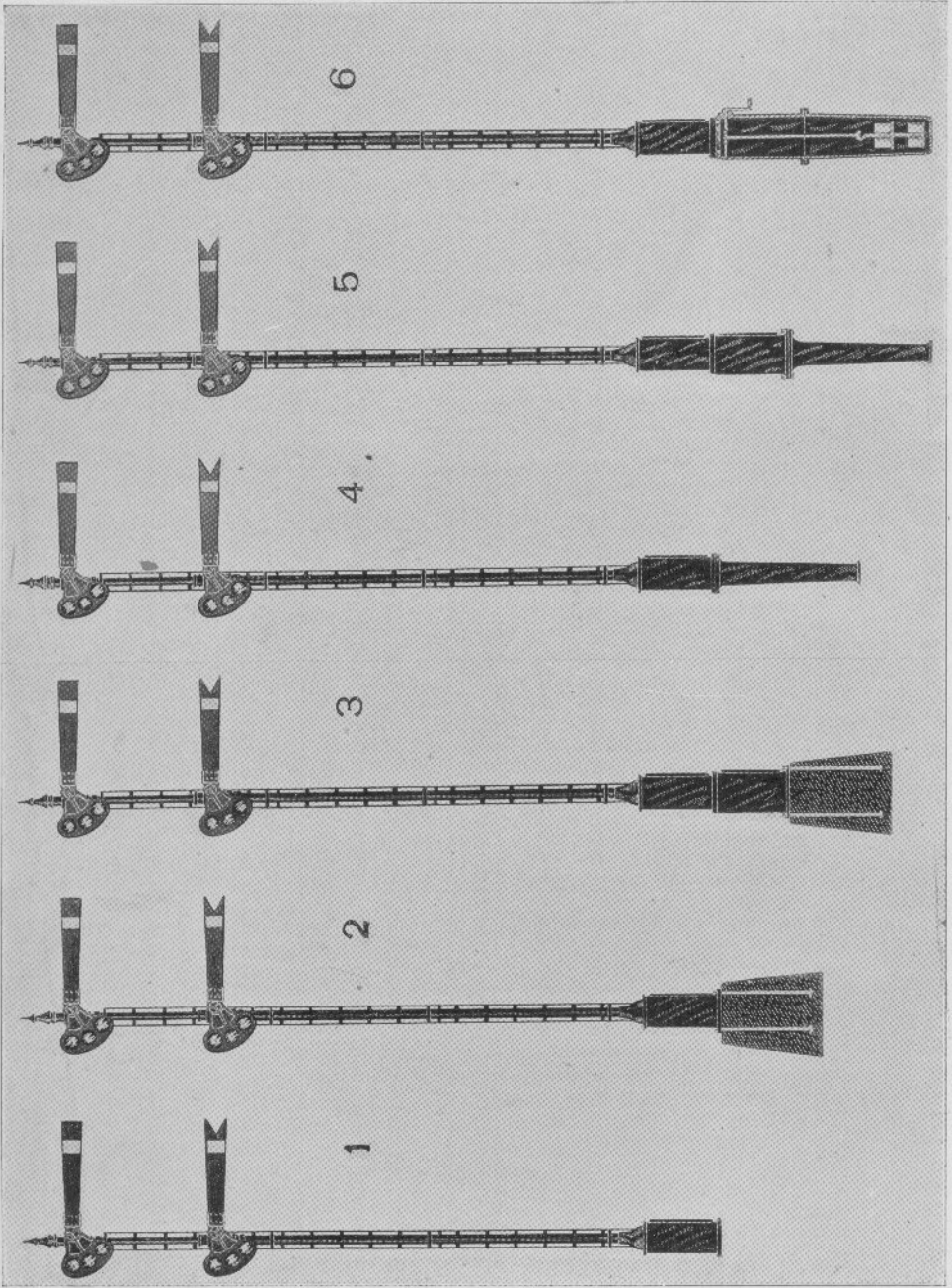
The above prices are for each Signal complete, including blades, ladders and fittings, but do not include lamps, glass, relays, pole changers, back-spectacles, or number plates, which should be ordered separately if required.

Orders should state character of each Signal desired specifying whether home or distant; and also any changes desired from the standard design.

Dimensions of posts and blades, color and number of glass roundels, arc traversed by arm, design of spectacle, etc., must be clearly stated when differing from standard design.

Unless otherwise specified, Signals will be furnished as follows:

Base of Battery Case to center line of blade.....	24'-1"
Base of Mechanism Case to center line of blade	21'1"
Inside diameter of lower section of pipe post.....	6"
Inside diameter of upper section of pipe post.....	5"
Spectacle blade-grip	7"x7"
Length of blade	4'-0"
Diameter of glasses	8 ³ / ₈ "



TWO-ARM STYLE B. ELECTRIC SEMAPHORE GROUND SIGNALS

**TWO-ARM STYLE B. ELECTRIC SEMAPHORE
GROUND SIGNALS**

Order by Plate and Number

No.		List Price
1	Two Arm, 60°, Two-Position Home and Distant Signal; no battery case, anchor bolts or foundations	\$501 00
2	Two Arm, 60°, Two-Position Home and Distant Signal with anchor bolts; no battery case or foundation	507 00
3	Two Arm, 60°, Two-Position Home and Distant Signal, with battery case and anchor bolts; no foundation	560 00
4	Two Arm, 60°, Two-Position Home and Distant Signal, with cast iron foundation; no battery case	534 00
5	Two Arm, 60°, Two-Position Home and Distant Signal, with battery case and cast iron foundation	587 00
6	Two Arm, 60°, Two-Position Home and Distant Signal, with cast iron battery well and elevators	732 00

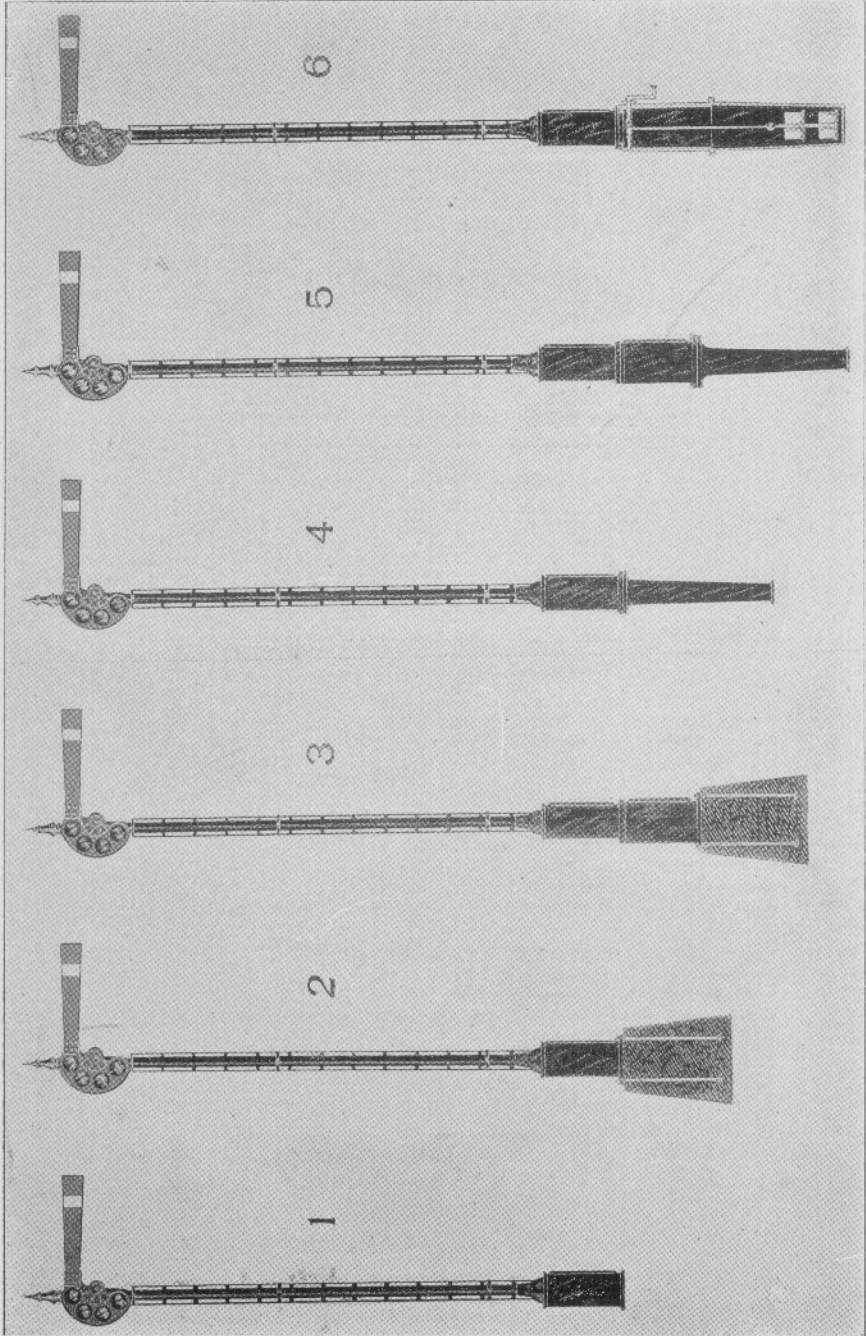
The above prices are for each Signal complete, including blades, ladders and fittings, but do not include lamps, glass, relays, pole changers, back-spectacles, or number plates, which should be ordered separately if required.

Orders should state character of each Signal desired specifying whether 2-homes or 2-distant or 1-home or 1-distant; and also any changes desired from standard designs.

Dimensions of posts and blades, color and number of glass roundels, arc traversed by arm, design of spectacle, etc., must be clearly stated when differing from standard design.

Unless otherwise specified, Signals will be furnished as follows:

Base of Battery Case to center line of bottom blade	24'-1"
Base of Mechanism Case to center line of bottom blade	21'-1"
Inside diameter of lower section of pipe post	6"
Inside diameter of upper section of pipe post	5"
Spectacle blade-grip	7"x7"
Length of blade	4'-0"
Diameter of glasses	8 $\frac{3}{8}$ "



3-POSITION STYLE B. ELECTRIC SEMAPHORE GROUND SIGNALS

**3-POSITION STYLE B. ELECTRIC SEMAPHORE
GROUND SIGNALS**

Order by Plate and Number

No.		List Price
1	One Arm, 90°, Three-Position Signal; no battery case, anchor bolts or foundation	\$476 00
2	One Arm, 90°, Three-Position Signal with anchor bolts; no battery case or foundation	482 00
3	One Arm, 90°, Three-Position Signal with battery case and anchor bolts; no foundation	535 00
4	One Arm, 90°, Three-Position Signal, with cast iron foundation; no battery case	509 00
5	One Arm, 90°, Three-Position Signal, with battery case and cast iron foundation.....	562 00
6	One Arm, 90°, Three-Position Signal, with cast iron battery well and elevators	707 00

The above prices are for each Signal complete, including blades, ladders and fittings, but do not include lamps, glass, relays, pole changers, back-spectacles, or number plates, which should be ordered separately if required.

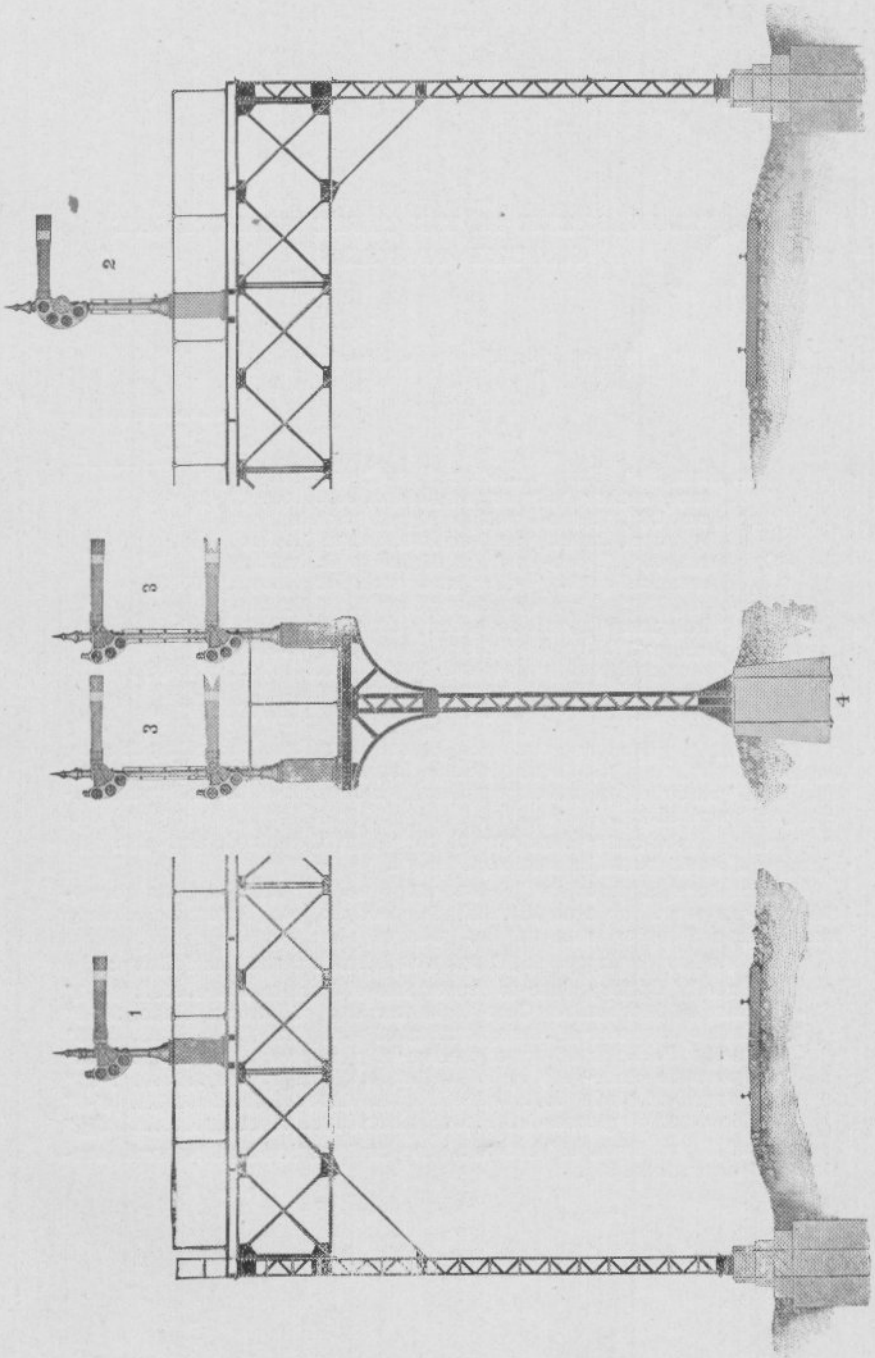
Order should state character of each Signal desired, and also any changes desired from the standard design.

Dimensions of posts and blades, color and number of glass roundels, arc traversed by arm, design of spectacle, etc., must be clearly stated when differing from standard design.

Unless otherwise specified, Signals will be furnished as follows:

Base of Battery Case to center line of bottom blade.....	24'-1"
Base of Mechanism Case to center line of bottom blade,	21'-1"
Inside diameter of lower section of pipe post	6"
Inside diameter of upper section of pipe post	5"
Spectacle blade-grip	7"x7"
Length of blade	4'-0"
Diameter of glasses	6½"

Arc of Signal Arm, 45° between stop and caution and between caution and clear, total 90°.

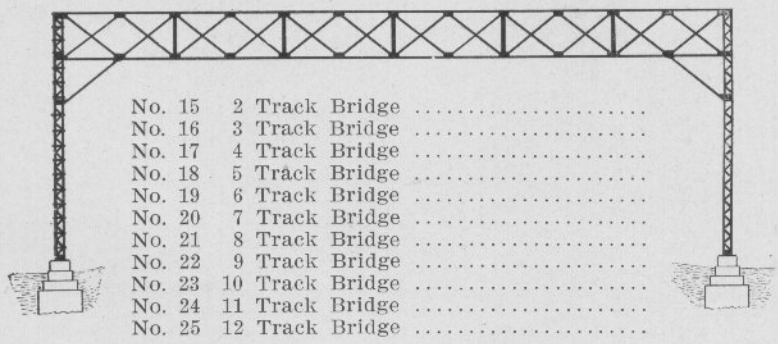
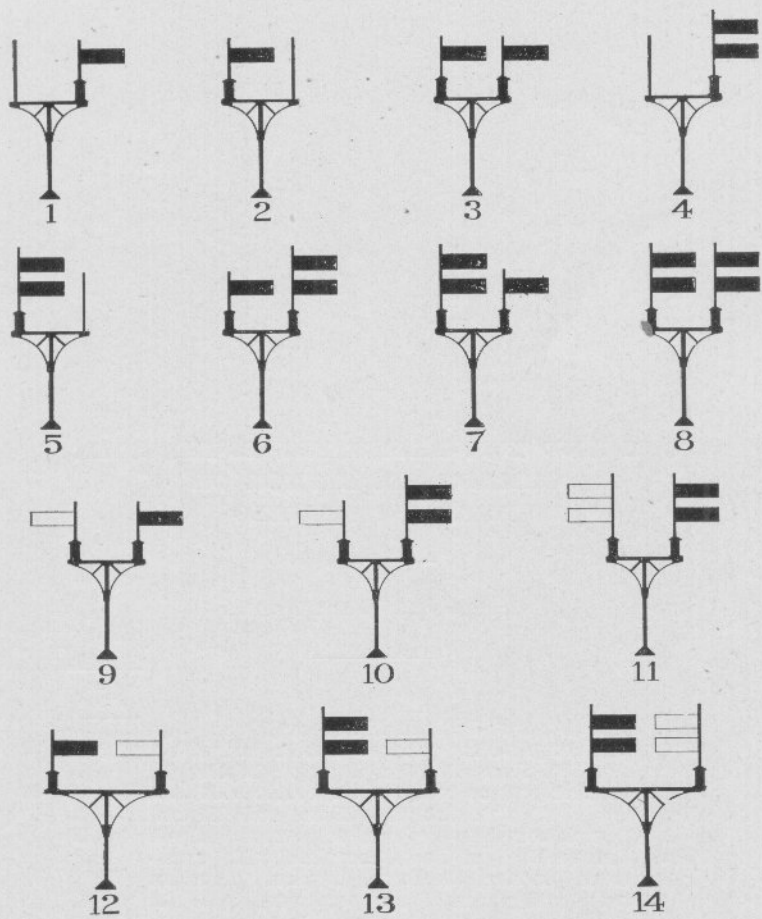


ONE AND TWO-ARM STYLE B. ELECTRIC SEMAPHORE BRIDGE OR BRACKET SIGNALS

ONE AND TWO-ARM STYLE B. ELECTRIC
SEMAPHORE BRIDGE OR
BRACKET SIGNALS

Order by Plate and Number

No.		List Price
1	One Arm, 60°, Two-Position Home or Distant Signal, complete for bracket post or bridge.....	\$333 00
2	One Arm, 90°, Three-Position Signal, complete for bracket post or bridge	449 00
3	Two Arm, 60°, Two-Position Home and Distant Signal, complete for bracket post or bridge..	468 00
4	Steel Lattice Bracket Post, complete with cross-trees, ladder, platform, handrails, anchor bolts, and plates. No upper posts.....	



DIAGRAMS OF BRACKET SIGNALS

DIAGRAMS OF BRACKET SIGNALS

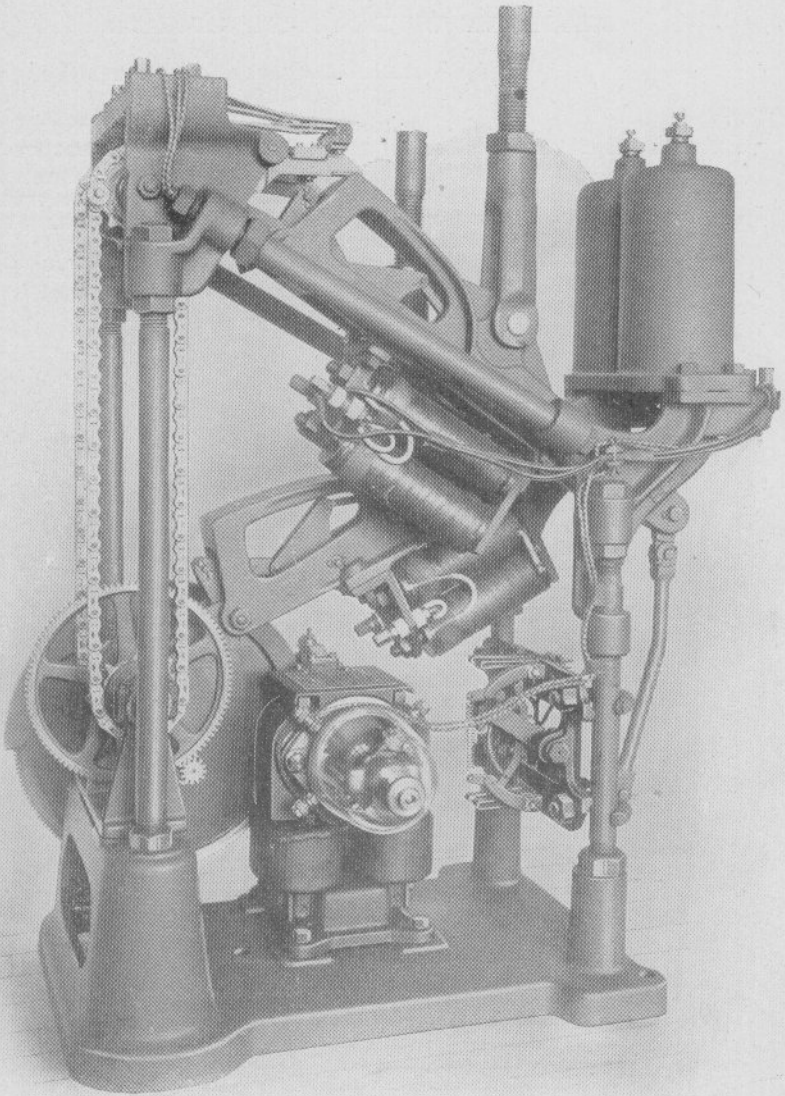
Figures 1 to 8, inclusive, represent diagrams of bracket signals for controlling traffic in one direction only on parallel and adjacent tracks.

Figures 9 to 14, inclusive, represent diagrams of bracket signals for controlling traffic in opposite directions on parallel and adjacent tracks. Figures 9, 10 and 11 represent diagrams for right hand running and Figures 12, 13 and 14 for left hand running.

Should three-position signals (Plate 1203, No. 2) be required with any of the above combinations, the fact must be specifically stated when ordering. Special prices for same furnished on application.

Order by Plate and Number

No.		List Price	Prices on application
1	Steel Lattice Bracket Post, as per Plate 1203, No. 4 with one one-arm, 60°, two-position style B electric semaphore signal (Plate 1203, No. 1) and one dummy post		
2	As above, with upper posts reversed		
3	As above, with two one-arm, 60°, two-position style B electric semaphore signals (Plate 1203, No. 1)		
4	As above, with one two-arm, 60°, two-position style B electric semaphore signal (Plate 1203, No. 3), and one dummy post		
5	As above, with upper posts reversed		
6	As above, with one one-arm and one two-arm, 60°, style B electric semaphore signals (Plate 1203, Nos. 1 and 3)		
7	As above, the upper posts reversed		
8	As above, with two two-arm, 60°, style B electric semaphore signals (Plate 1203, No. 3)		
9	Steel Lattice Bracket Post, as per Plate 1203, No. 4, with two one-arm, 60°, two-position style B electric semaphore signals (Plate 1203, No. 1)		
10	As above, with one one-arm and one two-arm, 60°, two-position style B electric semaphore signals (Plate 1203, Nos. 1 and 3)		
11	As above, with two two-arm, 60°, two-position style B electric semaphore signals (Plate 1203, No. 3)		
12	Similar to 9, with upper posts reversed		
13	Similar to 10, with upper posts reversed		
14	Similar to 11, with upper posts reversed		

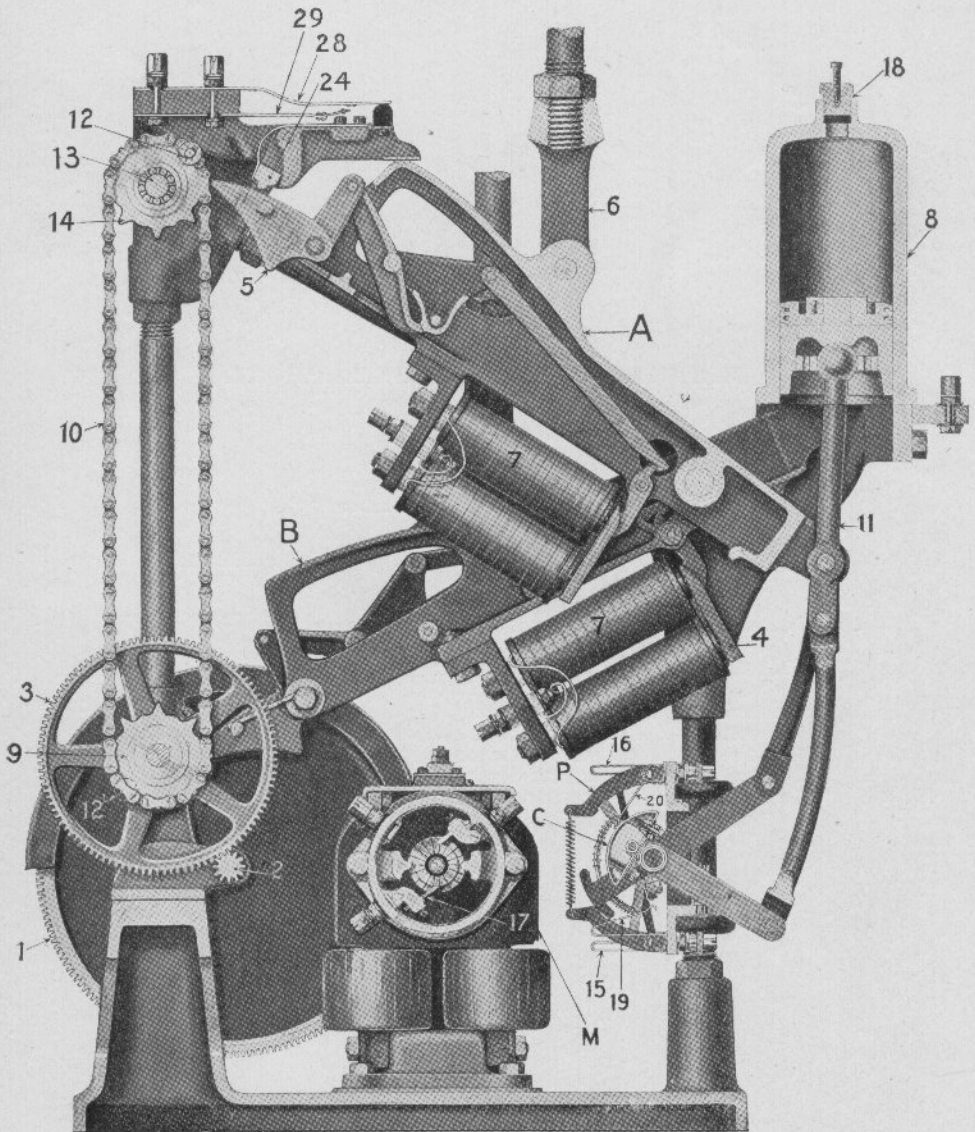


THE UNION ELECTRIC SEMAPHORE STYLE B. MECHANISM

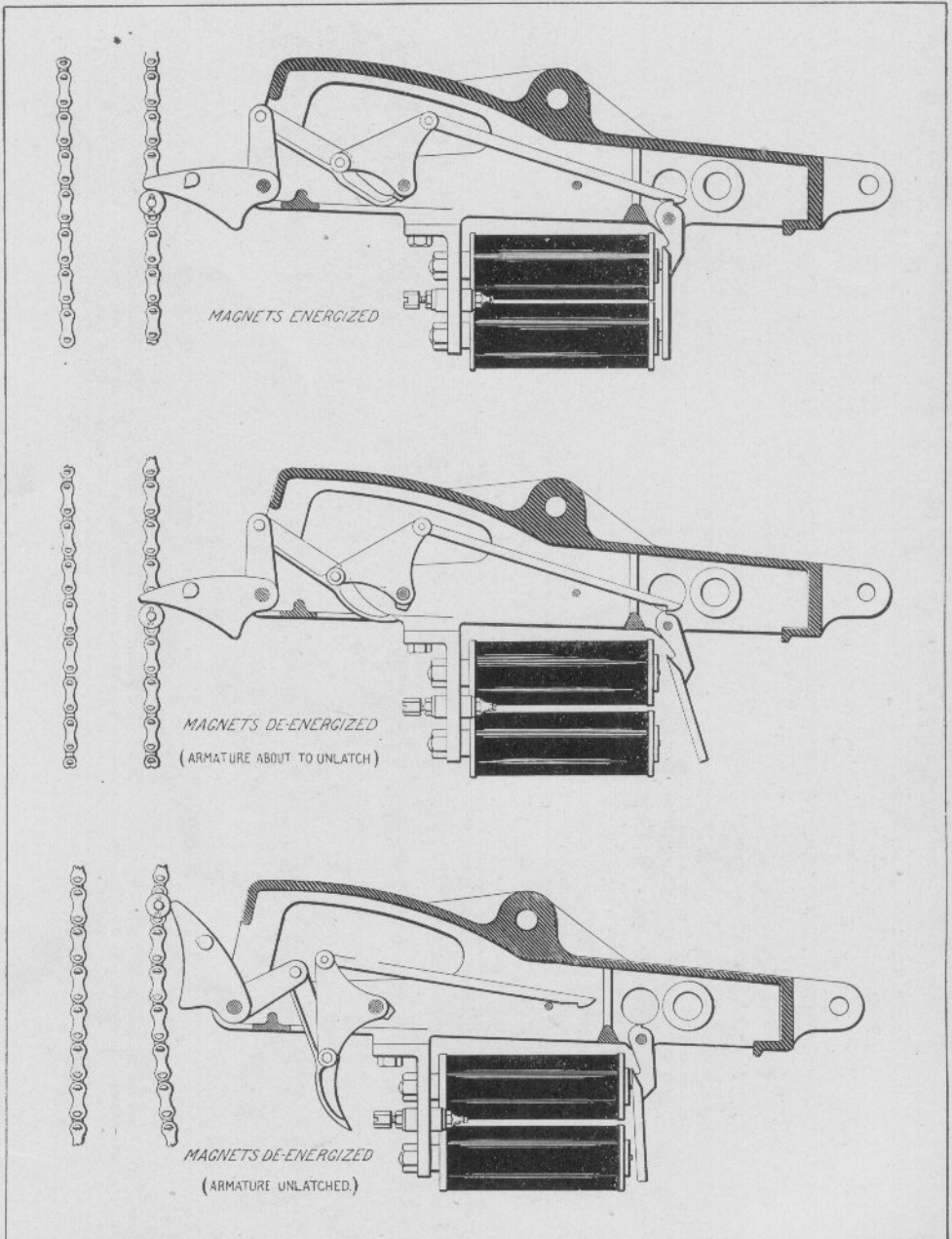
THE UNION ELECTRIC SEMAPHORE
STYLE B. MECHANISM

Order by Plate and Number

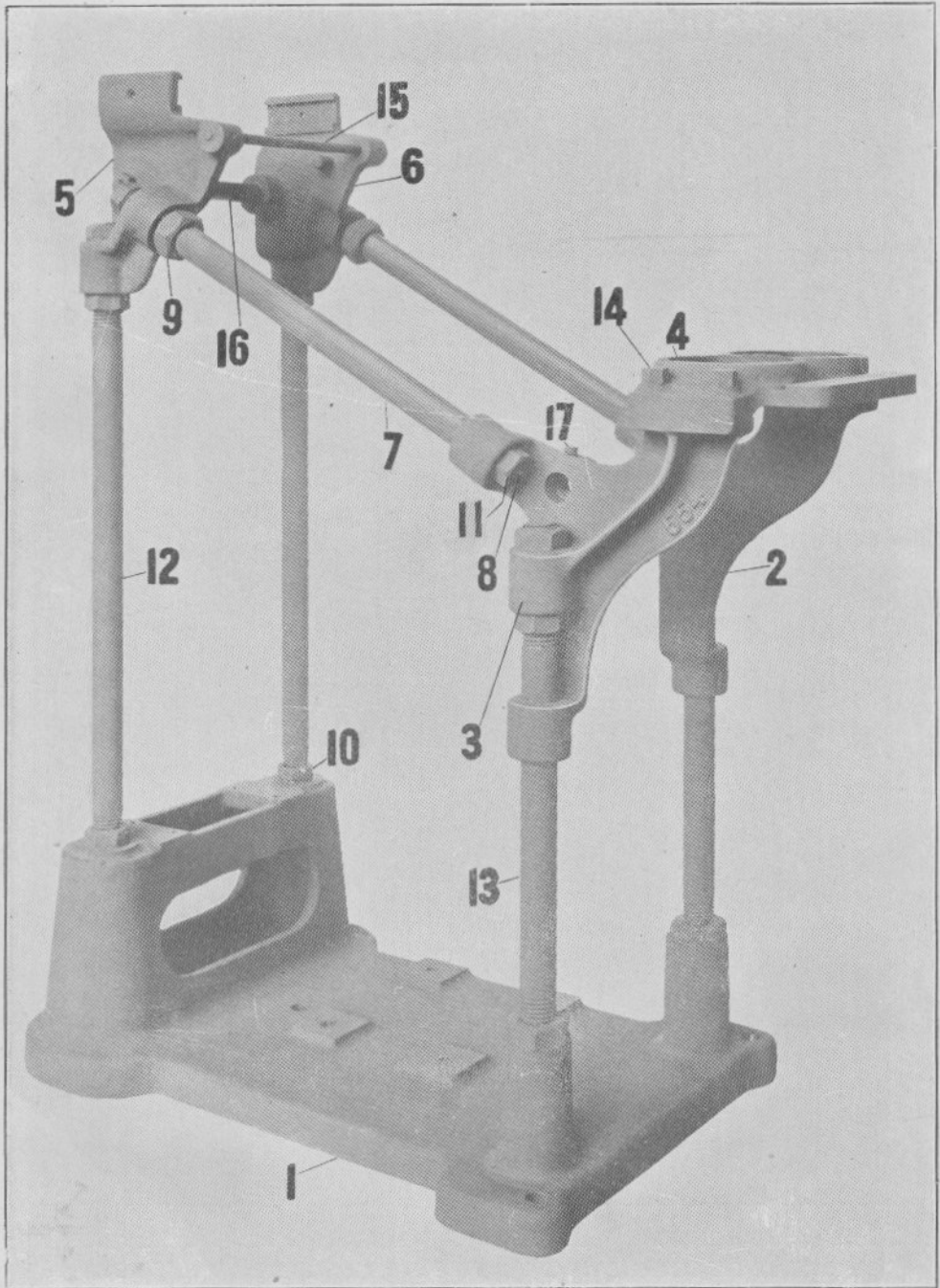
No.		List Price
1	Mechanism and motor complete for one-arm signal	\$212 00
2	Mechanism and motor complete for two-arm signal	288 00
3	Mechanism and motor complete for three-position one-arm signal	318 00
4	Mechanism without motor for one-arm signal.....	150 00
5	Mechanism without motor for two-arm signal.....	226 00
6	Mechanism without motor for three-position one-arm signal	256 00



SECTIONAL VIEW OF THE UNION ELECTRIC SEMAPHORE
STYLE B. MECHANISM



SECTIONAL VIEWS OF SLOT-ARM, SHOWING ITS MECHANISM AND THE SUCCESSIVE POSITIONS THE LATTER ASSUMES PRIOR TO, AND AT THE MOMENT OF RELEASING THE SIGNAL MECHANISM



MECHANISM FRAME
(OLD STYLE)

MECHANISM FRAMES

The earlier design of mechanism frame was intended for use in connection with the brass buffer cylinders No. A, Plate 1211. The support and base for these cylinders was a cast iron piece, No. 4, on the previous page. Since July, 1904, the brass cylinders were superseded by a cast iron design that combined the base and support, together with the cylinders, as shown by C and D Plate 1211½, which is now the standard used on the Style B mechanism. For those who desire to use a cast iron buffer cylinder on the old style frame a special design is made, which is cast as a part of the terminal post bracket. When this last design is required special mention should be made.

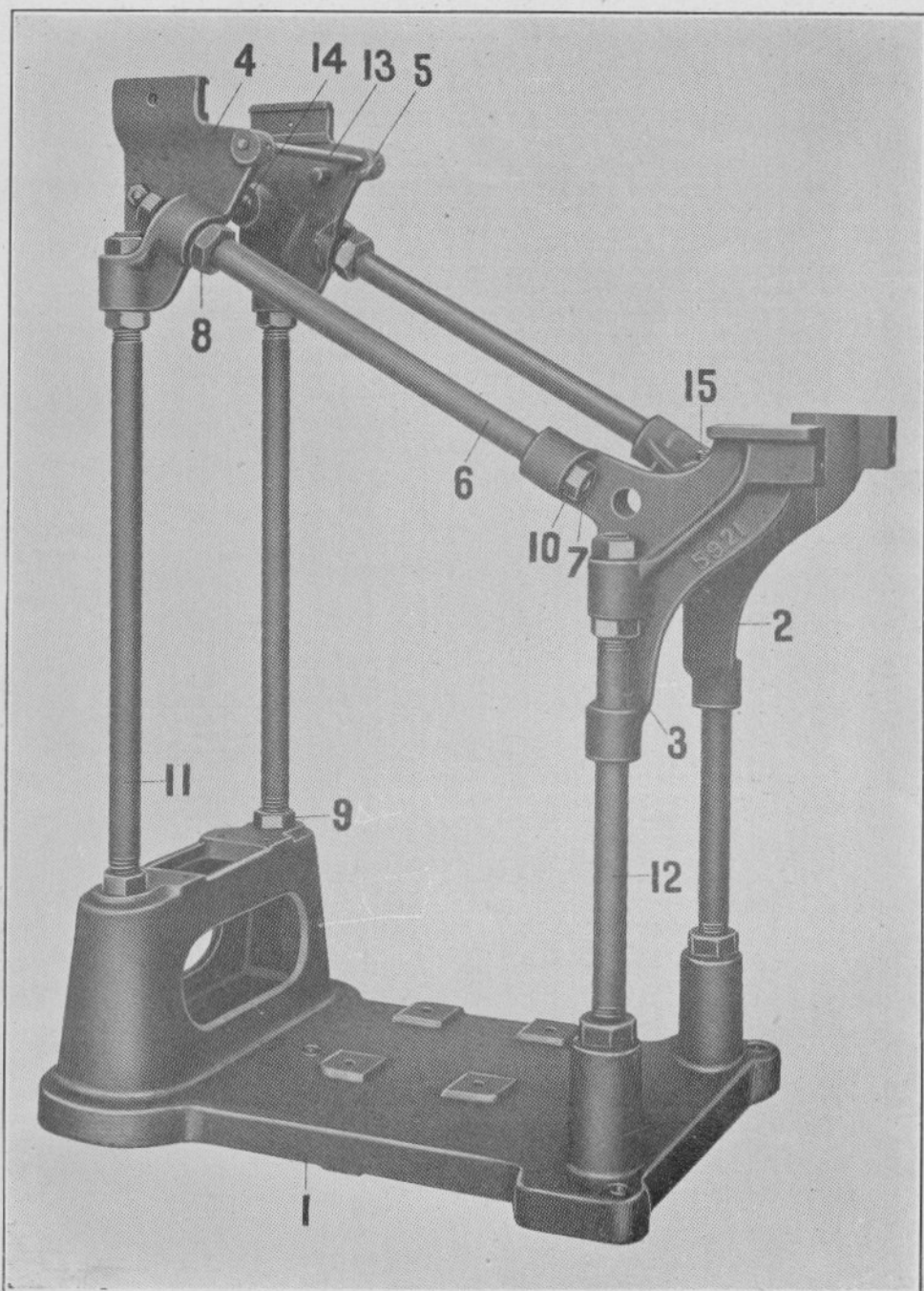
When ordering buffer cylinder brackets specify the pattern number as cast thereon, and described in the lists hereafter.

MECHANISM FRAME

(OLD STYLE)

Order by Plate and Letter or Number

No.		List Price
A	Mechanism Frame, complete, as shown.....	\$24 00
1	Mechanism Bed Plate	
2	Right Hand Bracket, supporting slot shaft and buffer. Pattern No. 553	
3	Left Hand Bracket, supporting slot shaft and buffer. Pattern No. 554.....	
4	Buffer Base Plate	
5	Right Hand Bracket for Upper Sprockets and contact spring support	
6	Left Hand Bracket for Upper Sprockets and contact spring support	
7	Outer Tube	
8	Inner Tube	
9	Adjustable Bushing	
10	Nut, 7/8" Hexagon.....	
11	Nut, 5/8" Hexagon.....	
12	Long Frame Upright	
13	Short Frame Upright	
14	Tap Bolt	
15	Pawl Pivot Pin	
16	Sprocket Shaft with bushing and nuts.....	
17	Set Screw for securing slot arm shaft.....	

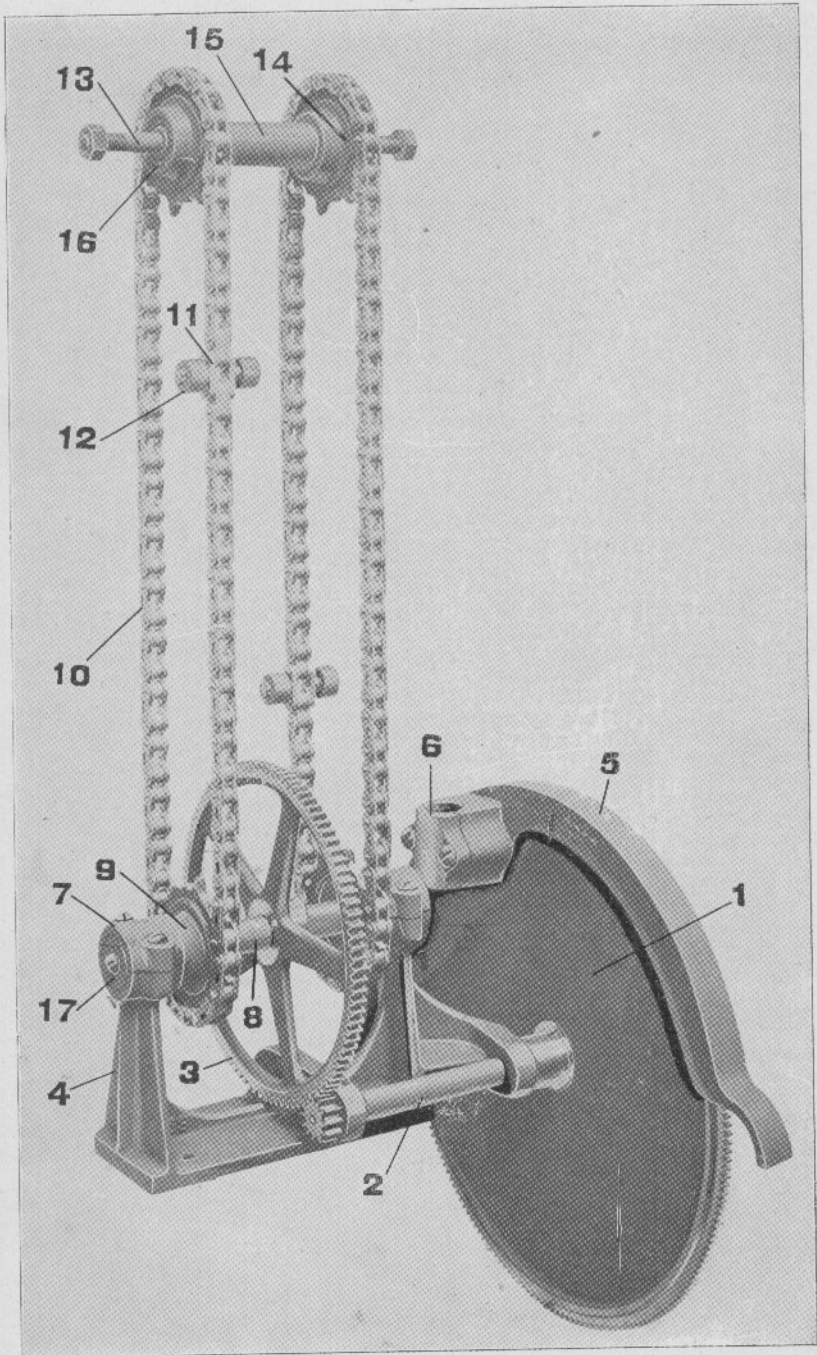


MECHANISM FRAME
(NEW STYLE)

MECHANISM FRAME
(NEW STYLE)

Order by Plate and Letter or Number

No.		List Price
B	Frame, complete, as illustrated (1-1, 1-2, 1-3, 1-4, 1-5, 2-6, 2-7, 2-8, 10-9, 2-9a, 4-10, 2-11, 2-12, 1-13, 1-14, 2-15)	\$22 00
1	Mechanism Base	5 40
2	Right Hand Buffer Cylinder Bracket, Pattern No. 5920	1 30
3	Left Hand Buffer Cylinder Bracket, Pattern No. 5921	1 30
4	Right Hand Contact Spring Support Bracket.....	1 26
5	Left Hand Contact Spring Support Bracket.....	1 26
6	Outer Tubing for Diagonal of Frame.....	44
7	Inner Tubing for Diagonal of Frame.....	78
8	Adjustable Bushing for No. 7.....	54
9	Nut, 7/8" Hexagon, 1/2" Thick, for Nos. 11 and 12....	08
9a	Nut, 7/8" Hexagon 5/8" Thick, for No. 12.....	08
10	Nut, 5/8" Hexagon 7-16" Thick, for No. 7.....	03
11	Long Upright 7/8"x18 7/8" C. R. S. for frame.....	41
12	Short Upright 7/8"x13 3/8" C. R. S. for frame.....	32
13	Shaft 5-16"x7 3/4" C. R. S. for Nos. 24 and 26. Plate 1210	04
14	Shaft 3/8"x7 5/8" C. R. S., threaded on each end and two standard hexagon nuts, for supporting upper sprocket wheel.....	09
15	Special Set Screw 3/8"x3/8", for securing No. 2, Plate 1210 to Nos. 2 and 3 of Plates 1208 and 1208½	03

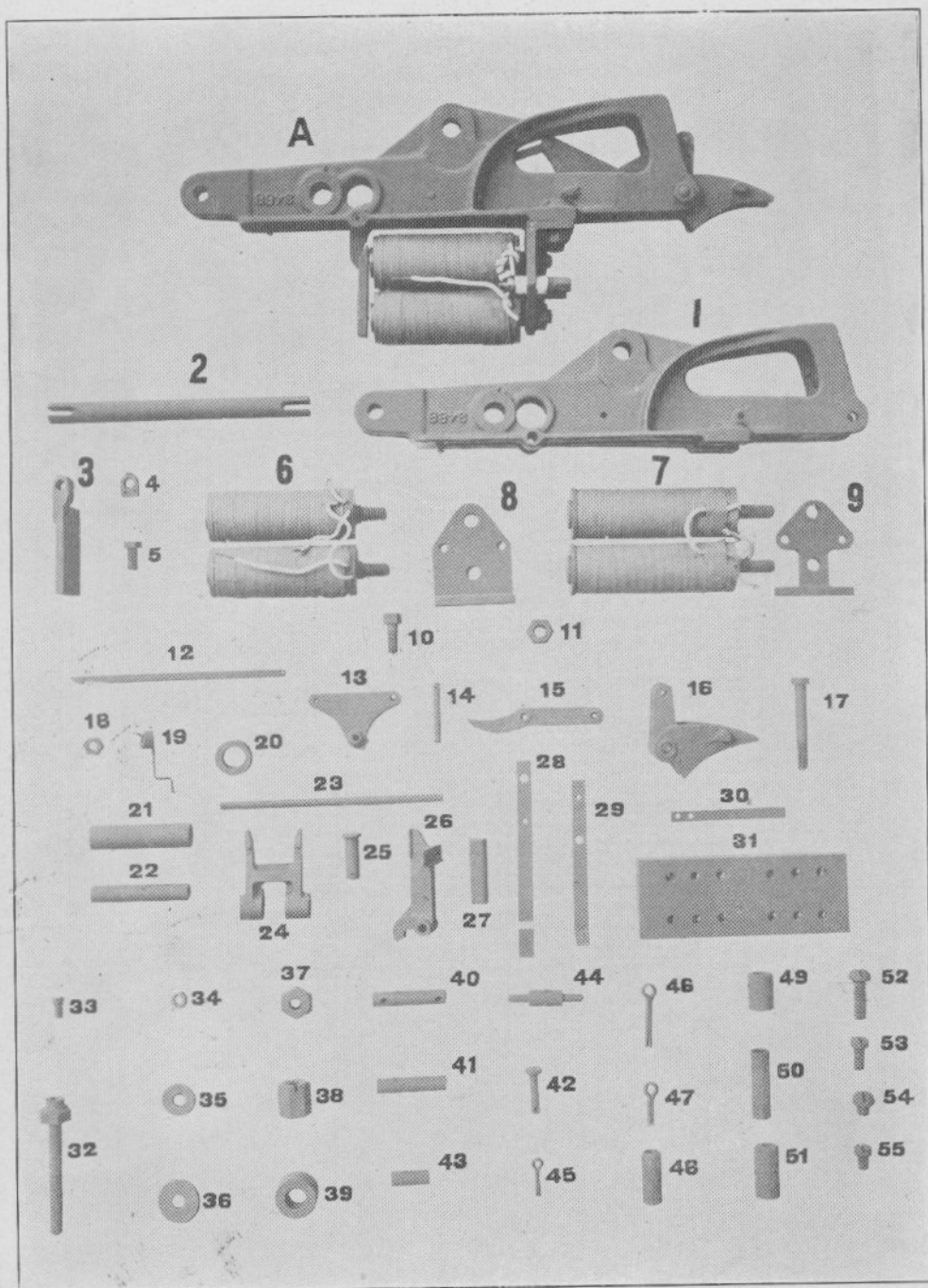


MECHANISM RUNNING GEAR

MECHANISM RUNNING GEAR

Order by Plate and Number

No.		List Price
1	Main Gear Wheel	\$8 36
2	Counter Shaft and Pinion	1 77
3	Intermediate Gear Wheel	3 17
4	Bearing Bracket only.....	5 30
4a	Bearing Bracket with cap and screws.....	6 25
5	Shield for main gear wheel.....	37
5a	Shield with clamp cap and screws for main gear wheel	63
6	Clamp Cap	27
7	Cap for bearing bracket.....	35
8	Shaft for lower sprocket.....	24
9	Lower Sprocket Wheel	1 40
10	Chain with one trunnion, complete.....	5 64
10a	As above, with two trunnions, complete.....	6 40
11	Trunnion Link for chain	26
12	Roller for trunnion link	04
13	Shaft for upper sprocket.....	09
14	Upper Sprocket Wheel.....	1 68
15	Bushing for upper sprocket.....	22
16	Roller Bearing for shafts, Figs. 8 or 13.....	58
17	Retaining Washer with screw for roller bearing...	05



SLOT-ARM AND DETAILS

SLOT-ARM AND DETAILS

All orders for slot-arms or slot-magnets should specify resistance, and state whether or not slow releasing feature is desired.

Order by Plate and Letter or Number

No.		List Price.
A	Covered Slot-Arm, complete.....	\$38 60
1	Slot-Arm only	3 60
2	Main Shaft for supporting slot-arm.....	45
3	Armature, complete (1-3, 1-4 and 1-49).....	1 70
4	Wearing Plate for No. 3.....	09
5	Adjustable Bushing for trunnion.....	07
6	Pair of Distant Signal Magnets with nuts.....	13 60
7	Home Signal Magnets with nuts.....	14 65
8	Back Strap for securing distant signal magnets....	1 30
9	Back Strap for securing home signal magnets.....	1 90
10	Tap Bolt for securing back strap to slot-arm.....	03
11	Hexagon Nut for securing magnets to back strap..	03
12	Latch for engaging armature.....	28
13	Three-Way Crank	80
14	Shaft for No. 13	03
15	Link with stop	29
16	Forked Head	65
17	Stud for forked head.....	13

SLOT-ARM AND DETAILS
CONTINUED

All orders for slot-arms or slot-magnets should specify resistance, and state whether or not slow releasing feature is desired.

Order by Plate and Number

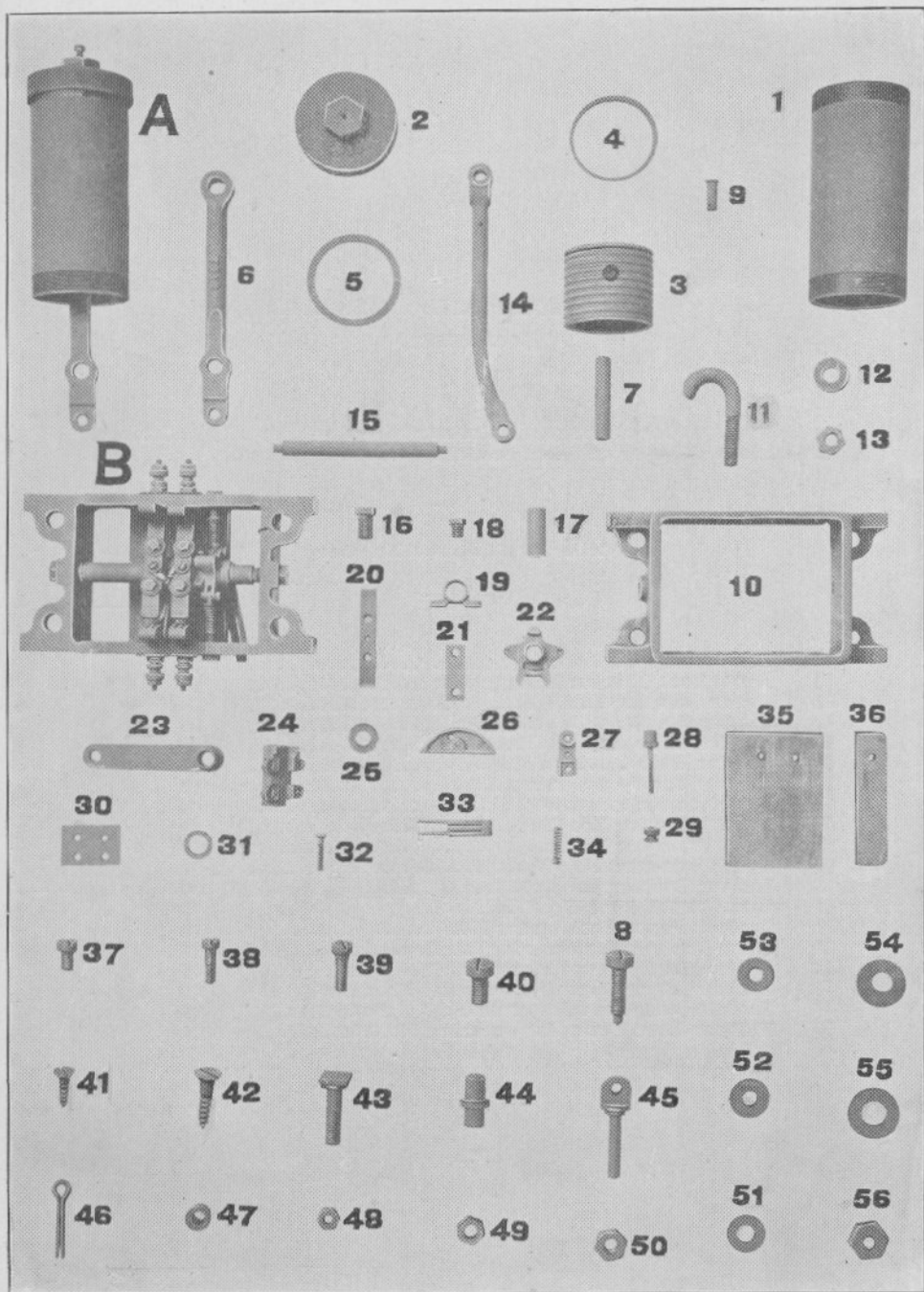
No.		List Price
18	Nut for forked head stud.....	\$ 04
19	Coil Spring for forked head of slot-arm.....	12
20	Collar with set screw for No. 23.....	35
21	Filler Tube for No. 22.....	21
22	Filler Tube for No. 23.....	22
23	Pivot Pin for pawl.....	04
24	Pawl for supporting slot-arm.....	53
25	Pin for buffer connecting link.....	09
26	Circuit Closing Lever.....	76
27	Insulation for No. 26.....	18
28	Long Contact Spring.....	1 02
29	Short Contact Spring.....	48
30	Spring for circuit closing lever.....	13
31	Slate Base for contact springs.....	54
32	Binding Post.....	10
32a	Binding Post, complete, with washers and nuts (1-32, 1-33, 1-34, 2-35, 2-36, 1-37 and 1-38)....	24
33	Fillister Head Screw for binding post.....	01
34	Brass Washer for binding post.....	01
35	Brass Washer for binding post.....	01
36	Copper Washer for binding post.....	02

SLOT-ARM AND DETAILS
CONTINUED

All orders for slot-arms or slot-magnets should specify resistance, and state whether or not slow releasing feature is desired.

Order by Plate and Number

No.		List Price
37	Brass Nut for binding post.....	\$ 03
38	Brass Lock Nut for binding post.....	04
39	Lavite Bushing	04
40	Pin for No. 15 and 16.....	03
41	Pin for latch stop.....	02
42	Pin for latch	12
43	Pin for three-way crank.....	02
44	Trunnion for armature	04
45	Split Cotter for No. 42.....	01
46	Split Cotter for No. 2.....	01
47	Split Cotter for No. 17.....	01
48	Rubber Bushing for No. 31.....	03
49	Brass Bushing for No. 3.....	03
50	Grade C Paper Bushing for No. 32.....	03
51	Brass Bushing for trunnion bearing.....	04
52	Round Head Screw for securing No. 23 and 31.....	01
53	Fillister Head Screw for securing No. 26 to 27.....	01
54	Round Head Screw for securing No. 20 to 23.....	01
55	Fillister Head Screw for securing No. 30.....	01



BUFFER CYLINDER AND POLE CHANGING MECHANISM
 (OLD STYLE)

**BUFFER CYLINDER AND POLE CHANGING
MECHANISM**

(OLD STYLE)

If extra contacts are required, in addition to the four usually furnished for pole changing, the fact should be stated in the order which should also indicate at what point of the movement of the signal the contacts are to be closed or opened.

Order by Plate and Letter or Number

No.		List Price
A	Buffer with piston link, complete, as shown.....	\$ 9 42
B	Pole Changer, complete, as shown.....	14 34
1	Buffer Cylinder	3 22
2	Cap for buffer cylinder head	68
3	Buffer Piston	3 66
4	Piston Packing Ring.....	80
5	Fibre Washer	03
6	Buffer Piston Connecting Link	33
7	Wrist Pin for piston	05
8	Screw for regulating exhaust.....	05
9	Pin for connecting link.....	08
10	Pole Changing Box only	1 30
11	Hook Bolt	06
11a	Hook Bolt, Nut and Washer (1-11, 1-12, 1-13).....	09
12	Washer $\frac{5}{8}$ " for hook bolt	01
13	Nut $\frac{5}{8}$ " for hook bolt	03
14	Pole Changer Connecting Link	28
15	Shaft for pole changer	07
16	Trunnion Screw for shaft	08
17	Brass Bushing for shaft	06
18	Trunnion Screw for spring rod bushing.....	06

**BUFFER CYLINDER AND POLE CHANGING
MECHANISM**

(OLD STYLE)

CONTINUED

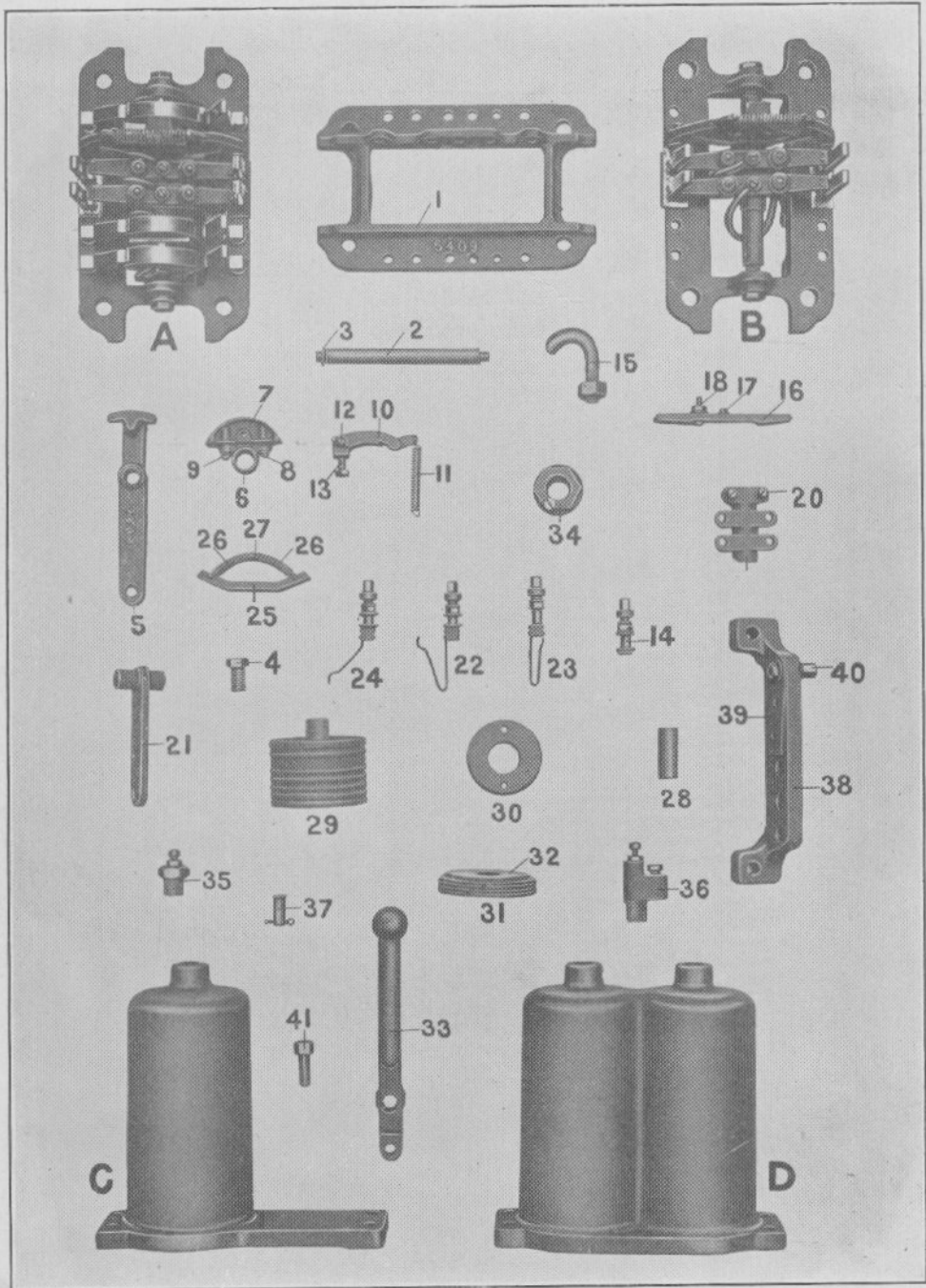
Order by Plate and Number

No.		List Price
19	Bracket for circuit controller.....	\$ 49
20	Contact Piece for pole changer.....	77
21	Mica Insulation for circuit controller.....	10
22	Toggle	88
23	Arm for pole changer and circuit controller.....	66
24	Bracket for pole changer contact pieces.....	84
25	Mica Washer $\frac{3}{4}$ " for pole changer.....	04
26	Contact Piece for circuit controller.....	32
27	Terminal for securing binding post.....	16
28	Binding Post and Stop for pole changer.....	10
28a	Binding Post, complete (1-28, 1-50, 1-29, 1-51, 2-54)	20
29	Thumb Nut	05
30	Mica Insulation for binding posts.....	05
31	Brass Washer $\frac{1}{2}$ " for shaft.....	02
32	Binding Post for back of pole changer.....	07
32a	Binding Post, for back of pole changer, complete (1-32, 2-52, 1-50, 1-29 and 1-56).....	18
33	Phosphor Bronze Spring for pole changer.....	19
33a	Phosphor Bronze Spring for circuit controller.....	17
34	Spring for toggle	11
35	Center Piece for pole changing box.....	23
36	End Piece for pole changing box.....	14

**BUFFER CYLINDER AND POLE CHANGING
MECHANISM
(OLD STYLE)
CONTINUED**

Order by Plate and Number

No.		List Price
37	Fillister Head Screw No. 10-32 for No. 20.....	\$ 01
38	Fillister Head Screw No. 6-32 for No. 45.....	01
38a	Fillister Head Screw No. 6-32 for No. 45 with nut	03
39	Fillister Head Screw No. 10-32 for connecting Nos. 19 and 26	01
40	Fillister Head Screw No. 12-32 for No. 27.....	01
41	Wood Screw $\frac{1}{2}$ " for No. 27.....	01
42	Wood Screw $\frac{3}{4}$ " for Nos. 35 and 36.....	01
43	Square Head Bolt No. 8-32 for securing No. 20 to No. 24	04
44	Brass Bushing for trunnion spring.....	03
45	Spring Rod for toggle.....	10
46	Split Cotter $\frac{3}{32}$ " for No. 9.....	01
47	Fibre Bushing for binding post.....	02
48	Brass Nut No. 8-32 for No. 38.....	02
49	Brass Nut No. 10-32 for No. 43.....	02
50	Brass Nut No. 10-32 for Nos. 28 and 32.....	02
51	Brass Washer $\frac{7}{32}$ " for No. 28.....	01
52	Brass Washer $\frac{3}{16}$ " for No. 43.....	01
53	Copper Washer $\frac{3}{16}$ " for No. 20.....	01
54	Brass Washer $\frac{3}{16}$ " for No. 40.....	01
55	Brass Washer $\frac{7}{32}$ " for Nos. 20 and 24.....	01
56	Brass Nut No. 10-32 for Nos. 28 and 32.....	02



BUFFER CYLINDER AND POLE CHANGING MECHANISM
(NEW STYLE)

**BUFFER CYLINDER AND POLE CHANGING
MECHANISM**

(NEW STYLE)

If extra contacts are required, in addition to those shown by A and B on the opposite plate, the fact should be specified when ordering, as well as the point of the movement of the signal at which the contacts are to make or break. In the new design of pole-changing mechanism the shifting of the contacts is almost instantaneous and with a sharp, positive snap.

Order by Plate and Letter or Number

No.		List Price
A	Pole Changer and Circuit Controller, complete as illustrated (1-1, 1-2, 2-3, 2-4, 1-5, 3-6, 3-7, 6-8, 6-9, 2-10, 1-11, 2-12, 2-13, 5-14, 2-16, 5-17, 4-18, 1-19, 2-20, 1-21, 3-22, 4-23, 3-24, 1-25, 2-26, 1-27)	\$26 59
A1	Pole Changer and Circuit Controller with hook bolts and nuts (1-A, 4-15).....	27 10
A2	Pole Changer and Circuit Controller, complete with hook bolts and connecting link to slot arm (1-A, 4-15 and 1-14, Plate 1211).....	27 38
B	Pole Changer, complete as illustrated (1-1, 1-2, 2-3, 2-4, 1-5, 2-10, 1-11, 2-12, 2-13, 2-14, 2-16, 2-17, 4-18, 1-19, 2-20, 4-23, 1-25, 2-26, 1-27, 1-28)	17 30
B1	Pole Changer with hook bolts and nuts (1-B, 4-15)	17 81
B2	Pole Changer, complete, with hook bolts and connecting link to slot arm (1-B, 4-15 and 1-14, Plate 1211)	18 00
C	Cast Iron Buffer Cylinder, as illustrated, for use on a one-arm signal mechanism.....	3 71
C1	Cast Iron Buffer Cylinder with terminal post bracket for use on the old style one-arm signal mechanism frame to replace the brass cylinders and base plate. Special.....	4 49
D	Cast Iron Buffer Cylinder, as illustrated, for use on a two-arm signal mechanism or a three-position signal mechanism	6 89
D1	Cast Iron Buffer Cylinder with terminal post bracket for use on the old style two-arm signal mechanism or the three-position mechanism, to replace the brass cylinders and base plate. Special	7 95
E	Cast Iron Buffer Cylinder for use on a three-arm signal mechanism or one two-position and one three-position signal mechanism.....	10 23

**BUFFER CYLINDER AND POLE CHANGING
MECHANISM
(NEW STYLE)**

CONTINUED

Order by Plate and Number

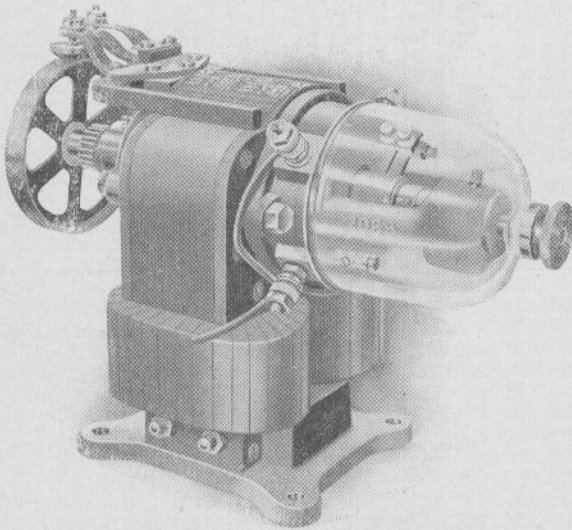
No.		List Price
1	Frame for pole changer and circuit controller....	\$ 88
2	Shaft for frame No. 1	07
3	Washer for shaft No. 2	01
4	Trunnion Screw for supporting shaft No. 2.....	13
5	Operating Arm for pole changer.....	82
6	Bracket for circuit controller contact piece No. 7..	27
7	Contact Piece for circuit controller.....	31
8	Fillister Head Machine Screw No. 8—32x9/16", for fastening No. 7 to No. 6.....	01
9	Hard Rubber Bushing for No. 6.....	02
10	Steel Latch Arm	73
11	Contact Tension Spring for latch.....	25
12	Pin 1/4"x7/8" with cotter for fastening No. 13 to No. 10	03
13	Brass Jaw 1/4" with nut	23
14	Binding Post for external connecting wires, com- plete	19
15	Hook Bolt and Nut for fastening frame No. 1 to mechanism frame	13
16	Improved Contact Arm for pole changer.....	68
17	Fillister Head Machine Screw No. 8—32x1/4", with washer for connecting wires from binding post No. 14 to contact piece No. 7 and con- tact arm No. 16.....	01
18	Fillister Head Machine Screw No. 10—32x13/16", complete with nut, washers and insulations, for fastening No. 16 to No. 19.....	03
19	Bracket for pole changer contact arms.....	1 01
20	Fillister Head Machine Screw No. 10—32x1/2", for fastening No. 25 to No. 19.....	01
21	Operating Arm of circuit controller.....	66
22	Binding Post and Contact Spring, complete with nuts, washers and insulations for circuit con- troller	68

**BUFFER CYLINDER AND POLE CHANGING
MECHANISM
(NEW STYLE)**

CONTINUED

Order by Plate and Number

No.		List Price
23	Binding Post and Contact Spring, complete with nuts, washers and insulation, for pole changer	\$ 68
24	Binding Post and Contact Spring, complete, with nuts, washers and insulations, for circuit controller	68
25	Steel Latch for pole changer	73
26	Contact Compression Spring for pole changer latch No. 25	13
27	Brass Rod for latch No. 25	28
28	Brass Sleeve, ½"x⅝"x1-9/16", for use on shaft No 2 in pole changer B.....	05
29	Piston for buffer cylinder.....	2 19
30	Follower for piston No. 29.....	69
31	Piston Ring	68
32	Cage for piston ring	1 75
33	Piston Rod for buffer cylinder.....	1 44
34	Brass Nut with screw for fastening No. 32 to No. 29	37
35	Check Valve for buffer cylinders C, D, and E.....	70
36	Check Valve with Bye Pass (standard) for buffer cylinders C, D, and E.....	1 63
37	Pin, ½"x1½", for buffer cylinder piston.....	09
38	Cast Iron Terminal Post Bracket for one or two-arm signal mechanism frame.....	40
38a	Cast Iron Terminal Post Bracket for three-arm signal mechanism frame	55
39	Mica Insulation for terminal post bracket No. 38	19
39a	Mica Insulation for terminal post bracket No. 38a	29
40	Terminal Post, complete with nuts, washers and insulating bushings, for Nos. 38 and 38a.....	18
41	Tap Bolt, ⅜"x1¼", for fastening Nos. 38 and 38a, and C, D and E to mechanism frame.....	02



**THE UNION ELECTRIC SEMAPHORE MECHANISM
MOTOR**

Note.—The above view shows the field actuated brake and the transparent shield over commutator which completely overcomes the serious troubles formerly experienced from frost or dust accumulating on the commutator.

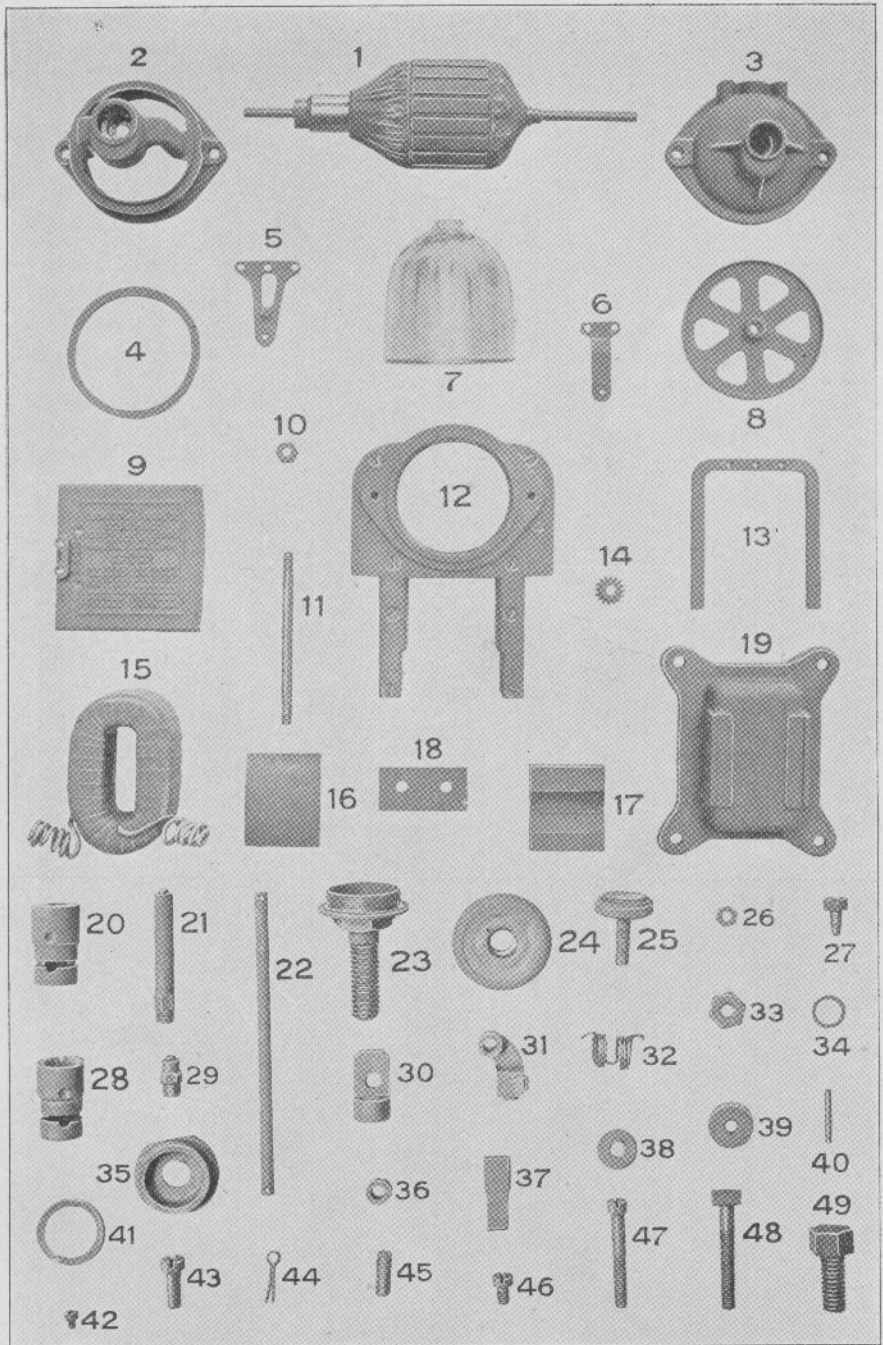
For Details of Motor, see Plate 1213

**THE UNION ELECTRIC SEMAPHORE
MECHANISM MOTOR**

Order by Plate Number

Electric Semaphore Mechanism Motor, complete, as
shown, with brake and commutator shield..

List Price	
\$62 00	

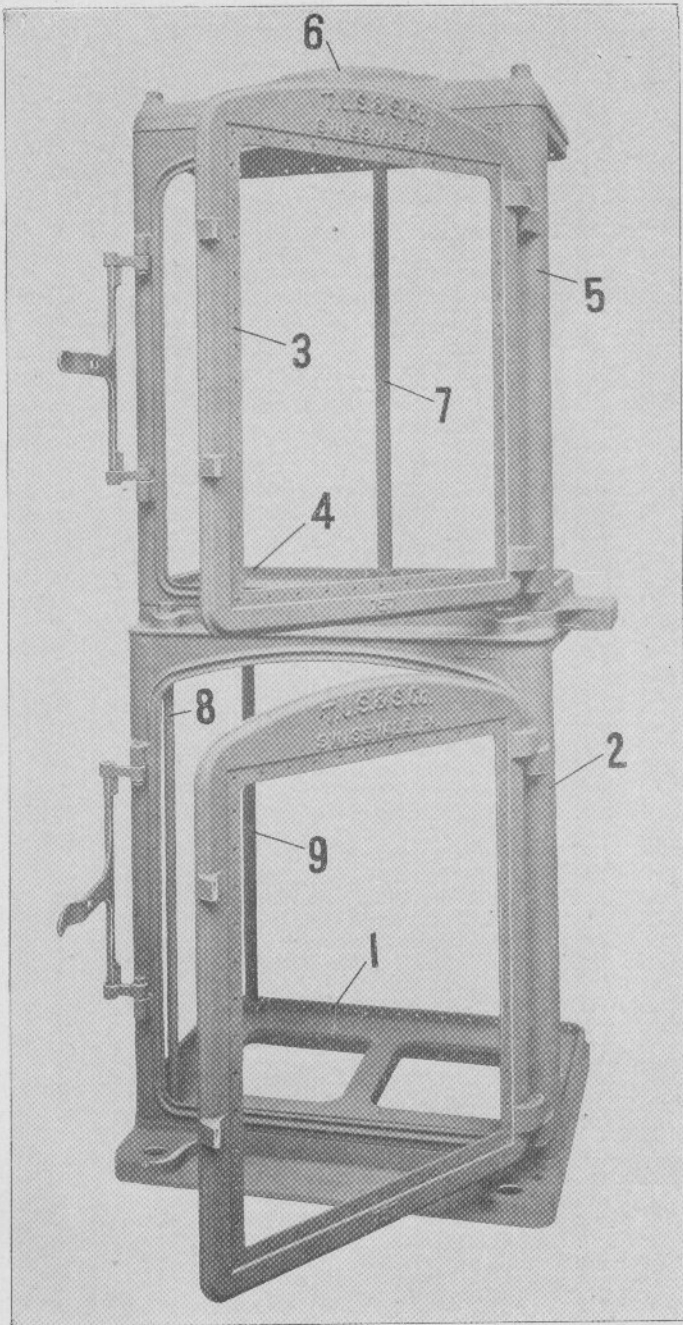


DETAILS OF THE UNION ELECTRIC SEMAPHORE MECHANISM MOTOR

DETAILS OF THE UNION ELECTRIC SEMAPHORE
MECHANISM MOTOR

Order by Plate and Number

No.		List Price
1	Armature, complete	\$16 60
2	Armature Shaft Bearing—(Commutator End).....	2 95
3	Armature Shaft Bearing—(Gear End).....	2 10
4	Leather Gasket for commutator shield.....	53
5	Brake Shoe Bracket	16
6	Spring for brake shoe bracket.....	22
7	Glass Commutator Shield	36
8	Brake Wheel	80
9	Name Plate and Shield for brake armature.....	80
10	Nut for field stay bolt.....	05
11	Field Stay Bolt	12
12	Motor Field, complete	9 44
13	Brake Armature	42
14	Pinion for armature shaft	1 30
15	Field Coil	4 80
16	Top Wood Filler under name plate.....	10
17	Bottom Wood Filler under armature.....	10
18	Plate for field stay bolt	17
19	Motor Base	1 25
20	Armature Shaft Bearing Sleeve—(Commutator End)	35
21	Spring Oil Cup (Gear End)	34
22	Brake Shoe Shaft	12
23	Stud for securing glass commutator shield.....	34
24	Nut with leather cushion for above.....	24
25	Brake Shoe with leather disc.....	30
26	Lock Nut for brush holder stud No. 47.....	02
27	Set Screw for shaft bearing sleeve.....	04
28	Armature Shaft Bearing Sleeve (Gear End).....	34
29	Spring Oil Cup (Commutator End).....	24
30	Brush Holder Bracket	04
31	Brush Holder	30
32	Double Spiral Spring for brush holder.....	09
33	Lock Nut for binding post.....	02
34	Wearing Ring for armature shaft.....	02
35	Nut for armature shaft bearing No. 3.....	24
36	Collar for brush holder stud No. 47.....	02
37	Brush	45
38	Washer for binding post No. 48.....	01
39	Thumb Nut for binding post No. 48.....	05
40	Dowel Pin for securing Nos. 8 and 14 to armature shaft	01
41	Oil Ring	03
42	Set Screw for collar No. 36.....	01
43	Fillister Head Machine Screw for securing No. 5 to No. 13	04
43a	Fillister Head Machine Screw for securing No. 6 to No. 9	04
44	Cotter for shaft No. 22.....	01
45	Adjusting Screw and Nut for brake shoe.....	05
46	Set Screw for brush holder	01
47	Stud with threaded end for brush holder.....	05
48	Binding Post	05
49	Tap Bolt for securing armature shaft bearings to field	07

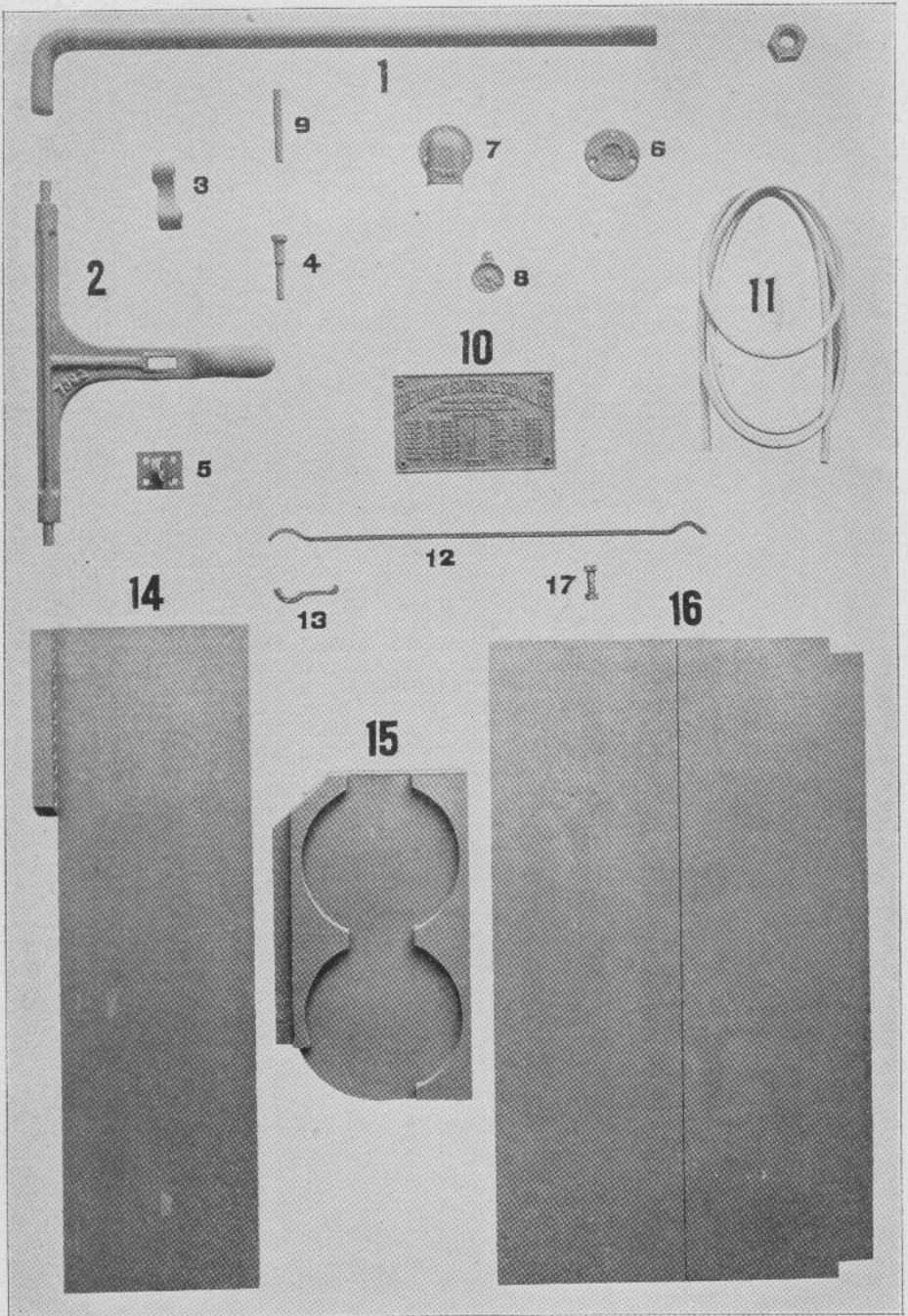


COMBINED MECHANISM AND BATTERY CASE

COMBINED MECHANISM AND BATTERY CASE

Order by Plate and Letter or Number

No.		List Price
A	Combined Mechanism and Battery Case, complete	\$112 00
B	Mechanism Case only	60 30
1	Base Casting for battery case.....	11 70
2	Door Frame with hinge pins for battery case.....	6 72
3	Door Casting for either case.....	3 50
3a	Door Casting with sheet iron for either case, complete	11 86
4	Base Casting for mechanism case.....	10 60
5	Door Frame with hinge pins, for mechanism case	6 72
6	Dome Casting	8 05
7	Square Bolt with threaded ends for rear of mechanism case	1 34
8	Stay Bolt for either case.....	80
9	Thimble over stay bolt in rear of battery case.....	28

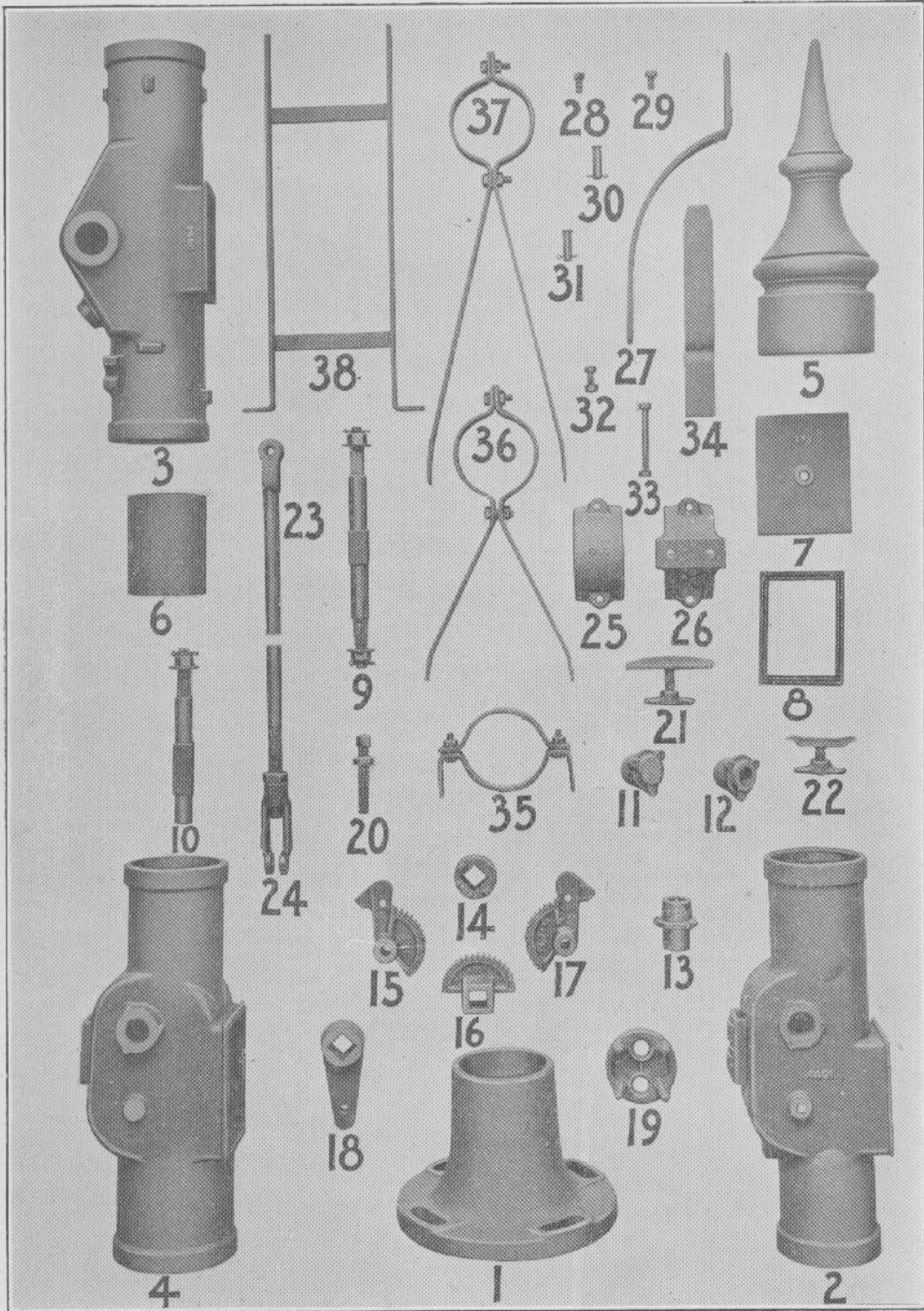


MECHANISM AND BATTERY CASE FITTINGS

MICCHANISM AND BATTERY CASE FITTINGS

Order by Plate and Number

No.		List Price
1	Anchor Bolt and Nut for fastening case to foundation	\$1 14
2	Hasp	48
3	Link for hasp	17
4	Pin for hasp	17
5	Staple with rivets	12
6	Ventilator only	23
6a	Ventilator, complete, with screws, escutcheon and ventilator hood	43
7	Ventilator Hood	15
8	Escutcheon for ventilator	03
9	Hinge Pin	03
10	Name Plate with rivets	18
11	Rubber Tubing Gaskets for either case, per foot....	14
12	Wrought Iron Strap for supporting shelving.....	20
12a	Wrought Iron Strap with clamps and bolts (1-12, 2-13 and 2-17)	35
13	Wrought Iron Clamp for No. 12.....	05
14	Board and Cleat for lightning arrester and terminals	84
14a	Board and Cleat for lightning arrester, complete, with carriage bolts	90
15	Board for holding relays.....	45
16	Shelving for battery case.....	1 10
17	Bolt and Nut for No. 12.....	03



FITTINGS FOR PIPE POST SIGNALS

FITTINGS FOR PIPE POST SIGNALS

Order by Plate and Number

No.		Price List
1	Socket for 5" pipe post.....	\$4 50
1a	Socket for 6" pipe post.....	7 00
2	Semaphore Bearing for a one or two-arm 90° signal	7 50
3	Semaphore Bearing for a one or two-arm 60, 70 or 75° signal	6 66
4	Semaphore Bearing for the bottom arm of a three arm 90° signal	9 30
4a	Semaphore Bearing for the bottom arm of a three-arm 60, 70 or 75° signal	9 30
5	Pinnacle for No. 3	2 22
5a	Pinnacle for No. 2	2 22
6	5" Casing. Specify length when ordering. Price per foot	1 20
6a	6" Pipe. Specify length when ordering. Price per foot	2 25
7	Hand Hole Plate for Nos. 2 and 3.....	50
7a	Hand Hole Plate for Nos. 4 and 4a.....	50
8	Soft Rubber Gasket for No. 7.....	18
8a	Soft Rubber Gasket for No. 7a.....	18
9	Semaphore Shaft, complete, with nuts, washers and cotters for a one or two-arm signal using back spectacles	4 16
9a	as above, for the bottom arm of a three-arm signal using back spectacles.....	5 00
10	as above, for a one or two-arm signal without back spectacles	2 78
10a	as above, for the bottom arm of a three-arm signal without back spectacles	3 50
11	Rear Bushing for use with No. 10.....	2 26
12	Bushing for use with No. 9 and front end of No. 10 on Nos. 3 or 4a.....	2 54
13	Bushing for use with No. 9 and front end of No. 10 on Nos. 2 or 4.....	2 54

FITTINGS FOR PIPE POST SIGNALS
CONTINUED

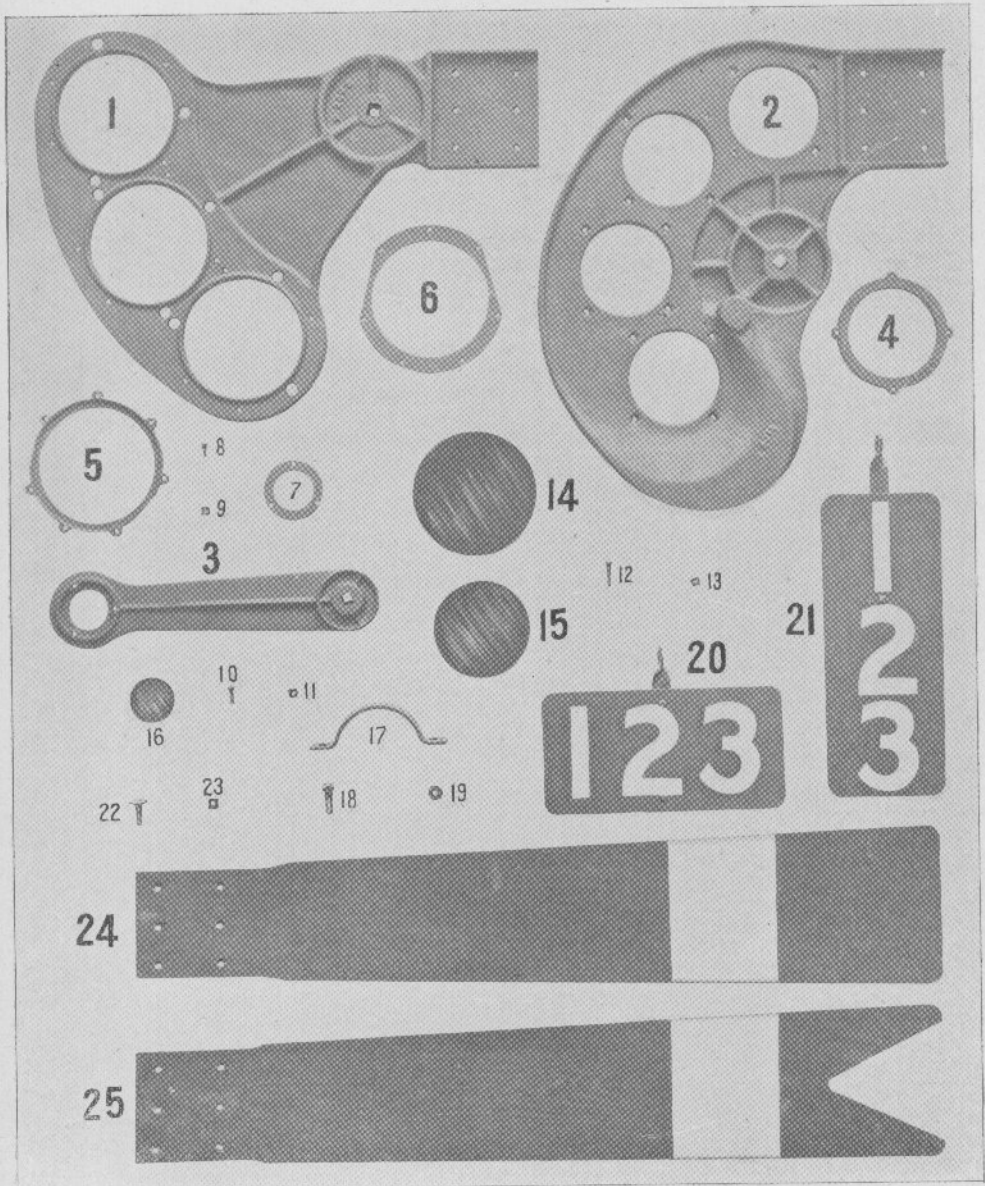
Order by Plate and Number

No.		List Price
14	Separator for semaphore shaft of a 60, 70 or 75° signal	\$ 14
15	Combined Operating Arm and Segment, Left Hand, for a 90° signal	2 08
16	Plain Segment for a 90° signal.....	1 44
17	Combined Operating Arm and Segment, Right Hand, for a 90° signal.....	2 08
18	Operating Arm for a 60, 70, or 75° signal.....	1 15
19	Pipe Guide for up and down rods of a two-arm signal	60
20	Cap Screw and Lock Nut, 5/8"x4", for Nos. 2 and 4	24
20a	Cap Screw and Lock Nut, 3/4"x4½", for Nos. 3 and 4a	28
21	Clamp and Handle for hand hole plate No. 7.....	28
22	Clamp and Handle for hand hole plate No. 7a.....	28
23	Solid Jaw, 1", with butt end for up and down rod	75
23a	as above, with pin and cotter (1-23, 1-30)...	84
24	Screw Jaw, 1", with butt end for up and down rod	1 10
24a	as above, with pin and cotter (1-24, 1-31)...	1 19
25	Lamp Bracket Clamp, Front Half, for No. 3 or 4a	35

FITTINGS FOR PIPE POST SIGNALS
CONTINUED

Order by Plate and Number

No.		List Price
26	Lamp Bracket Clamp, Back Half, for No. 3 or 4a	\$ 55
26a	Lamp Bracket Clamp, complete, for No. 3 or 4a (1-25, 1-26, 2-32, 2-33).....	1 02
27	Lamp Bracket for No. 3 or 4a.....	63
28	Tap Bolt, ½" x 7/8", for fastening bearings to pipe post	05
29	Tap Bolt, ½" x 5/8", for securing pipe guide to post	03
30	Pin, 5/8" x 1 1/8", with cotter, for No. 23	09
31	Pin, 5/8" x 2", with cotter for No. 24.....	09
32	Bolt and Nut, ½" x 1 1/4", for fastening No. 27 to No. 26	06
33	Bolt and Nut, ½" x 1 1/2", for fastening No. 25 to No. 26	09
34	Lamp Bracket for Nos. 2 and 4	74
35	Top Clamp for ladder, complete, with bolts.....	85
36	Top Ladder Stay for a one-arm signal.....	1 68
36a	Top Ladder Stay for a two-arm signal.....	1 70
36b	Second Ladder Stay for a two-arm signal.....	1 72
37	Bottom Ladder Stay for a one-arm signal.....	1 74
37a	Bottom Ladder Stay for a two-arm signal.....	1 76
38	Ladder for signals. Specify length when ordering. Price per foot	40

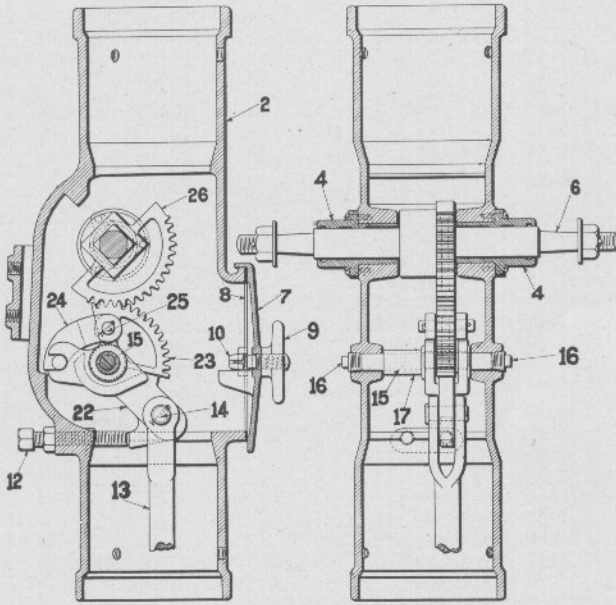


SPECTACLES, SIGNAL BLADES AND NUMBER PLATES

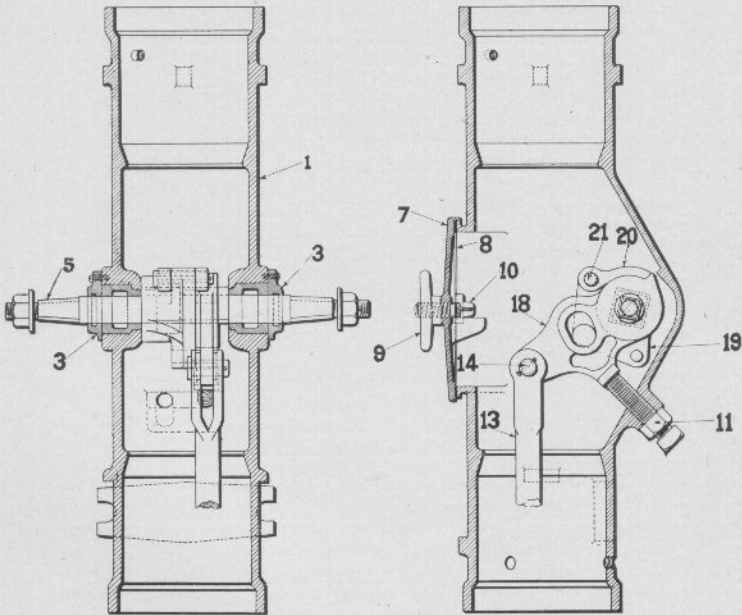
SPECTACLES, SIGNAL BLADES AND NUMBER PLATES

Order by Plate and Number

No.		List Price
1	Three Light, 60° Spectacle only.....	\$4 56
1a	as above, complete, with rings and bolts. (No glass)	6 95
1b	Three Light, 70° Spectacle only.....	4 56
1c	as above, complete, with rings and bolts. (No glass)	6 95
1d	Three Light, 75° Spectacle only.....	4 56
1e	as above, complete, with rings and bolts. (No glass)	6 95
2	Four Light 90° Spectacle only.....	9 15
2a	as above, complete, with rings and bolts. (No glass).....	10 50
3	Back Spectacle only for Nos. 1, 1b and 1d.....	1 10
3a	as above, with rings and bolts. (No glass)	1 35
3b	Back Spectacle only, for No. 2.....	1 10
3c	as above, with rings and bolts. (No glass)	1 35
4	Cast Iron Ring for holding glass in No. 2.....	14
5	Cast Iron Ring for holding glass in Nos. 1, 1b and 1d	19
6	Sheet Steel Ring for holding glass in Nos. 1, 1b and 1d	36
6a	as above, with cast iron ring and bolts for holding together	76
7	Sheet Steel Ring for holding glass in No. 3.....	06
8	Bolt for fastening Nos. 5 and 6 together.....	01
8a	Bolt for fastening No. 5 to Nos. 1, 1b and 1d.....	01
9	Nut for above	01
10	Bolt for fastening No. 7 to No. 3.....	01
11	Nut for above	01
12	Bolt for fastening No. 4 to No. 2.....	01
13	Nut for above	01
14	Glass, 8 $\frac{3}{8}$ " Dia., for Nos. 1, 1b and 1d.....	{ For prices of glass see Plate 481, Page 135, Section 4. }
15	Glass, 6 $\frac{1}{2}$ " Dia., for No. 2	
16	Glass, 3 $\frac{1}{2}$ " Dia., for No. 3	
17	Half Clamp for number plate.....	32
17a	Clamp for number plate, complete, with bolts and nuts (2-17, 2-18 and 2-19)	71
18	Bolt for clamp No. 17.....	03
19	Nut for above	02
20	Horizontal Number Plate, blank	1 44
20a	Horizontal Number Plate, painted and numbered..	2 32
21	Vertical Number Plate, blank.....	1 44
21a	Vertical Number Plate, painted and numbered....	2 32
22	Carriage Bolt for fastening blade to spectacle.....	04
23	Nut for above	02
24	Home Signal Blade, unpainted	2 20
24a	Home Signal Blade, painted.....	2 85
25	Distant Signal Blade, unpainted.....	2 20
25a	Distant Signal Blade, painted.....	2 85



A



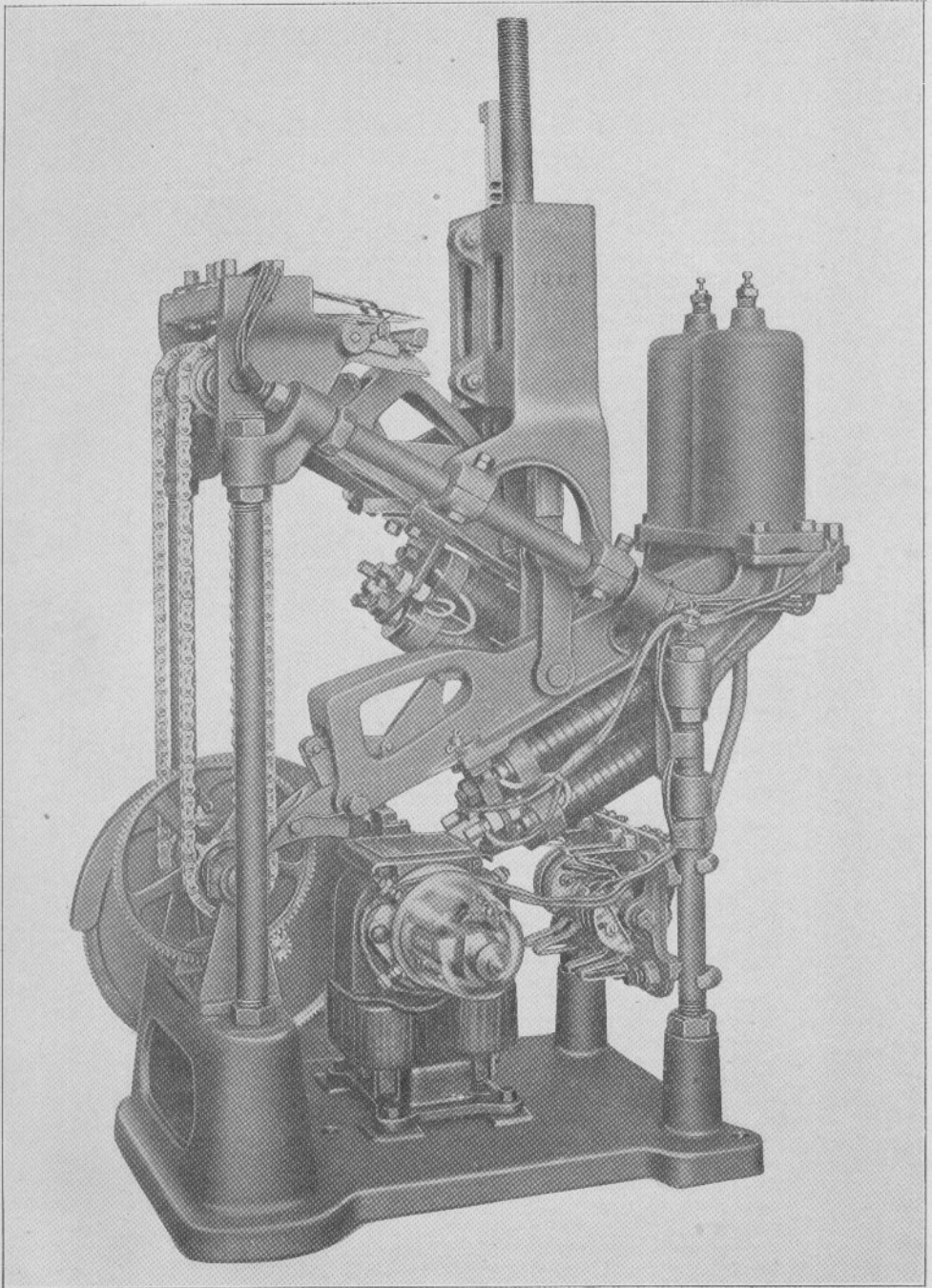
C

MECHANICALLY LOCKED SEMAPHORE BEARINGS

MECHANICALLY LOCKED SEMAPHORE BEARINGS

Order by Plate and Letter or Number

No.		List Price
A	Mechanically Locked Semaphore Bearing for a one or two-arm 90° signal, complete (1-2, 1-6, 2-4, 1-7, 1-8, 1-9, 1-10, 1-12, 1-13, 1-14, 1-15, 2-16, 1-17, 1-22, 1-23, 1-24, 1-25, 1-26).....	\$20 85
B	Mechanically Locked Semaphore Bearing for the bottom arm of a three-arm, 90° signal, complete (1-2a, 1-6a, 2-4, 1-7a, 1-8a, 1-9, 1-10a, 1-12, 1-13, 1-14, 1-15, 2-16, 1-17, 1-22, 1-23, 1-24, 1-25, 1-26)	22 65
C	Mechanically Locked Semaphore Bearing for a one or two-arm 60, 70 or 75° signal, complete (1-1, 2-3, 1-5, 1-7, 1-8, 1-9, 1-10, 1-11, 1-13, 1-14, 1-18, 1-19, 1-20, 1-21)	17 20
D	Mechanically Locked Semaphore Bearing for the bottom arm of a three-arm 60, 70 or 75° signal, complete (1-1a, 2-3, 1-5a, 1-7a, 1-8a, 1-9, 1-10a, 1-11, 1-13, 1-14, 1-18, 1-19, 1-20, 1-21) ..	19 00
1	Semaphore Bearing only, for C.....	6 66
1a	Semaphore Bearing only, for D	8 46
2	Semaphore Bearing only, for A.....	7 50
2a	Semaphore Bearing only, for B.	9 30
3	Cast Brass Bushing for No. 1.....	2 54
4	Cast Brass Bushing for No. 2.....	2 54
5	Semaphore Shaft, complete, with nuts, washers and cotters, for No. 1.....	4 16
5a	Semaphore Shaft, complete, with nuts, washers and cotters, for No. 1a	4 16
6	Semaphore Shaft, complete, with nuts, washers and cotters, for No. 2.....	4 16
6a	Semaphore Shaft, complete, with nuts, washers and cotters, for No. 2a.....	4 16
7	Hand Hole Plate for No. 1 or No. 2.....	50
7a	Hand Hole Plate for No. 1a or No. 2a.....	50
8	Soft Rubber Gasket for No. 7.....	18
8a	Soft Rubber Gasket for No. 7a.....	18
9	Cast Iron Handle for clamps Nos. 10 and 10a.....	18
10	Clamp for hand hole plate No. 7.....	10
10a	Clamp for hand hole plate No. 7a.....	10
11	Cap Screw and Lock Nut, 3/4"x4 1/2".....	24
12	Cap Screw and Lock Nut, 5/8"x4".....	20
13	Solid Jaw, 5/8", with stub end.....	75
14	Pin, 5/8"x1 3/4", with cotter.....	09
15	Pin, 3/4"x5"	10
16	Pipe Plug, 1/2"	04
17	Wrought Iron Pipe Separator, 3/4"x1 5/8".....	04
18	Male Half of Operating Arm for C or D.....	78
19	Female Half of Operating Arm for C or D.....	61
20	Pawl for C or D.....	36
21	Pin, 1/2"x2 1/2", with cotter, for No. 20.....	09
22	Semaphore Crank for A or B.....	55
23	Semaphore Crank Segment for A or B.....	1 22
24	Pawl for A or B.....	34
25	Pin, 1/2"x2 3/8", with cotters, for No. 24.....	09
26	Semaphore Shaft Segment for A or B.....	1 44

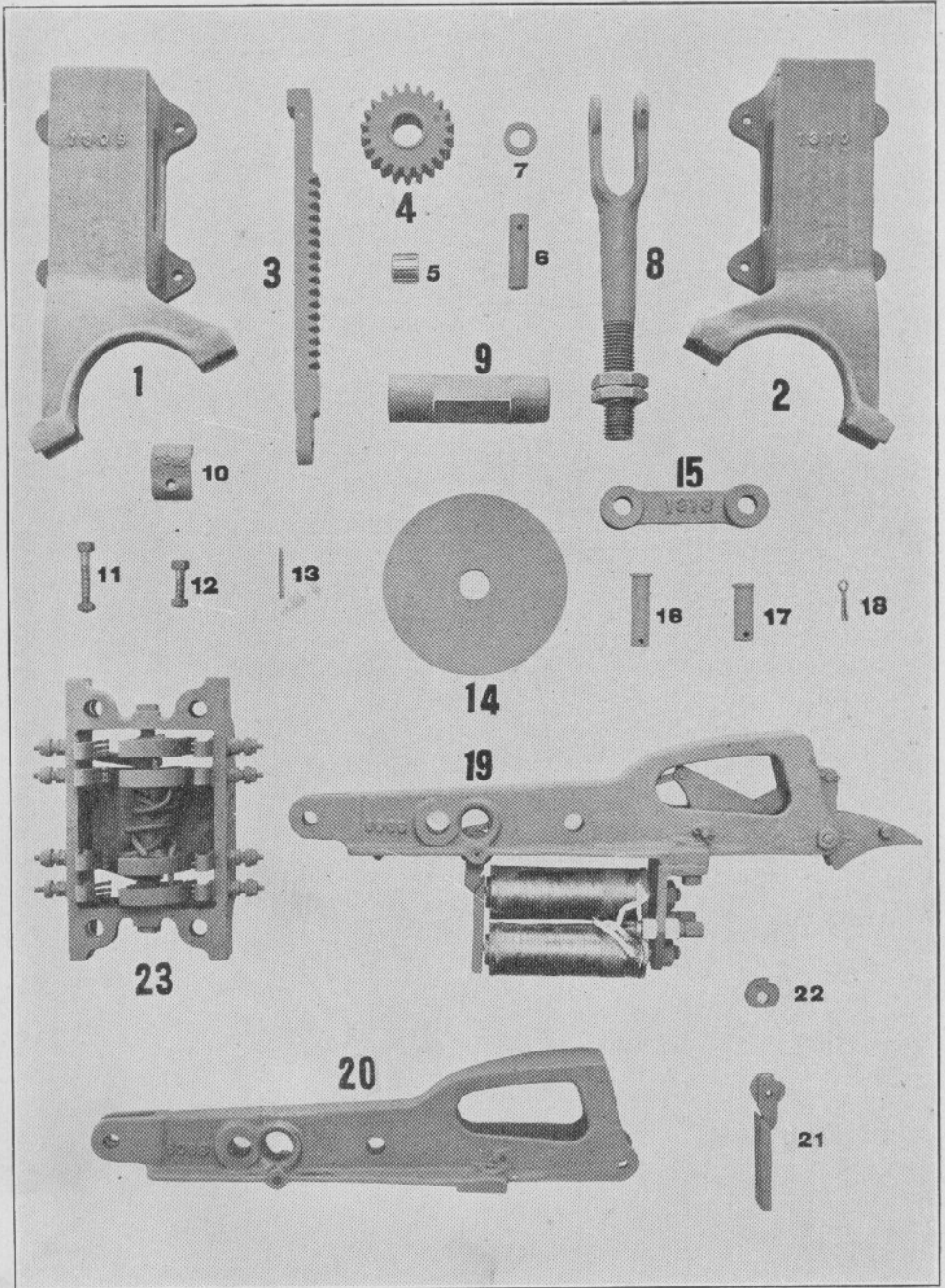


THE UNION ELECTRIC SEMAPHORE THREE-POSITION
STYLE B. MECHANISM

THE UNION ELECTRIC SEMAPHORE THREE-
POSITION STYLE B. MECHANISM

Order by Plate Number

	List Price
Mechanism, complete, as shown, for a three-position signal	\$318 00



SLOT ARM, CIRCUIT CONTROLLER AND SPECIAL ATTACHMENT FOR THREE-POSITION STYLE B. SIGNAL

SLOT ARM, CIRCUIT CONTROLLER AND SPECIAL ATTACHMENT FOR THREE-POSITION STYLE B. SIGNAL

For details of slot arm not listed below see Plate 1210, and for details of circuit controller see Plate 1211.

All orders for slot-arms or slot-magnets should specify resistance, and state whether or not slow releasing features are desired.

Order by Plate and Number or Letter

No.		List Price
A	Special Attachment for three-position signal, complete (1-2a, 2-3, 1-4, 1-5, 1-6, 2-7, 1-8, 1-9, 1-13, 1-14, 4-15, 2-16, 2-17, 4-18).....	\$30 00
1	Right Hand Half of Case for special attachment.....	3 32
2	Left Hand Half of Case for special attachment.....	3 32
2a	Case for special attachment, complete (1-1, 1-2, 4-11, 4-12 and 4-10).....	7 15
3	Rack for special attachment.....	5 22
4	Spur Gear for special attachment.....	2 10
5	Roller Bearing for No. 4.....	28
6	Pin for No. 4.....	09
7	Brass Washer for No. 6.....	04
8	Special Jaw with lock nuts.....	1 12
9	Turnbuckle.....	1 05
10	Cap for Nos. 1 and 2.....	08
11	Bolt $\frac{3}{8}$ "x2" for fastening No. 10 to Nos. 1 and 2.....	03
12	Bolts $\frac{3}{8}$ "x1 $\frac{1}{4}$ " for fastening Nos. 1 and 2 together.....	03
13	Dowel Pin for securing No. 6 in No. 8.....	02
14	Disc Shield for No. 8.....	30
15	Link for connecting slot-arm and rack.....	24
16	Pin for lower end of link.....	09
17	Pin for upper end of link.....	09
18	3/16" Cotter for Nos. 16 or 17.....	01
19	Slot-Arm, complete.....	38 60
20	Slot-Arm, Casting only.....	3 60
21	Armature, complete.....	1 70
22	Armature Wearing Plate.....	09
23	Circuit Controller, complete.....	19 40

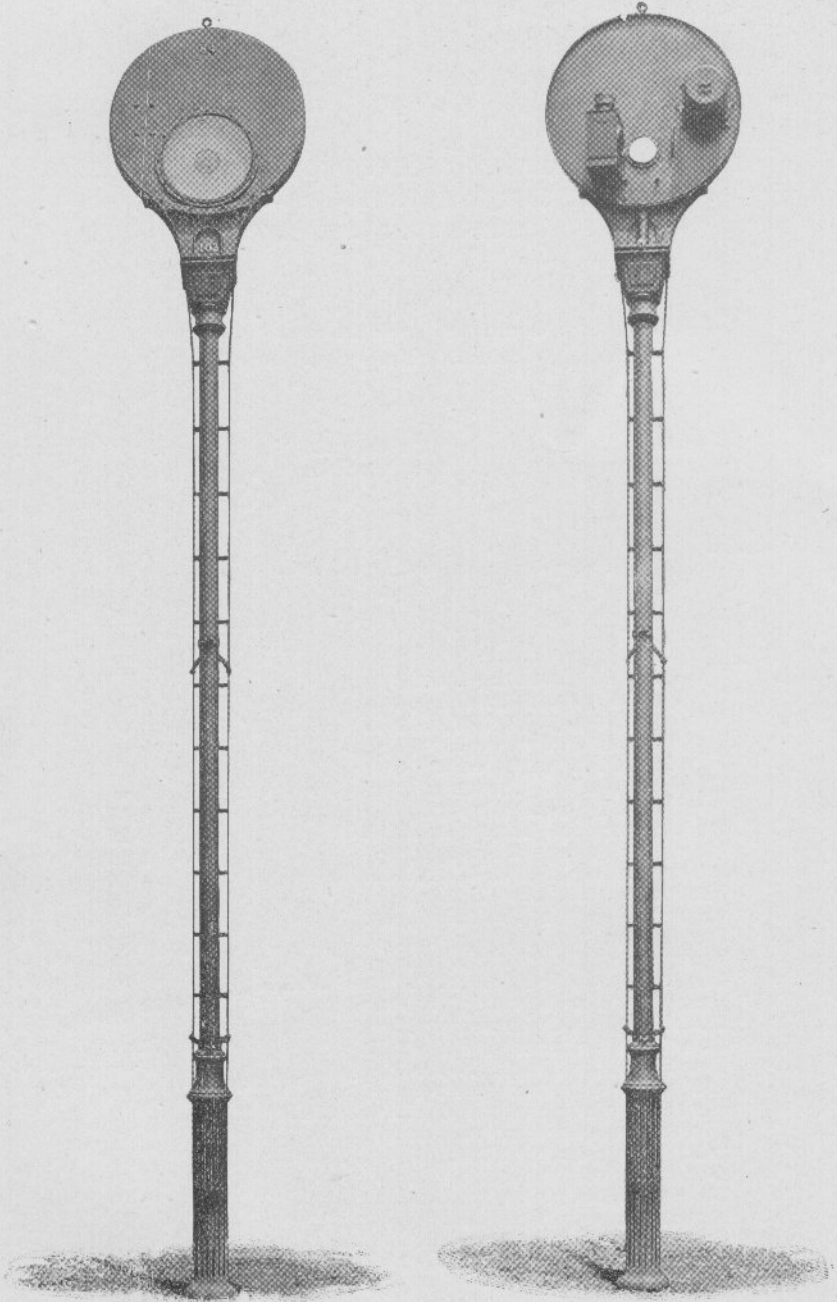


Fig. 1
FRONT VIEW SIGNAL CLEAR

Fig. 2
REAR VIEW OF SIGNAL

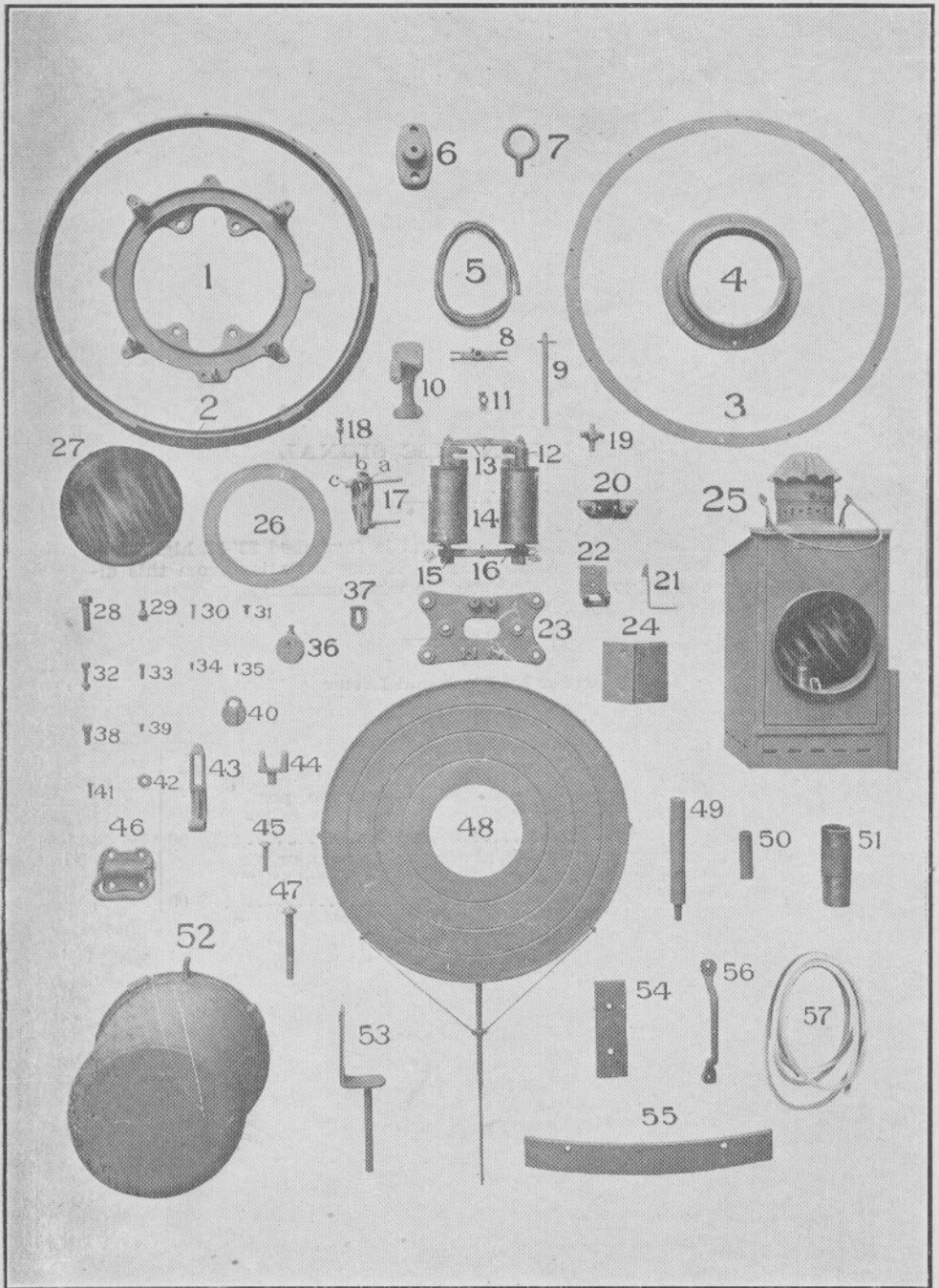
THE UNION DISC SIGNAL.

THE UNION DISC SIGNAL

Unless otherwise specified this signal is furnished 23'-3" high from base to center line of mechanism case. If any variation from this dimension is desired it should be specified when ordering.

Order by Plate and Letter

No.		List Price
A	Disc Signal, complete, with mechanism, case, post, ladder and lamp with white as the clear indication	\$278 00
A1	Disc Signal, complete, as above, using a color as the clear indication. When ordering specify color desired	283 00



THE UNION DISC SIGNAL
DETAILS

THE UNION DISC SIGNAL

DETAILS

Order by Plate and Number

No.		List Price
1	Inside Ring for magnet hood.....	\$1 32
2	Inside Ring for front light.....	1 90
3	Outside Ring for front light.....	2 00
4	Outside Ring for back light.....	30
5	Felt Gasket for No. 1.....	12
6	Socket for eye bolt	36
7	Eye Bolt	30
8	Fork for armature stem	44
9	Armature Shaft with dowel pin	24
10	Bearing with trunnion for banner shaft.....	2 12
11	Circuit Breaker Clamp	2 02
12	Pole Piece	3 22
13	Stay for magnet with trunnion screw.....	1 24
14	Magnet	14 04
15	Cap Screw, 1/2"x1 5/8" (blued) for magnet.....	12
16	Back Strap with trunnion screw.....	1 16
17	Armature, complete, with stems and set screws...	4 05
17a	Armature Top Plate	1 40
17b	Armature Middle Plate	1 20
17c	Armature Bottom Plate	1 35
17d	Armature Stem	04
18	Binding Post with nuts and washers for No. 23....	24
19	Banner Shaft with clamp and set screws.....	64
20	Hard Rubber Plate with contact springs for circuit breaker	1 40

THE UNION DISC SIGNAL
 DETAILS

CONTINUED

Order by Plate and Number

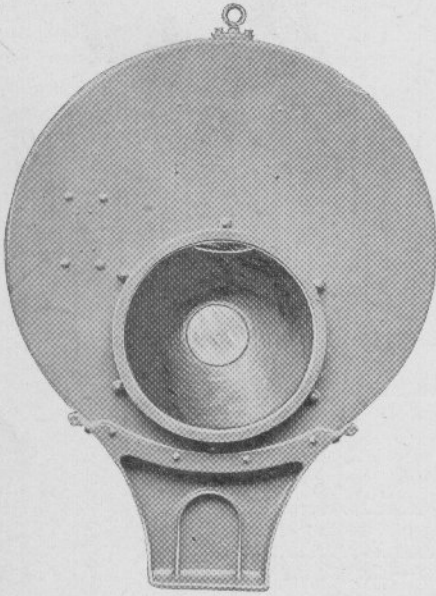
No.		List Price
20a	Contact Spring (long)	$\frac{3}{8}$ 35
20b	Contact Spring (short)	33
20c	Binding Post	18
21	Spring for lamp catch	70
22	Lamp Catch	17
23	Base for magnets	4 44
24	Bracket with felt cushion for banner.....	76
25	Lamp, complete	11 00
26	Aluminum Ring for banner.....	62
26a	Aluminum Ring for banner with special glass. Specify color of glass when ordering.....	3 80
26b	Aluminum Ring for banner with lucreted paper disc. Specify color of paper when ordering..	1 06
27	Special Glass Disc for banner. Specify color when ordering	3 18
28	Cap Screw, $\frac{1}{2}$ "x $1\frac{3}{4}$ ", for securing Nos. 6, 54 and 55 to case holder	09
29	Round Head Machine Screw, $5/16$ "x $1\frac{1}{4}$ ", with two nuts and washers for No. 37.....	05
30	Round Head Machine Screw, $1/4$ "x $7/8$ ", for securing Nos. 1, 4, 22, 53 and 56 to case.....	03
31	Flat Head Machine Screw, $1/4$ "x $1\frac{1}{2}$ ", for securing Nos. 24, 46 and 52 to case.....	02
32	Cap Screw, $5/16$ "x $1\frac{1}{2}$ ", with lock nut, for securing No. 1 to No. 52.....	08
33	Fillister Head Machine Screw, No. 12— 32 x $3/4$ ", for securing No. 20 to No. 23.....	02
34	Round Head Machine Screw, No. 10— 32 x $3/8$ ", for securing number plate to case holder.....	01
35	Round Head Machine Screw, No. 8— 32 x $1/2$ ", for securing No. 2 to No. 3.....	01
36	Counterweight with set screws for banner arm....	90

THE UNION DISC SIGNAL
DETAILS

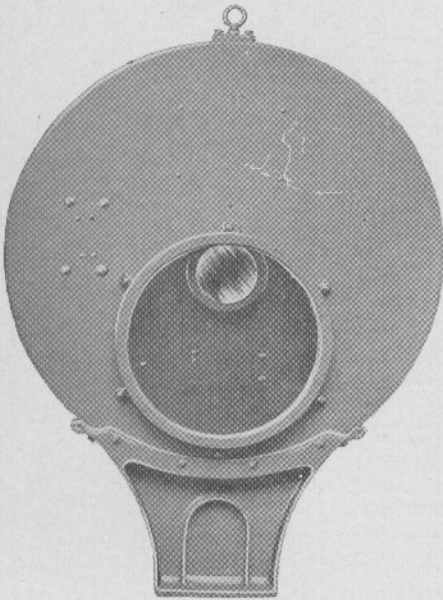
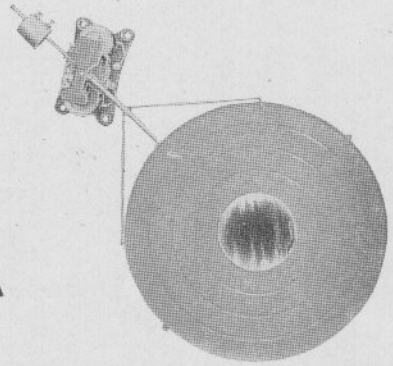
CONTINUED

Order by Plate and Number

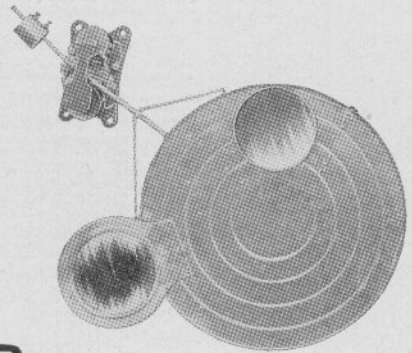
No.		List Price
37	Clamp for securing No. 2 to case.....	\$ 14
38	Cap Screw, $\frac{3}{8}$ "x $\frac{7}{8}$ ", for securing case to case holder	04
39	Round Head Machine Screw, No. 12—32x $\frac{3}{8}$ ", for securing No. 10 to case.....	01
40	Pad Lock	2 48
41	Round Head Machine Screw, No. 10—32x $\frac{7}{8}$ ", for counterweight	01
42	Nut, $\frac{1}{2}$ ", for No. 49.....	03
43	Hasp	22
44	Hasp Bracket	20
45	Rivet, $\frac{3}{8}$ "x2", for securing Nos. 43 and 44.....	02
46	Chest Handle	44
47	Round Head Stud Bolt	07
48	Banner with arm and braces (no glass).....	10 65
48a	Banner for color as the indication (no glasses) with arm and braces	11 85
49	Stud for securing mechanism	56
50	Thimble for No. 47.....	05
51	Nipple between case holder and cap.....	1 80
52	Magnet Cover with ring	4 98
53	Lamp Bracket	98
54	Top Reinforcing Plate	45
55	Bottom Reinforcing Plate	65
56	Handle for back of case	50
57	Rubber Gasket for No. 2.....	78
58	Glass Disc for No. 2.....	1 56
58a	Glass Disc for No. 2 with rubber band.....	2 66
58b	Rubber Band for No. 58.....	1 10
59	Glass Disc for No. 4.....	15
59a	Glass Disc for No. 4 with rubber band.....	50
59b	Rubber Band for No. 59.....	35



A



B

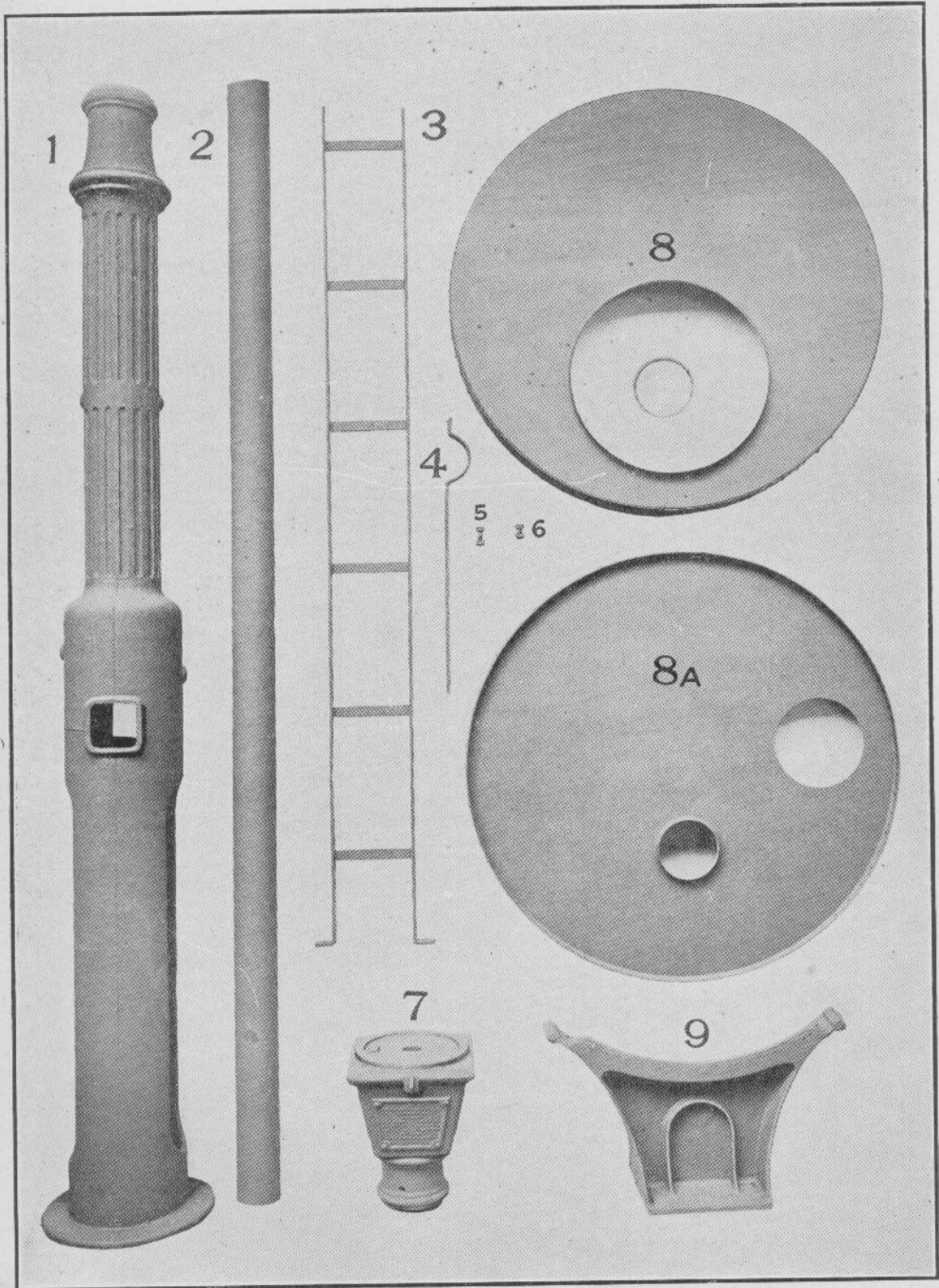


THE UNION DISC SIGNAL
MECHANISM CASES AND MECHANISMS

**THE UNION DISC SIGNAL
MECHANISM CASES AND MECHANISMS**

Order by Plate, Number and Letter

No.		List Price
A	Mechanism Case and Mechanism, complete, as shown, with white as the clear indication...	\$190 00
A1	Mechanism, complete, as shown, with white as the clear indication	69 00
B	Mechanism Case and Mechanism, complete, as shown, with a color as the clear indication. When ordering specify color desired.....	195 00
B1	Mechanism, complete, as shown, with a color as the clear indication. When ordering specify color desired	74 00



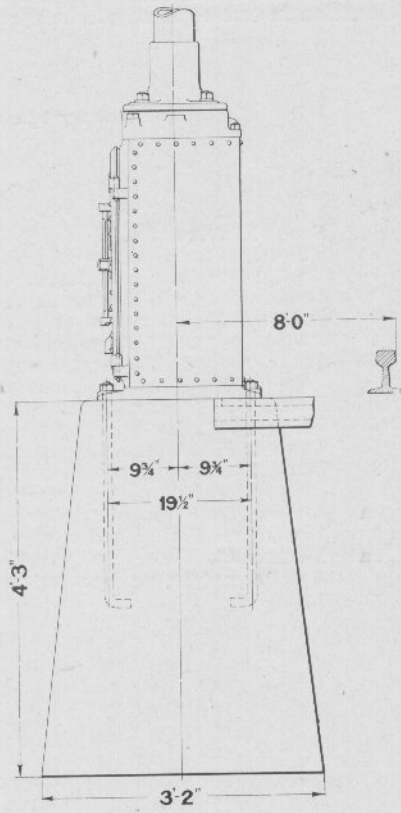
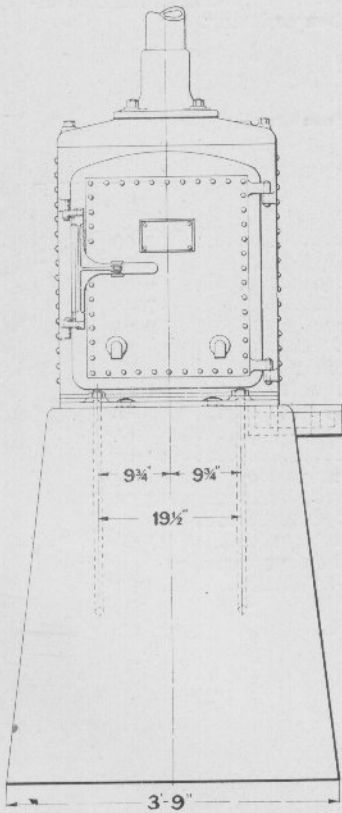
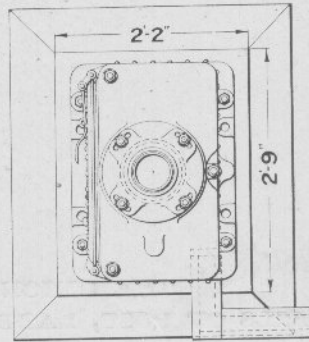
THE UNION DISC SIGNAL
DETAILS OF POST, LADDER AND MECHANISM CASE

THE UNION DISC SIGNAL
DETAILS OF POST, LADDER AND MECHANISM CASE

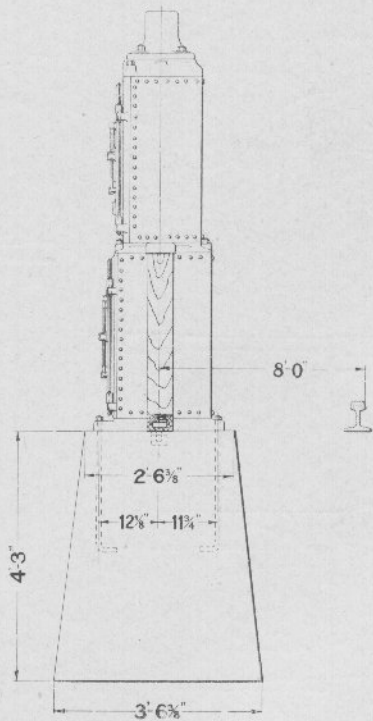
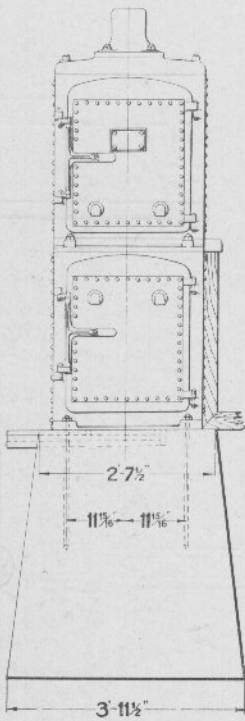
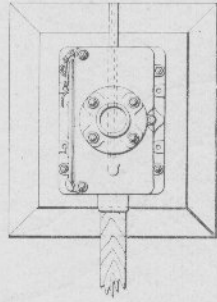
Unless otherwise specified this signal is furnished 23'-3" high, from base to center line of mechanism case. If any variation from this dimension is desired it should be specified when ordering.

Order by Plate and Number

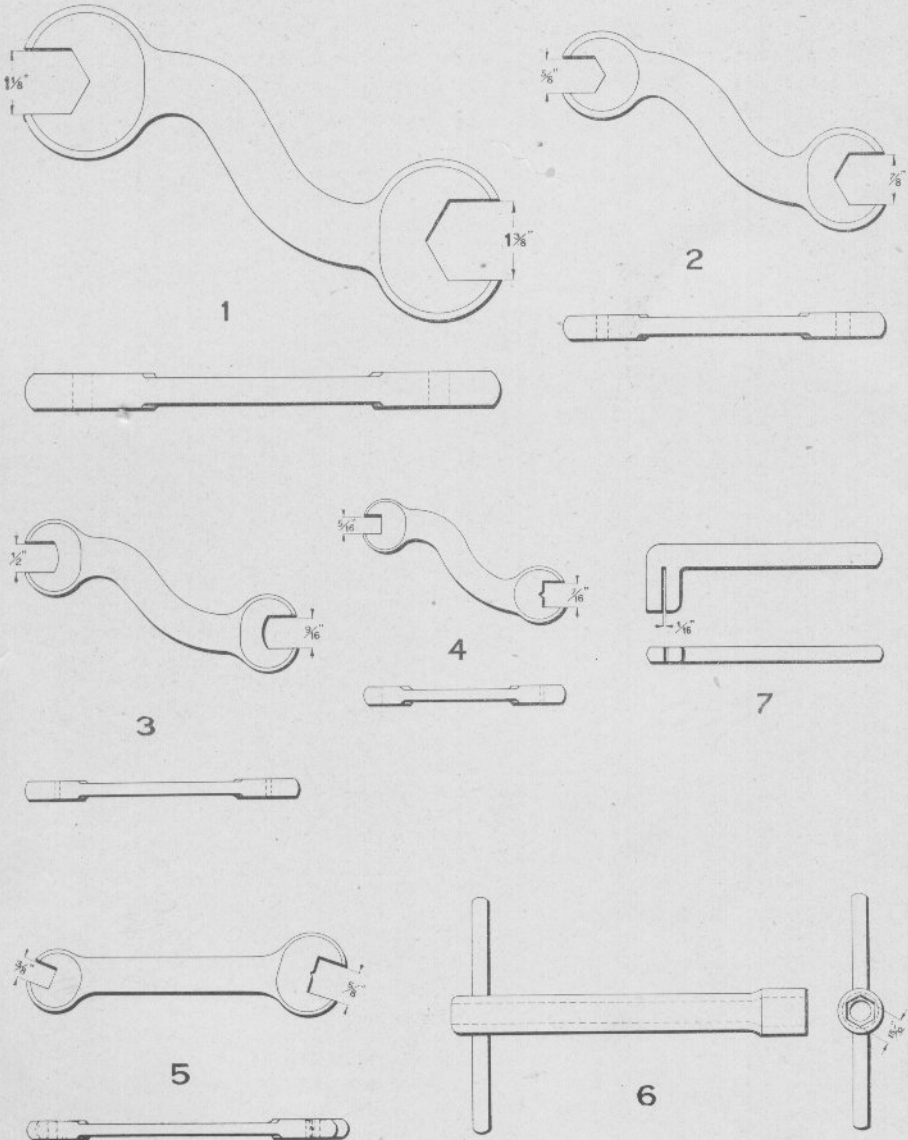
No.		List Price
1	Base	\$37 00
1a	Base, complete, with post and cap (1-1, 1-2, 1-7)...	58 00
2	Post, 11'-0" long	9 50
3	Ladder only, 16'-6" long	7 45
3a	Ladder with stays and bolts (1-3, 2-4a).....	9 25
4	Ladder Stay, 29" long, half clamp	80
4a	(Ladder Stay, 29" long, complete, with bolts (2-4, 2-5, 2-6)	1 80
5	Bolt, 1/2"x1 1/2", for ladder stay	06
6	Bolt, 1/2"x1", for securing stay to ladder.....	05
7	Cap for No. 2.....	14 00
8	Mechanism Case (front view), with rings and fittings, complete, no mechanism.....	112 00
8a	Mechanism Case (back view).....	
9	Mechanism Case Holder with hasp and stud.....	17 00
9a	Mechanism Case Holder with mechanism case, complete, no mechanism (1-9, 1-8a)	119 00



FOUNDATION FOR STYLE B. ELECTRIC SEMAPHORE
SIGNAL WITHOUT BATTERY CASE



FOUNDATION FOR STYLE B. ELECTRIC SEMAPHORE SIGNAL WITH COMBINED MECHANISM AND BATTERY CASE



TOOLS FOR STYLE B. ELECTRIC SEMAPHORE
SIGNAL MECHANISM

TOOLS FOR STYLE B. ELECTRIC SEMAPHORE
SIGNAL MECHANISM

Order by Plate and Number

No.		List Price
1	"S" Wrench for nuts on up and down rod.....	80
2	"S" Wrench for $\frac{3}{8}$ " set screw and $\frac{5}{8}$ " lock nut....	90
3	"S" Wrench for $\frac{5}{16}$ and $\frac{3}{8}$ " cap screws and brass tap bolt	80
4	"S" Wrench for lock nuts for pole changer and ter- minal post	80
5	Wrench for set screw and nut for main shaft of mechanism	50
6	Socket Wrench for lock nut for terminal post.....	70
7	Adjusting Tool for contact springs of circuit con- troller	90

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SECTION 13

BATTERY AND RELAY SHELTERS
BELL BOXES, ETC.

REPRINT OF THE
FIRST EDITION
1908

PREFACE

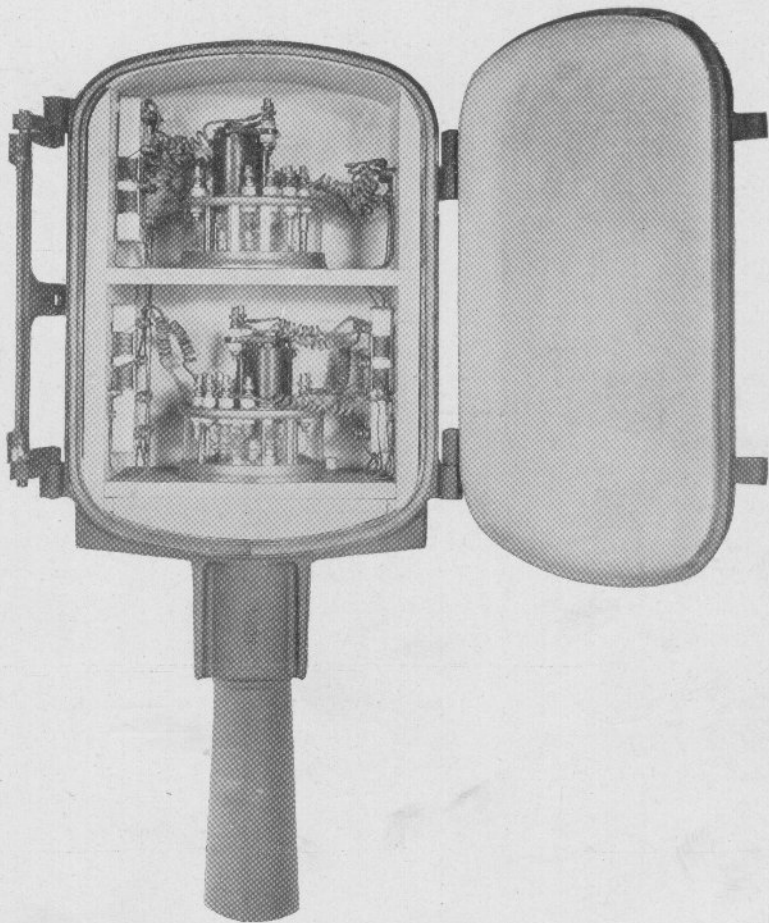
THIS section of our new Catalogue includes, in addition to our latest designs, most of the Battery and Relay Shelters of our manufacture in general use today on the principal railroads of the country.

Among the former we wish to call especial attention to the Single and Double Cast Iron Battery Chutes (Models 10 and 11) recently illustrated in the advance sheets of this section (Plates 1300 and 1301) which we believe to be the best types on the market for simplicity, durability and cheapness.

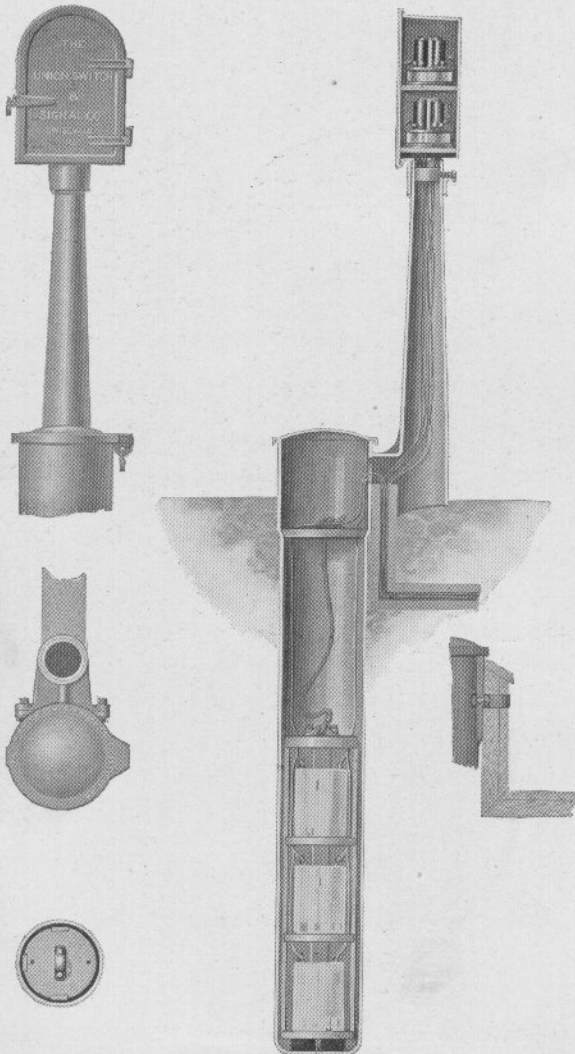
To accommodate the increased size of our new "Universal" style of relay, we have designed a larger type of Cast Iron Relay Box which will be found on Plate 1305, Fig. 1, capable of containing two of these relays and having its door fastened with a clamp similar to those in use on the Union Electric Semaphore. The wooden boxes for this type of relay are shown in Figs. 5, 6, 7 and 8 on the same plate.

The Union Switch & Signal Co.

Swissvale, Pa., Oct., 1905.



Relay Box with Two Universal Relays and
Lightning Arresters



MODEL 10

Single Cast Iron Battery Chute with Cast Iron Post and Relay Box

SINGLE CAST IRON BATTERY CHUTE

MODEL 10

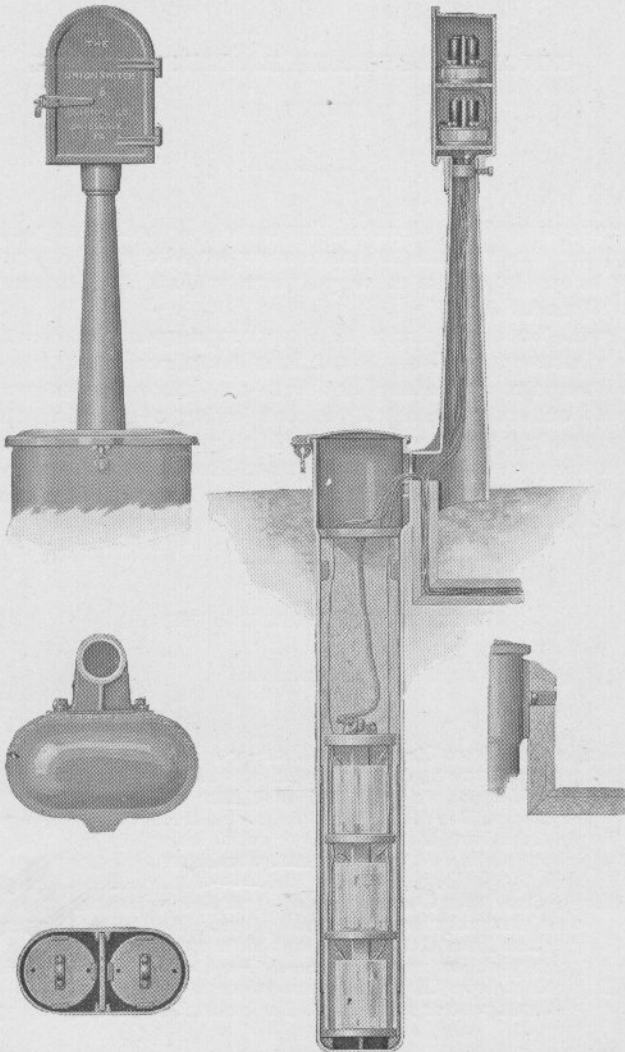
In response to a demand for a cast iron battery chute of a simpler design than some now on the market, we have lately brought out a new pattern which is illustrated on pages 6 and 8.

It will be seen from the accompanying cuts that the large rectangular box head has been replaced by one of more compact and simpler form, and that the cover of the chute is entirely removable, not being secured to the head by hinges, but by a small lip which projects down from one side of the cover, and fits under a flange on the rim of the head, securing the cover thereto so long as the chute remains locked.

ORDER BY PLATE AND NUMBER

No.		List Price
1	Single Cast Iron Chute to hold <i>three</i> cells 6' x 8' gravity battery, complete with elevator and frost board, cast iron post and cast iron relay box. (Pl. 1304, No. 2.) No locks.....	50 70
2	Single Cast Iron Chute for <i>three</i> cells, complete as above with cast iron post and wooden relay box. (Pl. 1304, No. 5.) No locks.....	41 95
3	Single Cast Iron Chute as above, complete with cast iron post only for wooden relay box. No locks...	35 25
4	Single Cast Iron Chute only, complete as above but with post for iron relay box. No locks.....	34 60
5	Single Cast Iron Chute only, complete as above but without post or relay box. No locks.....	28 35

For double chute of this design (Model 11), see Plate 1301



MODEL 11

**Double Cast Iron Battery Chute with Cast Iron Post
and Relay Box**

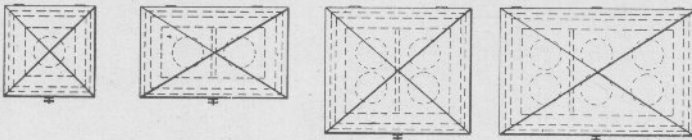
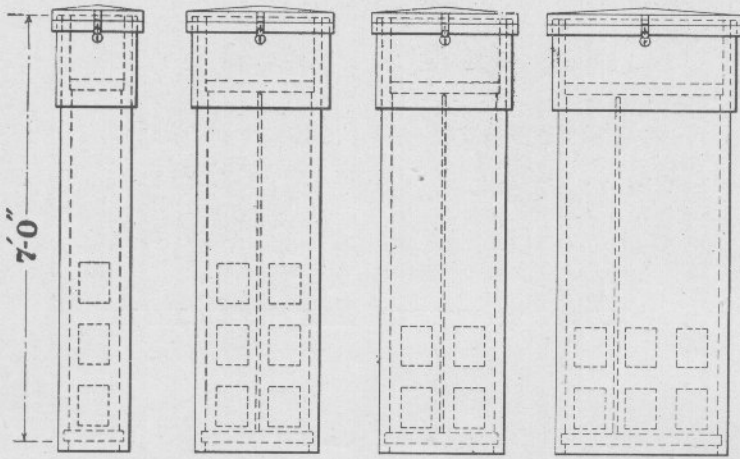
DOUBLE CAST IRON BATTERY CHUTE

MODEL 11

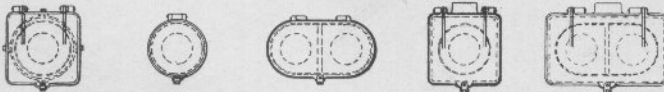
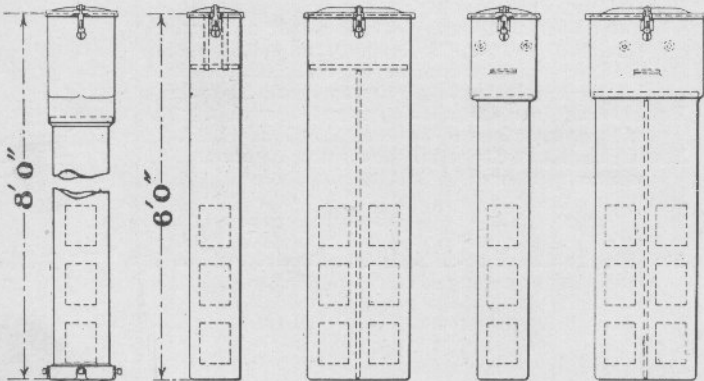
ORDER BY PLATE AND NUMBER

No.		List Price
6	Double Cast Iron Chute to hold <i>six</i> cells 6'' x 8'' gravity battery, complete with elevator and frost board, cast iron post and cast iron relay box (Pl. 1304, No. 2). No locks.....	75 00
7	Double Cast Iron Chute for <i>six</i> cells complete as above with cast iron post and wooden relay box (Pl. 1304, No. 6). No locks.....	68 20
8	Double Cast Iron Chute, as above, complete with cast iron post only for wooden relay box. No locks..	59 65
9	Double Cast Iron Chute only, complete as above, but with post for iron relay box. No locks.....	58 95
10	Double Cast Iron Chute only, complete a above, but without post or relay box.....	52 80

For Single Chute of this design (Model 10) see Plate 1300



1 **2** **3** **4**



5 **6** **7** **8** **9**

Wooden and Cast Iron Battery Chutes of Various Designs

BATTERY CHUTES OF VARIOUS DESIGNS

The wooden chutes shown on Plate 1302, Nos. 1 to 4, are completely covered with galvanized iron, heavily soldered at the joints, and are thus rendered waterproof.

The cast iron chutes Nos. 5 to 9 are furnished in several different patterns, designed to meet various requirements.

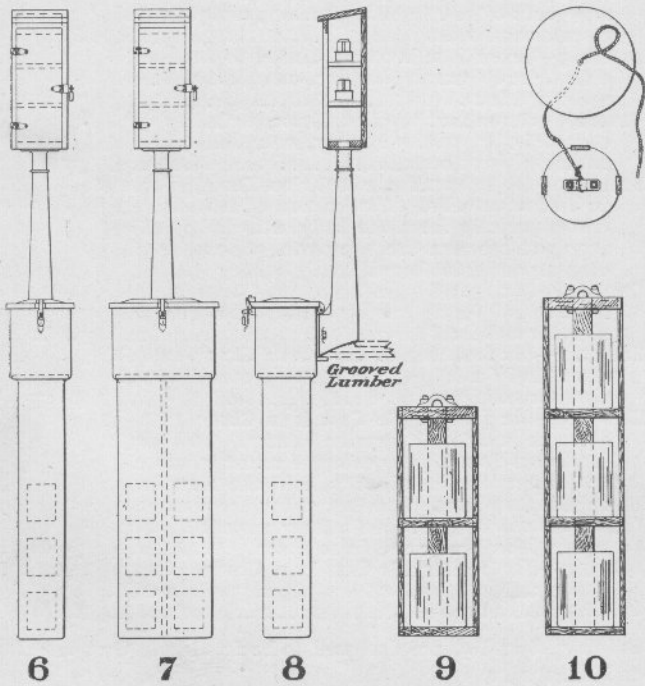
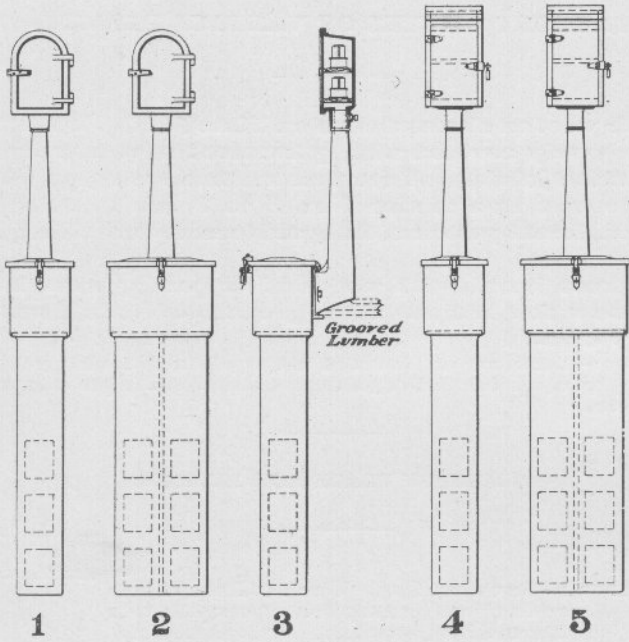
A frost board, with means of supporting same inside the chute a few inches below ground level, is furnished in every case.

Note:—Locks are not included in any of the following prices, as the majority of our customers prefer to use those of their own standard pattern.

ORDER BY PLATE AND NUMBER

No.		List Price
1	MODEL 1—Seven foot Single Wooden Chute, to hold <i>three</i> cells 6'' x 8'' gravity battery, complete with elevator and frost board.....	54 63
2	MODEL 2—Seven foot Double Wooden Chute, to hold <i>six</i> cells 6'' x 8'' gravity battery, complete with elevator and frost board.....	63 87
3	MODEL 3—Seven foot Wooden Chute, to hold <i>eight</i> cells 6'' x 8'' gravity battery, complete with elevator and frost board.....	71 28
4	MODEL 4—Seven foot Wooden Chute, to hold <i>twelve</i> cells 6'' x 8'' gravity battery, complete with elevator and frost board.....	77 64
5	MODEL 5—Eight foot Single Cast Iron Chute, (special) to hold <i>three</i> cells. The bottom of this chute is cast separately from the body, a leaded joint being made between the two parts. Complete with elevator and frost board.....	59 46
6	MODEL 6—Six foot Single Cast Iron Chute, to hold <i>three</i> cells 6'' x 8'' gravity battery, complete with elevator and frost board.....	32 82
7	MODEL 7—Six foot Double Cast Iron Chute, to hold <i>six</i> cells 6'' x 8'' gravity battery, complete with elevator and frost board.....	58 47
8	MODEL 8—Six foot Single Cast Iron Chute, to hold <i>three</i> cells 6'' x 8'' gravity battery. This chute is made with a slightly enlarged rectangular head, which provides an offset to hold the frost board in place, and also allows space for the storage of a small amount of spare battery material. Complete with elevator and frost board.....	33 06
9	MODEL 9—Six foot Double Cast Iron Chute, of same design as No. 8, but having a capacity of <i>six</i> cells. Complete as above.....	68 61

Models 5, 8 and 9, are designed to be fitted with Cast Iron Posts as shown on Plate 1303.



Cast Iron Battery Chutes

CAST IRON BATTERY CHUTES

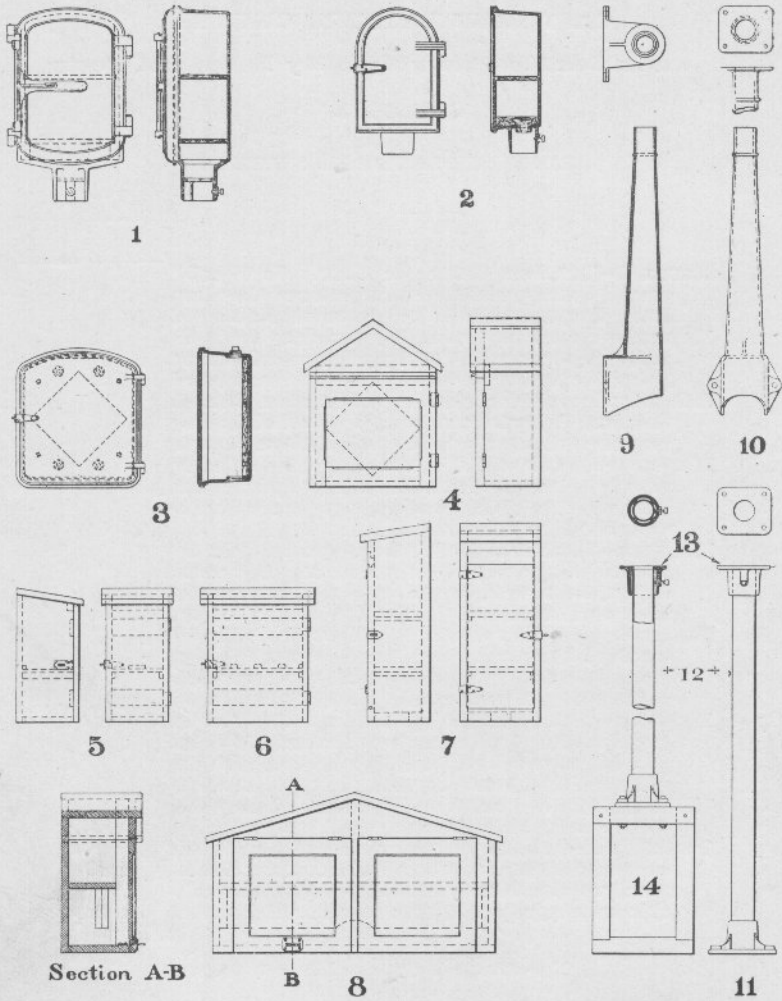
Shown in Combination with Relay Boxes and Posts

ORDER BY PLATE AND NUMBER

No.		List Price
1	MODEL 8—Cast Iron Chute, for <i>three</i> cells 6'' x 8'' gravity battery, with Cast Iron Post and Cast Iron Relay Box, complete with elevator and frost board	55 40
2	MODEL 9—Cast Iron Chute, for <i>six</i> cells 6'' x 8'' gravity battery, with Cast Iron Post and Cast Iron Relay Box, complete with elevator and frost board	91 00
3	Side Elevation of Nos. 1 and 2, with section through Cast Iron Relay Box, showing method of leading in grooved lumber (wire conduit) at base of post.	
4	MODEL 8—Cast Iron Chute, for <i>three</i> cells 6'' x 8'' gravity battery, with Cast Iron Post and Wooden Relay Box, to hold <i>one</i> relay, complete with elevator and frost board	46 65
5	MODEL 9—Cast Iron Chute, for <i>six</i> cells 6'' x 8'' gravity battery, with Cast Iron Post and Wooden Relay Box, to hold <i>one</i> relay, complete with elevator and frost board	82 20
6	MODEL 8—Cast Iron Chute, for <i>three</i> cells 6'' x 8'' gravity battery, with Cast Iron Post and Wooden Relay Box, to hold <i>two</i> relays, complete with elevator and frost board	54 00
7	MODEL 9—Cast Iron Chute, for <i>six</i> cells 6'' x 8'' gravity battery, with Cast Iron Post and Wooden Relay Box, to hold <i>two</i> relays, complete with elevator and frost board	89 60
8	Side Elevation of Nos. 6 and 7, same as No. 3, but with Wooden Relay Box	
9	Two cell wooden battery elevator only, with malleable hanger, rope and frost board	2 28
10	Three cell wooden battery elevator only, with malleable hanger, rope and frost board	2 61

For Chutes only, see Plate 1302

For Relay Boxes, Posts and Foundations, see Plate 1304

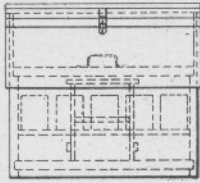


Relay Boxes and Posts

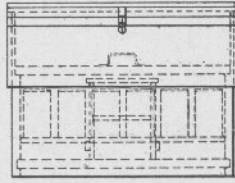
RELAY BOXES AND POSTS

ORDER BY PLATE AND NUMBER

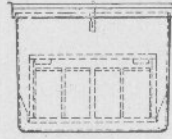
No		List Price
1	Cast Iron Relay Box, to hold <i>two</i> "Universal" 4C track relays and <i>two</i> lightning arresters. Complete with shelves as shown.	23 61
2	Cast Iron Relay Box, to hold <i>one</i> 4C track relay (old type) and <i>one</i> lightning arrester, or <i>two</i> 4C track relays (old type.) Complete as shown.	16 11
3	Cast Iron Relay Box, for interlocking "hook" relay. The relay is mounted against the back of the box, and hangs with its base in a vertical plane, as indicated by the dotted square. Four bolt holes are provided in the back of the box for bolting or screwing same to a wooden post or other support. The holes, top and bottom are tapped for 1½ inch pipe. Complete as shown (without bolts or lag screws).	23 70
4	Wooden Relay Box, for interlocking relay.	15 84
5	One-way Wooden Relay Box, to hold <i>one</i> "Universal" 4C track relay and <i>one</i> lightning arrester.	6 72
6	Two-way, one high, Wooden Relay Box, to hold <i>two</i> "Universal" 4C track relays and <i>two</i> lightning arresters.	8 52
7	Two-way, two high, Wooden Relay Box, to hold <i>two</i> "Universal" 4C track relays and <i>two</i> lightning arresters.	13 80
8	Four-way Relay Box, to hold <i>four</i> "Universal" 4C track relays and <i>four</i> lightning arresters. Commonly used on Signal Bridges.	22 68
9	Cast Iron Post, for supporting Cast Iron Relay Box, as shown in combinations 1, 2 and 3, Plate 1303.	5 61
10	Same as No. 9, but with flange cast on top of post for supporting Wooden Relay Box, as shown in combinations 4, 5, 6, 7 and 8, Plate 1303.	5 79
11	Wrot Iron Pipe Post, leaded into Cast Iron Base, and with Cast Iron Flanged Head, for supporting Wooden Relay Box.	8 34
12	Wrot Iron Pipe Post, as above, but without flanged head. To fit Cast Iron Relay Box No. 1 or No. 2.	7 02
13	Cast Iron Head, only for No. 12.	1 32
14	Oak Foundation for No. 12.	1 35



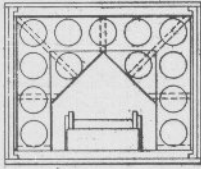
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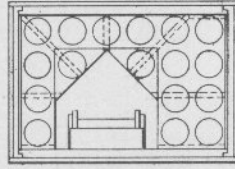
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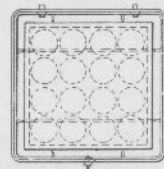
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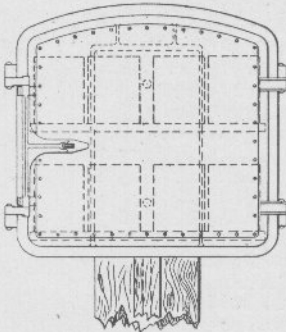
1A



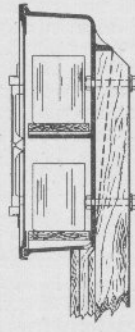
2A



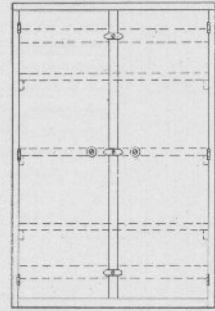
3A



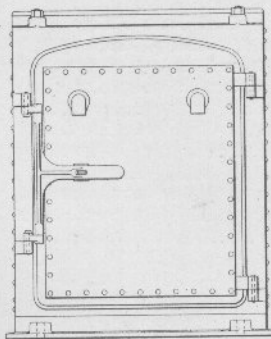
4



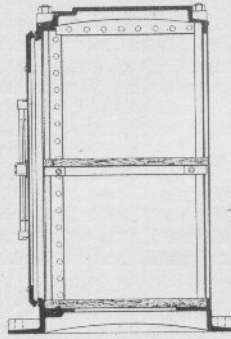
4A



5



6



6A

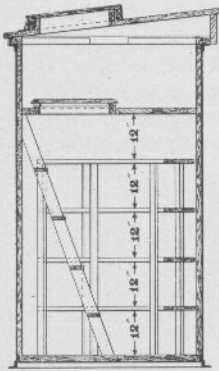
Wooden Battery Boxes and Cast Iron Battery Cases

BATTERY BOXES

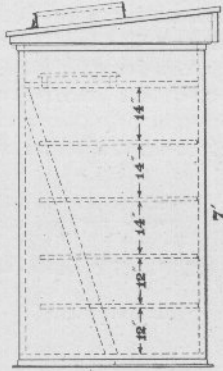
The battery boxes and cases described on this page, being wholly exposed to the air, or only slightly buried in the ground, are chiefly employed for sheltering batteries of the caustic soda or other non-freezing types. They may also be used for gravity batteries in places where these are not exposed to more than a very few degrees of frost.

ORDER BY PLATE AND NUMBER

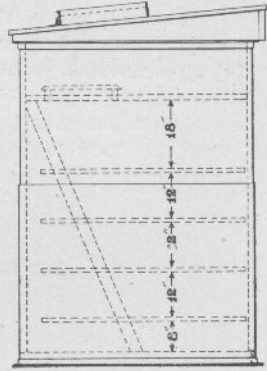
No.		List Price
1	Wooden Battery Box with sides and bottom covered with Galvanized Iron, and Soldered. Inside depth 2' 11". Capacity, <i>thirteen</i> cells Edison-Lalande type "SS." Complete with steps and frost breaker as shown	81 06
1A	Plan view of the above with cover removed.....	
2	Wooden Battery Box, similar to No. 1, but with a capacity of <i>seventeen</i> cells Edison-Lalande type "SS." Complete with steps and frost breaker...	92 04
2A	Plan view of the above with cover removed.....	
3	Shallow Cast Iron Box with Wooden Box inside to contain batteries. Capacity, <i>sixteen</i> cells Edison-Lalande type "SS"	50 28
3A	Plan view of the above with cover removed.....	
4	Cast Iron Battery Box, to be supported on post as shown. Capacity, <i>eight</i> cells.....	33 84
4A	Sectional elevation through No. 4 showing mode of supporting box and securing same to post.....	
5	White Pine Battery Closet with 15-inch head room between shelves. Made in all sizes, varying according to the number of cells which they are to contain.....	
6	Front view of Electric Semaphore Battery Case, as arranged when used for independent battery housing. Capacity, <i>sixteen</i> cells Edison-Lalande. Complete as shown, with shelf.....	76 35
6A	Sectional side view of No. 6.....	



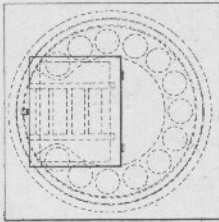
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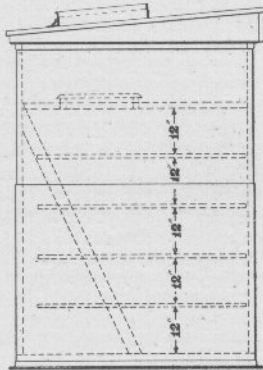
2



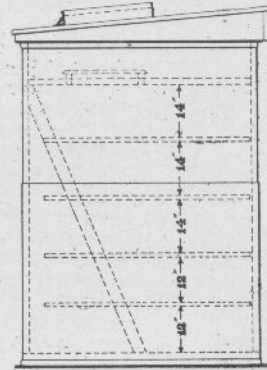
3



1A



4



5

Battery Wells

BATTERY WELLS

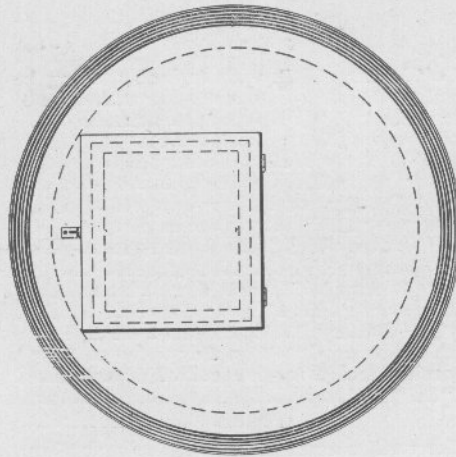
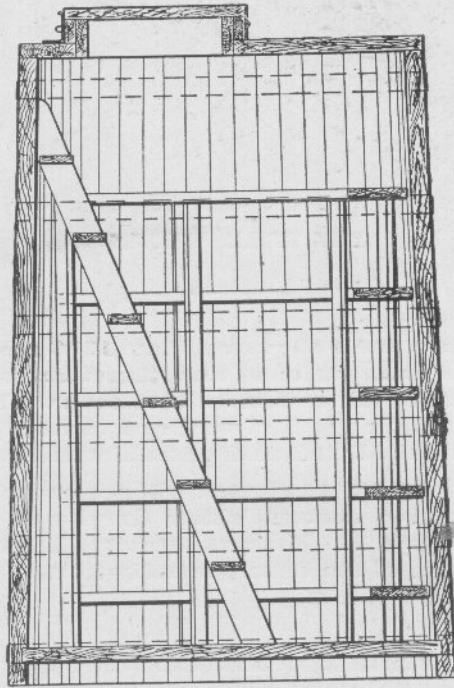
The battery wells shown on Plate 1306 are types generally known to signalmen, and therefore, need no description beyond the statement that each well consists of a $\frac{3}{8}$ " wrought iron shell, riveted and caulked, lined with wood and furnished with shelves, ladder and frost breaker.

Shelves with 12" head room will accommodate 6" x 8" gravity cells; 14" shelves, either Gravity or Edison-Lalande type "SS"; 18" shelves, Gravity, Edison-Lalande, or Storage Cells of the sizes generally in use.

ORDER BY PLATE AND NUMBER

No.		List Price
1	4' 0" x 7' 0" Battery Well, with 12 inch spacing between shelves. Capacity, <i>sixty-five</i> cells 6" x 8" Gravity Battery. Complete as shown.....	223 50
1A	Shows plan view of No. 1.....
2	4' 0" x 7' 0" Battery Well, with <i>two</i> 12 inch shelves and <i>three</i> 14 inch. Capacity, <i>twenty-six</i> cells 6" x 8" Gravity, and <i>thirty-six</i> cells Edison-Lalande type "SS." Complete as above.....	223 50
3	5' 0" x 7' 0" Battery Well, with <i>three</i> 12 inch and <i>one</i> 18 inch shelves.....	272 50
4	5' 0" x 7' 0" Battery Well, with <i>five</i> 12 inch shelves. Capacity, <i>ninety</i> cells 6" x 8" Gravity.....	272 50
5	5' 0" x 7' 0" Battery Well, <i>two</i> 12 inch and <i>three</i> 14 inch shelves. Capacity, <i>thirty-two</i> cells 6" x 8" Gravity, and <i>forty-five</i> cells Edison-Lalande type "SS".....	272 50

NOTE:—The various arrangements of shelves outlined above, cover all those usually required, but any other arrangement will be made to conform with specifications.



1

WOODEN BATTERY WELL

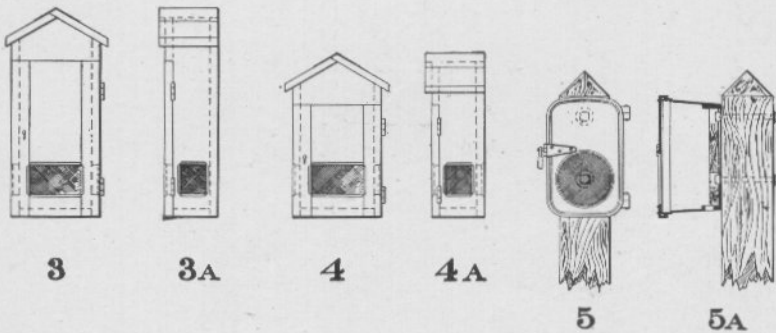
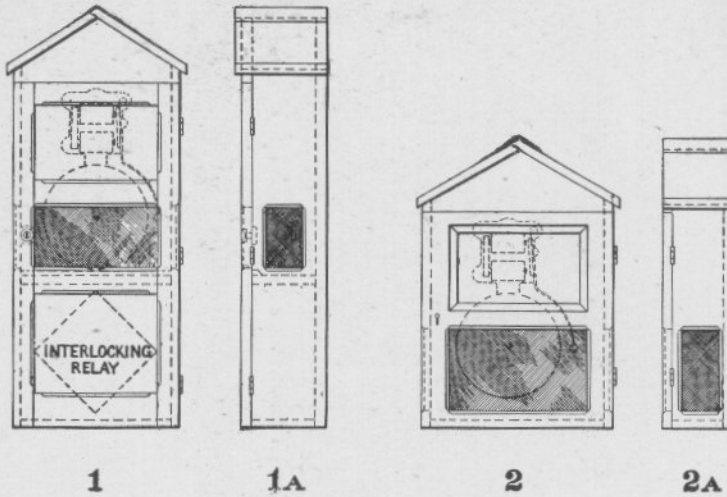
ORDER BY PLATE AND NUMBER

No.

I

Wooden Battery Well, 5' 0'' diameter at bottom and 4' 6'' diameter at top, by 7' 0'' deep. Complete as shown

List Price	
117 00	



BELL BOXES

ORDER BY PLATE AND NUMBER

No.		List Price
1	Front view of Double Box for 12-inch bell and interlocking relay	23 25
1A	Side view of No. 1.....	
2	Front view of Box for 12 or 15-inch bell	22 25
2A	Side view of No. 2.....	
3	Front view of Box for 6-inch bell and lightning arrester	8 70
3A	Side view of No. 3.....	
4	Front view of Box for 6-inch bell only	7 80
4A	Side view of No. 4.....	
5	Cast Iron Box for 5-inch bell.....	12 85
5A	Side view of No. 5.....	

SECTION 14

RELAYS

**Reprint of First Edition
1908**

PREFACE

This section of our new catalogue includes, in addition to our latest design of relay, the earlier types in general use on the principal railroads of the country at the present time.

It was not deemed desirable to illustrate detail parts, as orders for repairs should always be accompanied with sample of part required.

The Union Switch & Signal Company

Swissvale, Pa., November, 1903.

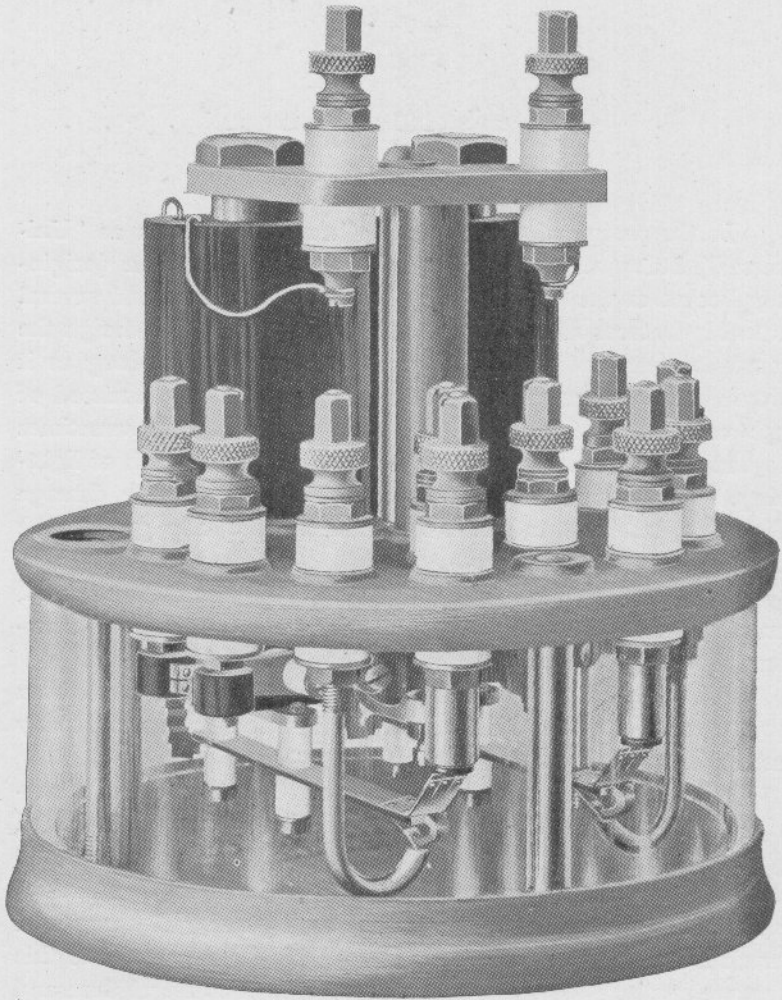


Fig. "A"

Model 1 Relay, Polarized Type

(7 in. Dia., 8 in. High)

Tested to stand 5000 volts A. C.

FOR DESCRIPTION SEE NEXT PAGE

THE MODEL 1 RELAY

In the design of the Model 1 (heretofore known as "Universal") Relay all of the good features of the Model 2 (originally known as the "4-C") Relay have been retained, and several valuable features added. In all relays previous to this design the insulation was not considered of great importance so long as it would stand the test of a magneto giving in the neighborhood of 350 volts. This insulation was easily ruptured and sometimes carbonized by an inductive charge resulting from a flash of lightning. This charge was not great enough to seriously damage the relay, but was sufficient to sometimes partially ground the binding posts or magnet coils.

In the "Universal" Relay an improved insulation is used, and is subject to a test of 5,000 alternating volts, which is fourteen times higher test than that applied to the "4-C" Relay.

A single thickness of this insulating material will stand from 10,000 to 20,000 volts, while a single thickness of that formerly used will stand from 500 to 700 volts.

All insulations are so arranged that the equivalent of three-eighths of an inch of dry air is obtained between each insulated part. A lightning arrester, in which but from 1,000 to 2,000 volts are required to produce a spark to earth when placed in the circuits of such a relay, gives a path for lightning discharges of much lower resistance than that formed by the relay, and to this fact we attribute the very successful operation of several thousand of these relays during the past year in a lightning infested district.

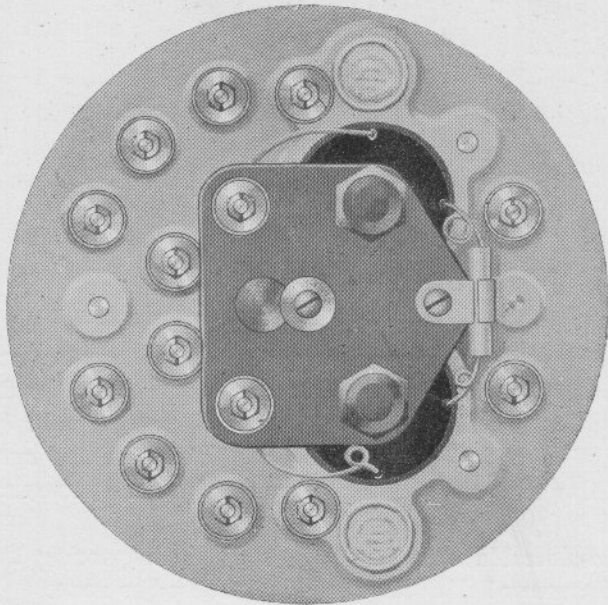


Fig. "B"
Plan View. Showing Arrangement of Binding Posts
for External Connections

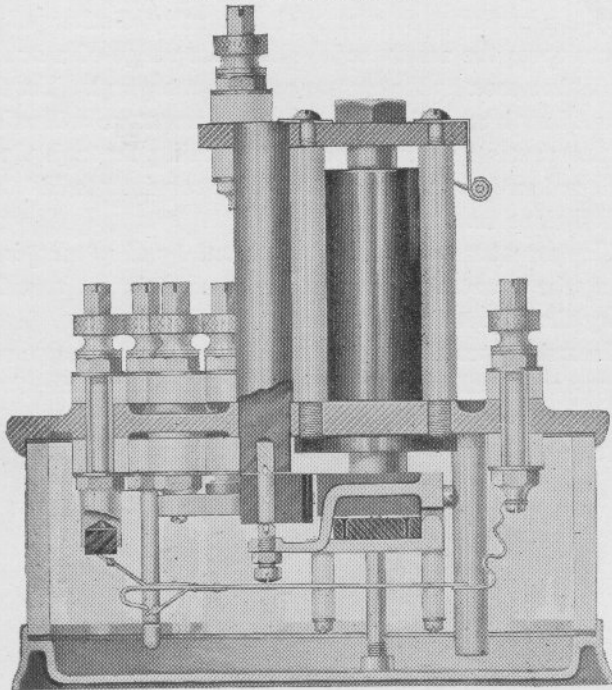


Fig. "C"
Sectional Elevation. Showing Arrangement of Neutral Armature and
Contacts, also Construction of Pivotal Bearing
for Polarized Armature
Model 1 Relay, Polarized Type

With former types of relays the insulation would usually break down with a lower charge than would produce an arc at the arrester, consequently the arrester did but little good in preventing these troubles. *Reversal of permanent magnets by lightning and other influences is also completely guarded against*, as exhaustive tests and a full year's use of some 1,000 relays have proved.

Considerable time has been spent in improving the magnetic features of this relay, making it second to none.

The armature is pivoted close to the magnetic field, thus giving a very short stroke of armature compared with the opening of the contacts, so that with the relay discharged and the contacts open, the armature is within the range of a strong magnetic field as soon as the magnets are re-energized. Yet this relay admits of such an adjustment that the armature will release and open the contacts when the current passing through the magnet coils is reduced to 50 per cent. of that required to lift the armature and close the contacts.

The armature pivots *are supported by the pole pieces*, thus keeping the armature always at the same distance from the poles, making the adjustment constant.

In early types of relays in which the magnets were supported by brass rods, and armature pivoted on the spectacle, the adjustments were not absolutely constant on account of the difference in expansion between the supports and magnet cores.

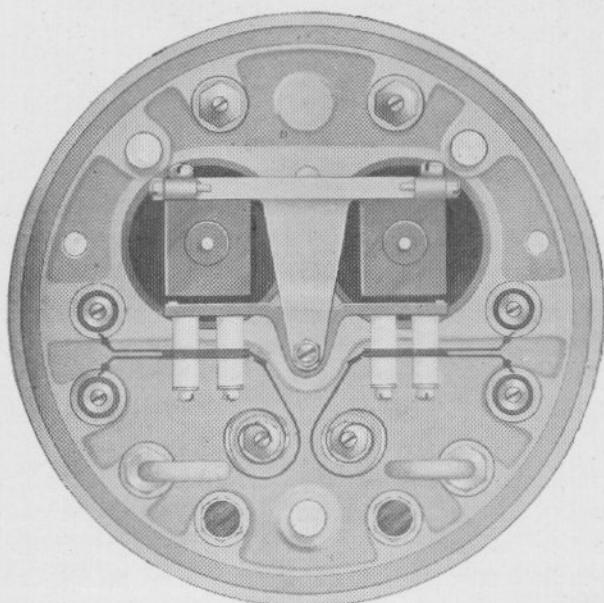


Fig. "D"
Inverted View. Showing Arrangement of Polarized Armature and Polar Contacts

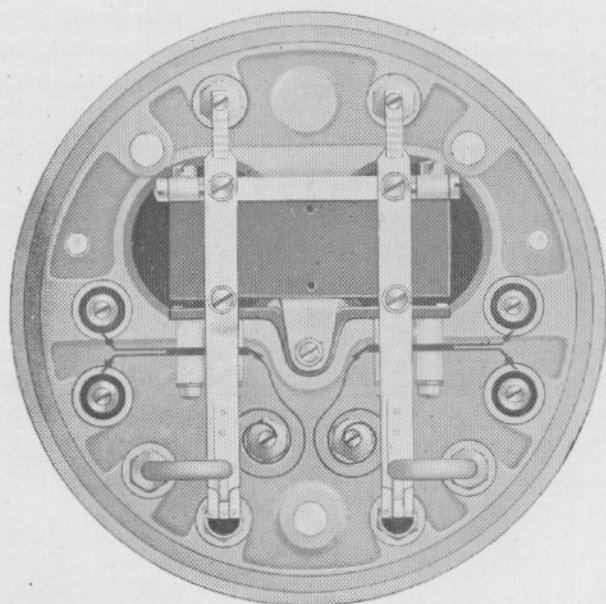


Fig. "E"
Inverted View. Showing Arrangement of Neutral Armature and Contacts
Model 1 Relay, Polarized Type

The enlarged pole pieces reduce the resistance of the magnetic circuits, giving a strong pull at the armature. *This pull is several times the pull obtained in relays of usual construction for an equal expenditure of energy.* With this increase in pull a better "sliding" effect in contacts is obtained than in former relays, while an increased pressure on the contacts and a lower resistance is secured, both of which are quite desirable *where carbon contacts are used.*

The minimum current that will raise the armature is ample to produce a sliding of the contacts. In former types of relays this was impossible on account of their lower magnetic efficiency.

The contact fingers of the relay are non-flexible, having a short flexible contact spring at their free ends. This arrangement gives a maximum sliding of the contact for a minimum stroke of the armature.

The contact arms are connected to the binding posts with thin strips of rolled annealed copper, making a connection so flexible as to in no way interfere with the adjustment or proper working of the relay, yet of sufficient carrying capacity as to require 40 amperes to fuse it.

All contacts of this relay, both front and back, are "sliding."

The terminal wires of the electro-magnets are attached to binding posts mounted on the back strap of the relay, where they can be inspected at any time without opening the relay.

The contacts and working parts are enclosed in a transparent, dust-proof compartment.

The arrangement of the contacts is such as to bring them all to the front of the relay, where they can readily be inspected.

These relays are tested, properly adjusted and sealed before leaving the factory, and each instrument bears the mark of the inspector passing it.

MODEL 1 RELAY
Polarized Type

This relay, formerly known as the "Universal," is never furnished with less than two neutral and two polar contacts, which should be connected in multiple when only one circuit is to be controlled, thereby reducing the amount of resistance to the passage of the current.

Unless otherwise specified, carbon front and platinum back contact discs will be furnished for the neutral points, and all carbon rollers for the polar points.

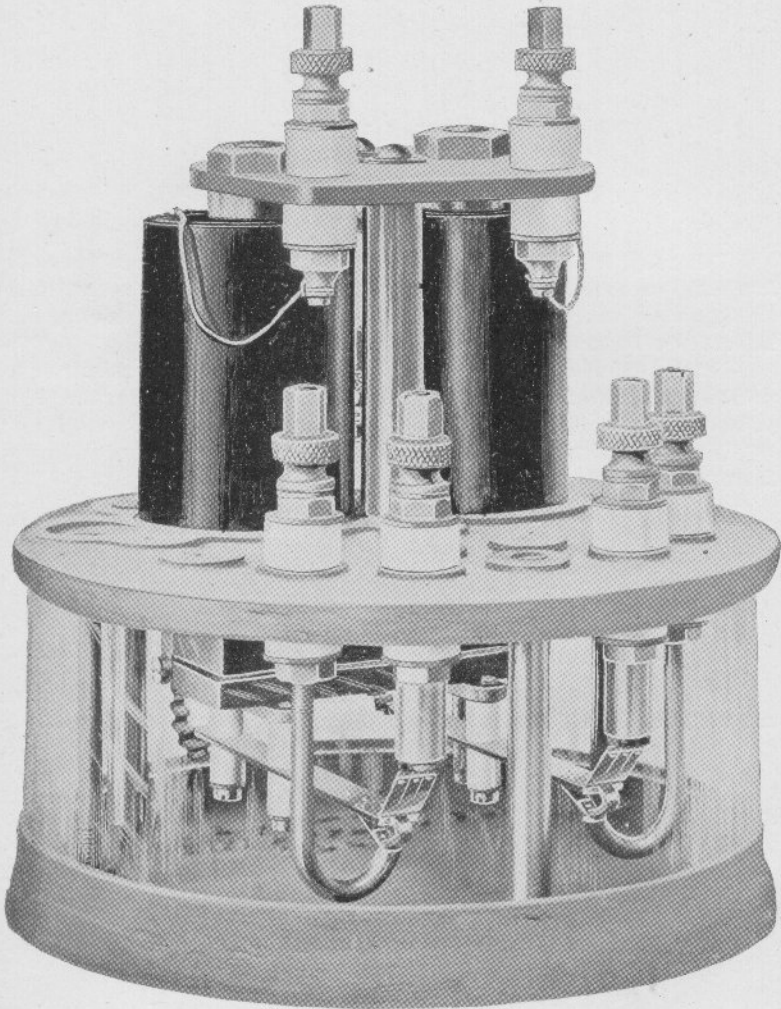
We do not advocate the use of a carbon back contact in any relay, believing that the safety of any system is in no way enhanced thereby.

ORDER BY PLATE AND LETTER

Specify Resistance of Magnets Required.

Unless otherwise specified relays will be furnished with Carbon Front and Platinum Back Contacts.

No.		List Price
A	2-point neutral, 2-point polar relay, with 2-front and 2-back neutral contacts and 2-front and 2-back polar contacts, Figs. A, B, C, D and E.....	52 00
A1	2-point neutral, 2-point polar relay, with 2-front and 2-back neutral contacts and 2-front polar contacts..	50 00



Model 2

MODEL 2 RELAY
Neutral Type

—————
 This relay is identical with Model 1, without the polarized features, which can be added at any time.

—————
ORDER BY PLATE AND LETTER

Specify Resistance of Magnets Required.

Unless otherwise specified relays will be furnished with Carbon Front and Platinum Back Contacts.

No.		List Price	
A	2-point neutral relay, with 2-front and 2-back contacts..	40 00	
A1	3-point neutral relay, with 3-front and 2-back contacts, Figs. A, B, C and D.....	46 00	

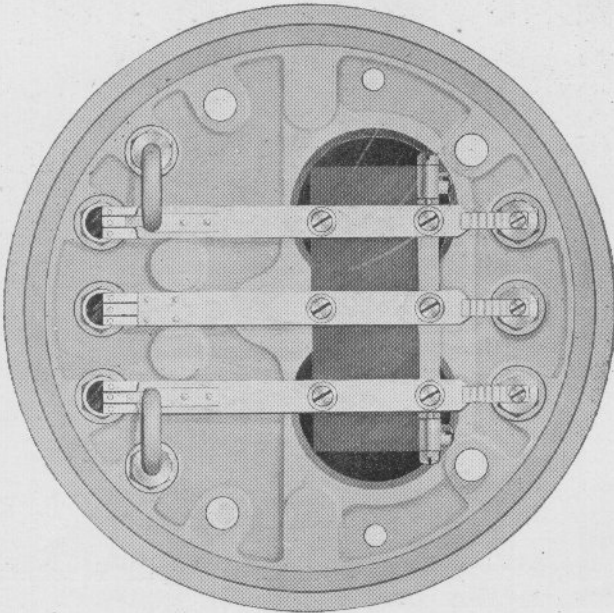


Fig. "A"
Inverted View. Showing Arrangement of Armature with Contacts and their Formation

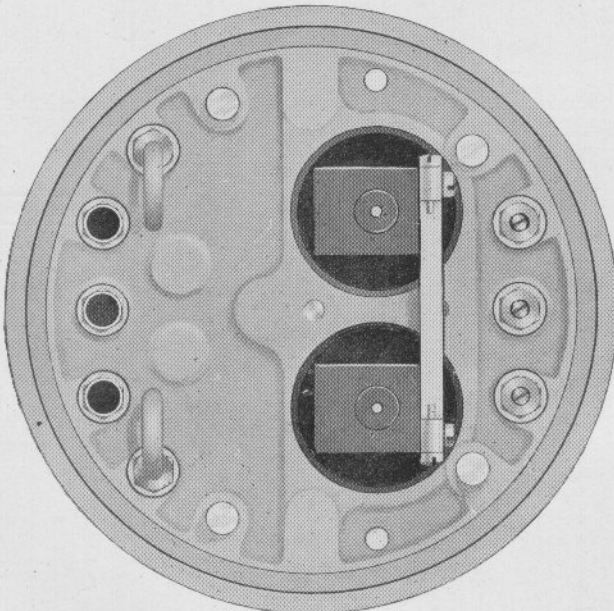


Fig. "B"
Inverted View. Showing Armature and Contact Pieces Removed, Pole Pieces, Armature Stops and Armature Bearing Bracket with Adjustable Pivots
Model 2 Relay, Neutral Type

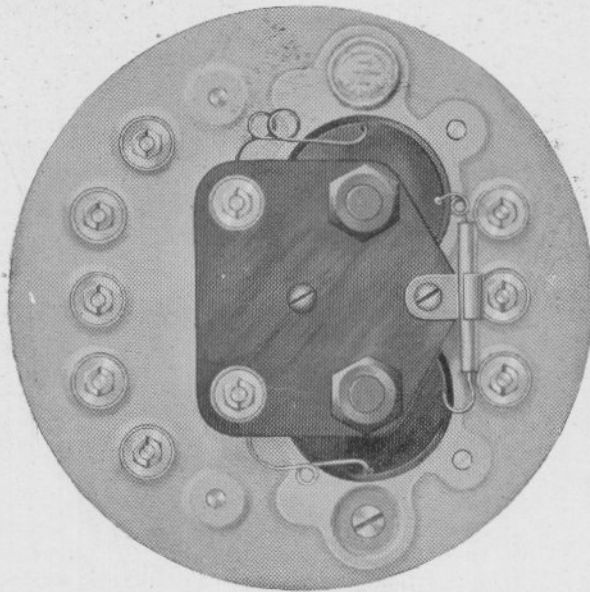


Fig. "C"
Plan View. Showing Arrangement of Binding Posts
for External Connections

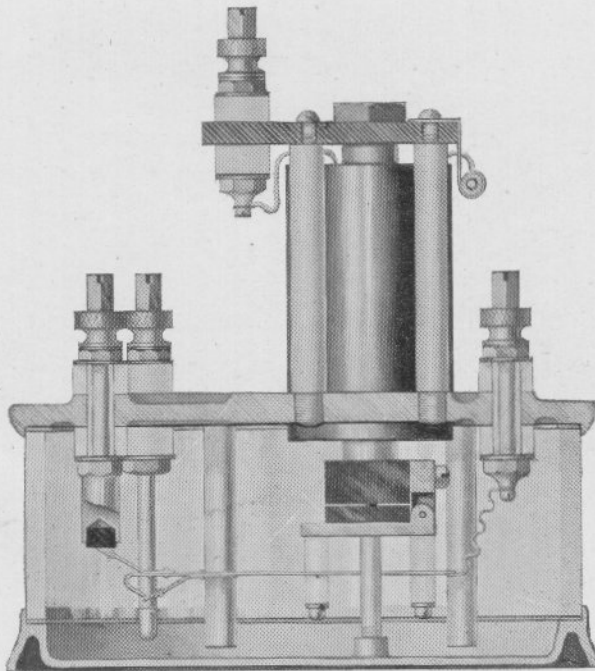
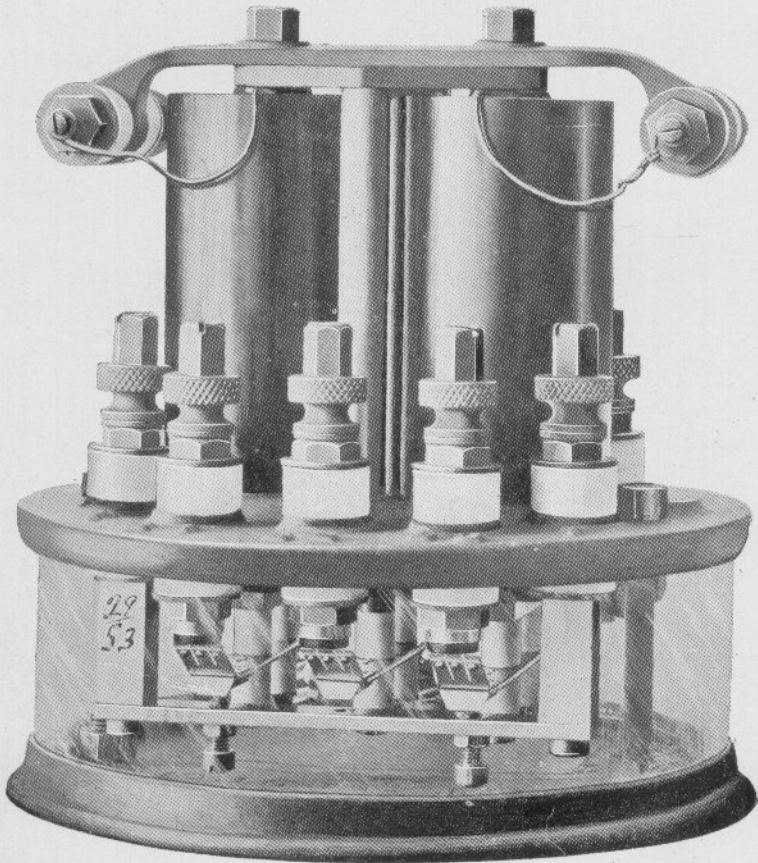


Fig. "D"
Sectional Elevation. Showing Arrangement of Armature Contacts
Model 2 Relay, Neutral Type



Model 3

MODEL 3 RELAY
Neutral Type

This relay is of similar design to our original "4-C" type, but is equipped with the same high-grade insulation found in Model 1, and is tested to stand 3,500 volts A. C. before being sealed for shipment.

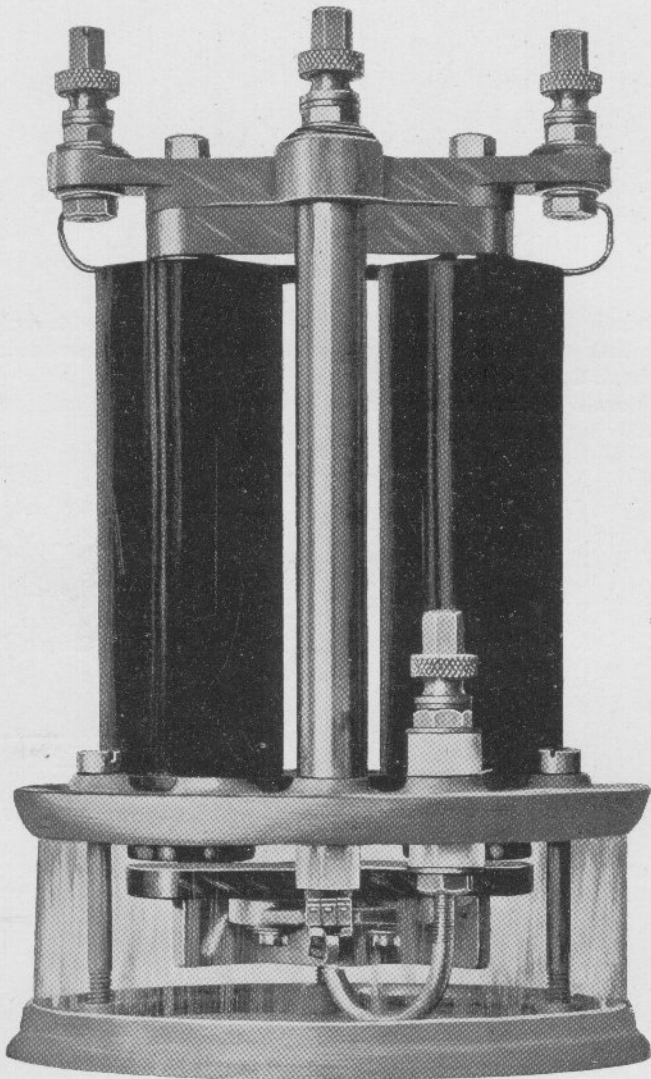
It is made in the neutral form only, with from one to three contacts inclusive.

ORDER BY PLATE AND LETTER

Specify Resistance of Magnets Required.

Unless otherwise specified relays will be furnished with Carbon Front and Platinum Back Contacts.

No.		List Price
A	1-point neutral relay, with 1-front contact.....	30 00
A1	1-point neutral relay, with 1-front and 1-back contact...	30 00
A2	2-point neutral relay, with 2-front contacts.....	34 00
A3	2-point relay, with 2-front and 2-back contacts.....	34 00
A4	3-point neutral relay, with 3-front contacts.....	38 00
A5	3-point neutral relay, with 3-front and 2-back contacts..	38 00



Model 4

MODEL 4 RELAY

Neutral Type

This type has been known as the slow releasing relay owing to the fact that it was originally designed to secure a slow release of its armature after the circuit energizing it was interrupted. This function is required for the efficient control of electric semaphores not equipped with slow release slot magnets, by the polarized wireless rail circuit, where it is necessary to prevent the opening of the signal circuit during the momentary reversal of current through the polarized track relay.

This relay is also furnished wound to release in the ordinary manner, with the slow acting function eliminated, and is often selected for use in ordinary capacities because of the great winding space on the cores presented, for meeting conditions where high resistances are desirable.

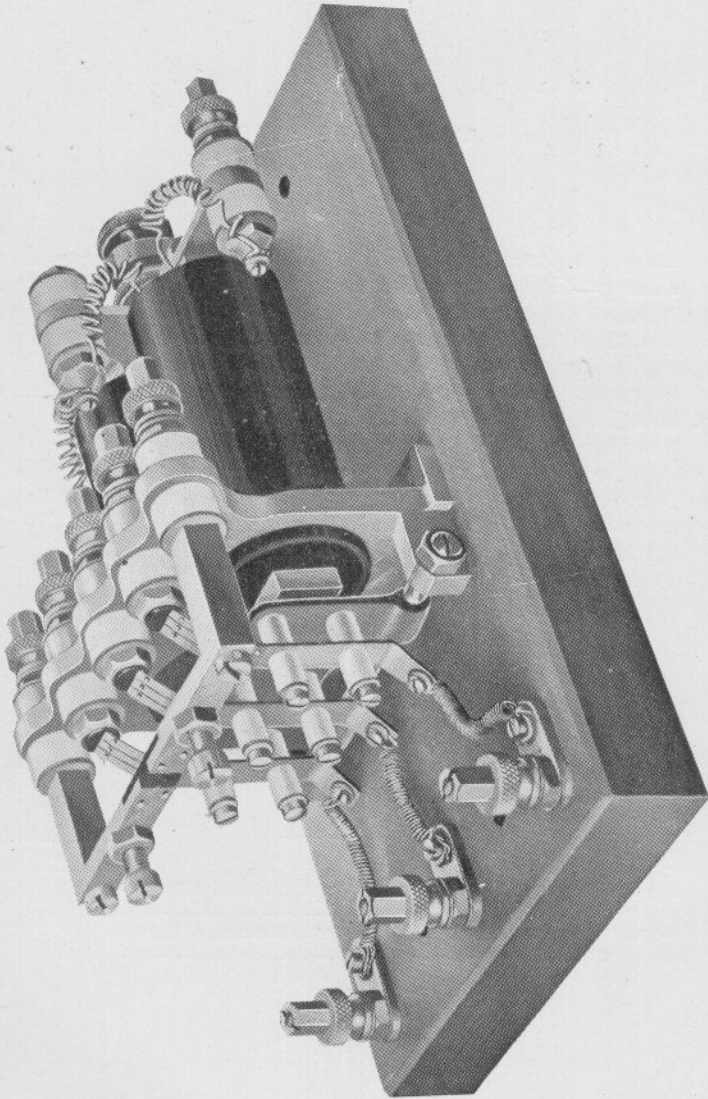
It is furnished with one point and is made in no other form.

ORDER BY PLATE AND LETTER

When ordering for non-slow releasing service, specify resistance desired.

Unless otherwise specified relays will be furnished with Carbon Front and Platinum Back Contacts.

No.		List Price
A	1-point relay, with 1-front and 1-back contact, slow releasing winding.....	50 00
B	1-point relay, with 1-front and 1-back contact, ordinary winding.....	50 00



Model 5

MODEL 5 RELAY

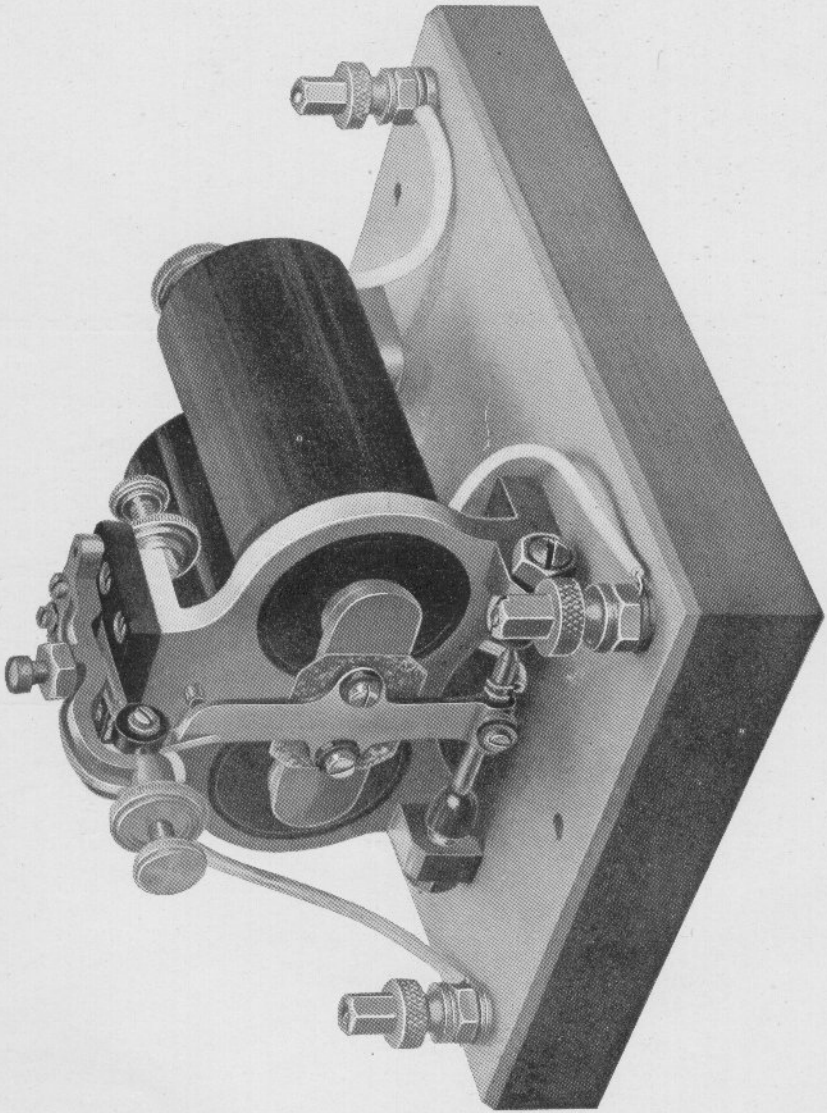
**Slate Base with Lavite Bushings and High Grade Insulation
Neutral Type**

ORDER BY PLATE AND LETTER

Specify Resistance of Magnets Required.

Unless otherwise specified relays will be furnished with Carbon Front and Platinum Back Contacts.

No.		List Price	
A	1-point relay, with 1-front contact.....	34 00	
A1	1-point relay, with 1-front and 1-back contact.....	34 00	
A2	2-point relay, with 2-front contacts.....	38 00	
A3	2-point relay, with 2-front and 2-back contacts.....	38 00	
A4	3-point relay, with 3-front contacts.....	42 00	
A5	3-point relay, with 3-front and 2-back contacts.....	42 00	



Model 6

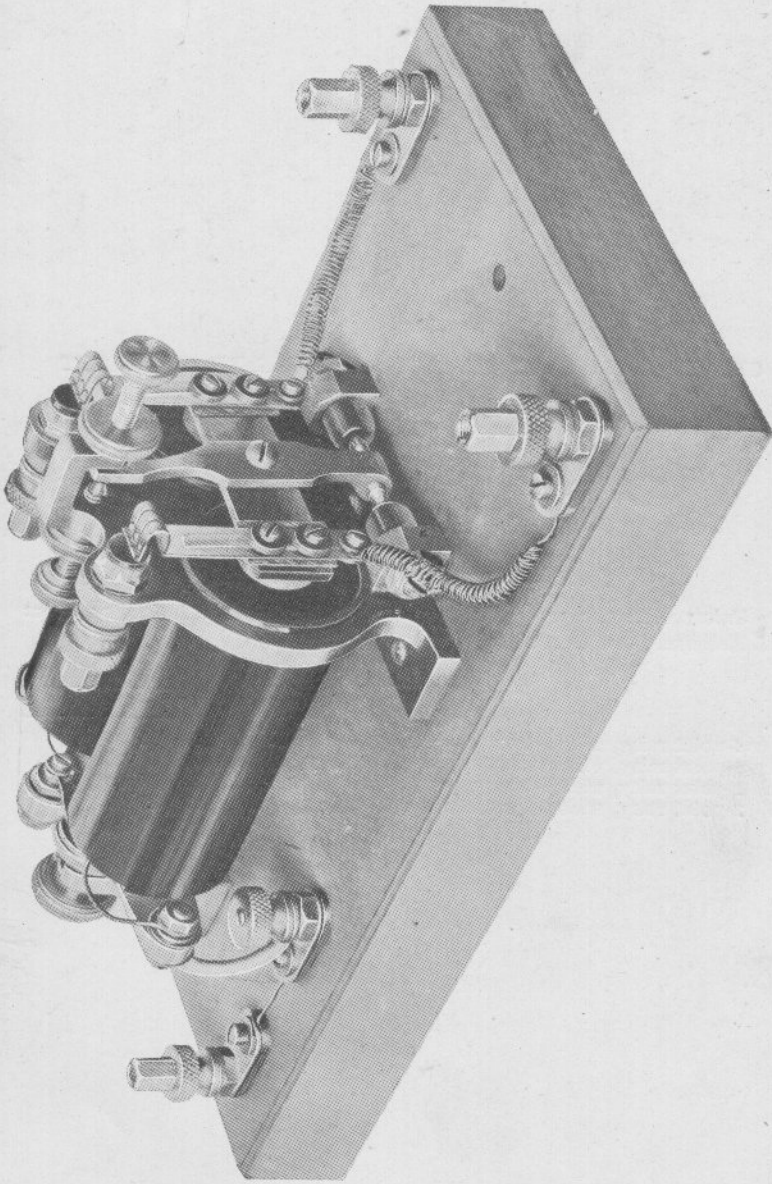
SLATE BASE SIGNAL RELAY—ROLLER CONTACT
Model 6

ORDER BY PLATE AND LETTER

Specify Resistance of Magnets Required

Unless otherwise specified relays will be furnished with Carbon Front and Platinum Back Contacts.

No.		List Price	
A	1-point relay, with 1-front contact, 100 ohms.....	30 00	
A1	1-point relay, with 1-front contact, 500 ohms.....	35 00	
A2	2-point relay, with 1-front contact, 100 ohms.....	34 00	
A3	2-point relay, with 1-front contact, 500 ohms.....	39 00	



Model 7

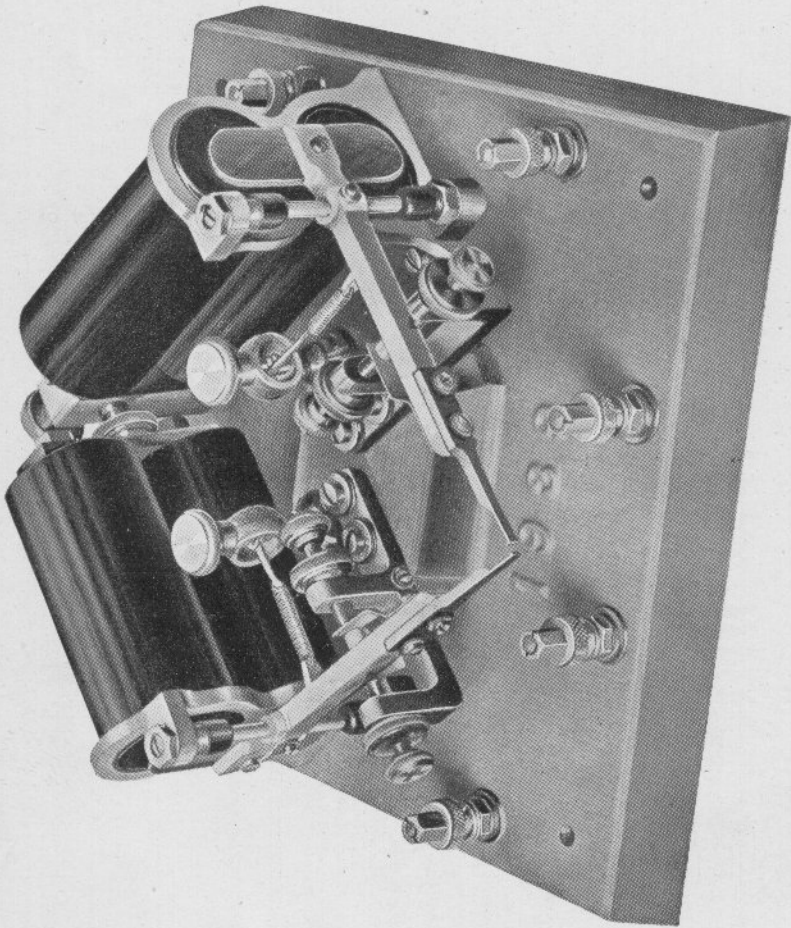
SLATE BASE RELAY
Model 7

ORDER BY PLATE AND LETTER

Specify Resistance of Magnets Required.

Unless otherwise specified relays will be furnished with Carbon Front and Platinum Back Contacts.

No.		List Price
A	1-point relay, with 1-front contact.....	30 00
A1	1-point relay, with 1-back contact.....	30 00
A2	2-point relay, with 2-back contacts.....	34 00
A3	2-point relay, with 1-front and 2-back contacts.....	34 00
A4	2-point relay, with 3-front contacts.....	38 00
A5	2-point relay, with 2-front and 2-back contacts.....	38 00



Model 8

MODEL 8 RELAY

Interlocking Type—Iron Base

This type of relay has been in service for many years, on a number of railroads, for operation of crossing bells on single track.

It has also been used for special cases of electric locking, signal control, etc.

The armature bars are now made of aluminum and the relay is well adapted to have coils connected direct to rails and be operated from track circuits.

Unless otherwise ordered one contact is furnished on each armature bar, this contact opens when relay is energized and is only closed when armature drops free of the other armature. Special contact open or closed will be furnished if desired, and function of relay should be specified.

ORDER BY PLATE AND LETTER

Specify Resistance of Magnets Required.

Unless otherwise specified relays will be furnished with Carbon Front and Platinum Back Contacts.

No.

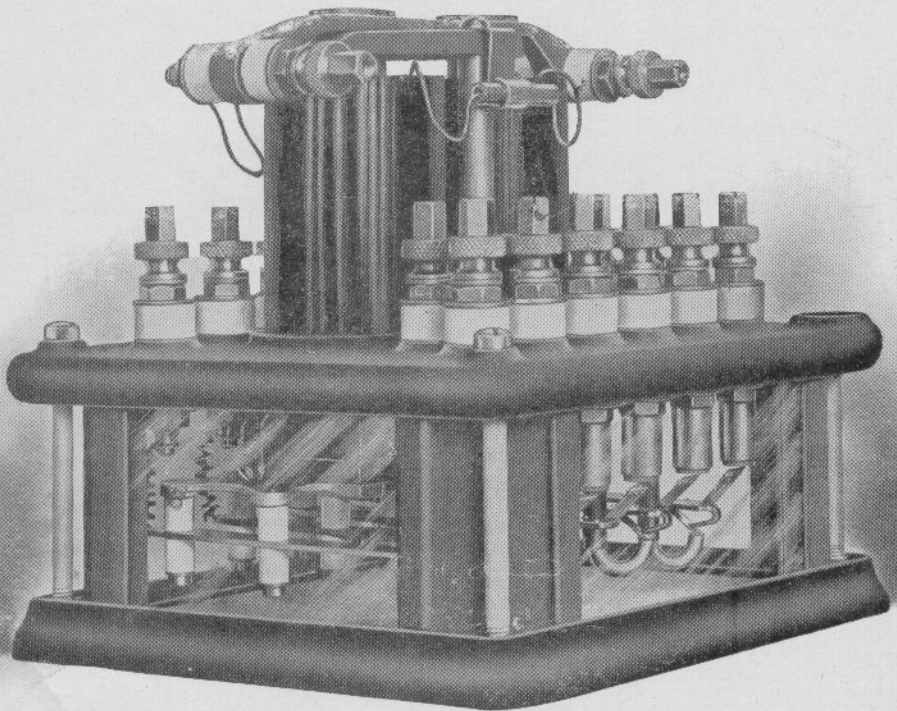
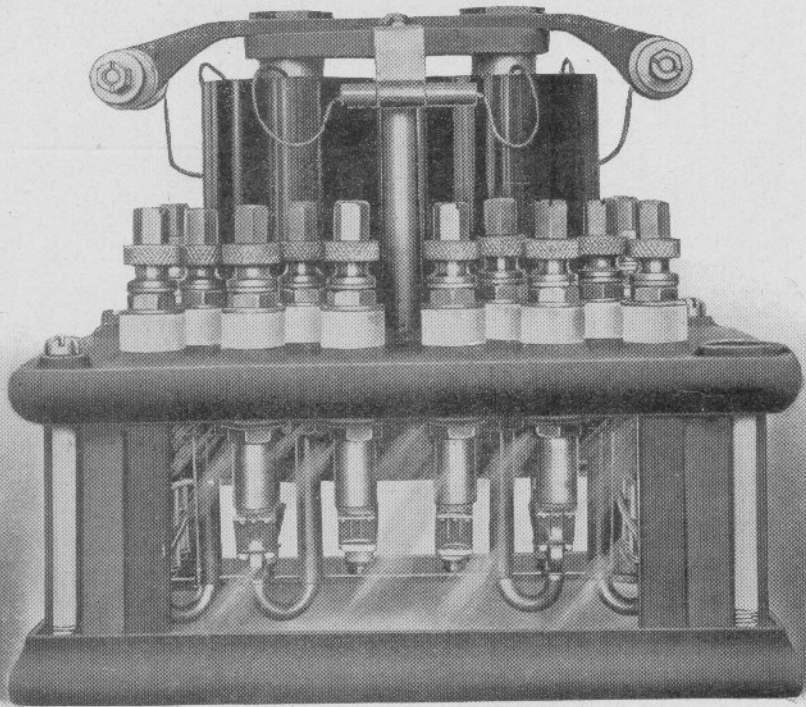
A 2-point relay, with 2-back contacts.....

List Price	
43 50	

SUPPLEMENT
TO
1902 CATALOGUE SECTION No. 14
RELAYS

The Union Switch & Signal Co.
Swissvale, Pa.

AUG. 1904



MODEL No. 9 RELAY
NEUTRAL TYPE

MODEL No. 9 RELAY

NEUTRAL TYPE

In offering Model No. 9 Relay we have endeavored to meet the situation where more than 4 front and 2 back contacts (as covered by Model No. 2 Relay) are required. All commendable features of insulation and design, as described in Section 14, are retained in this new type.

ORDER BY PLATE AND LETTER

Specify resistance of magnets required.

Unless otherwise ordered *carbon* front and *platinum* back contacts will be furnished.

	List Price
A 6 Point Relay—Model No. 9.1 with 6 front contacts	\$ 64 00
B 8 Point Relay—Model No. 9.2 with 6 front and 2 back contacts.....	68 00
C 8 Point Relay—Model 9.3 with 4 front and 4 back contacts	68 00
D 10 Point Relay—Model No. 9.4 with 6 front and 4 back contacts	72 00

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Swissvale, Pa.
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Wilkinsburg, Pa.

RE-ISSUE NOV. 1907

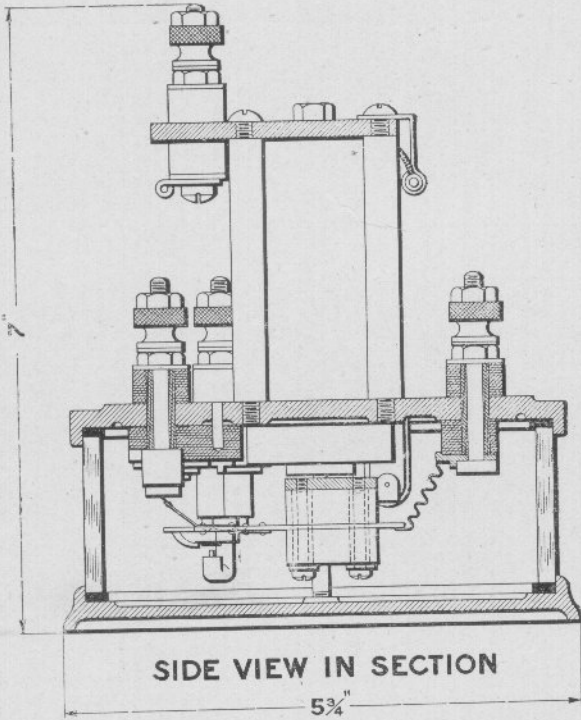
1123

SUPPLEMENT
TO
1902 CATALOGUE SECTION No. 14

THE 7-C RELAY

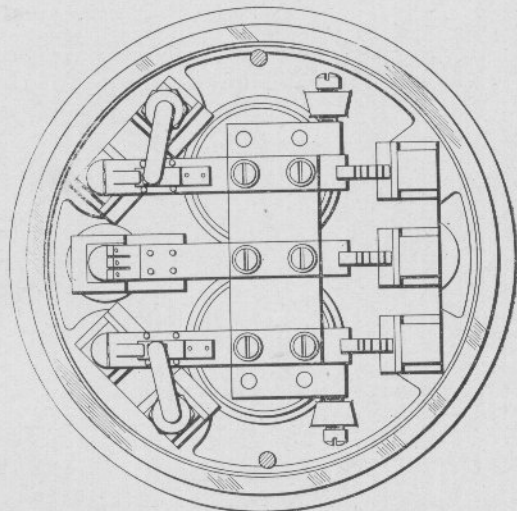
The Union Switch & Signal Co.
Swissvale, Pa.

JULY, 1907



SIDE VIEW IN SECTION

5 1/4"



INVERTED PLAN VIEW
BOTTOM PLATE REMOVED
7-C RELAY

7-C RELAY

This relay is intended to take the place of our 4-C, Type X and Model 3 Relays and embodies the best features of each.

While not as efficient as our Universal Type on account of its smaller size, it can be used to advantage in many places where high efficiency is of secondary importance and price the first consideration.

It is fitted throughout with high grade insulation and each relay must stand a test of 3500 alternating current volts before shipment.

The binding posts are prevented from turning by a new method recently introduced and all insulation blocks and bushings are of lignum vitæ.

These relays are furnished only with the arrangements of contacts and magnet resistances shown in the following list. The back contacts are always of metal and unless otherwise specified graphite front contacts will be furnished.

Order by Plate and Figure.

The drawing references are shown merely for convenience in checking material against invoices and shipping lists.

Figure	Magnet Resistance Ohms	Independent Contacts		Front and Back Contacts	Number of Contact Fingers	Total Contacts		Drawing Reference	List Price
		Front	Back			Front	Back		
1	$\frac{1}{10}$			2	2	2	2	1-C-7214	\$ 20.00
2	$\frac{1}{10}$	1		2	3	3	2	2-C-7214	23.00
3	4			2	2	2	2	1-C-7214	21.00
4	4	1		2	3	3	2	2-C-7214	24.00
5	5			2	2	2	2	1-C-7214	21.00
6	5	1		2	3	3	2	2-C-7214	24.00
7	9			2	2	2	2	1-C-7214	21.50
8	9	1		2	3	3	2	2-C-7214	24.50
9	16			2	2	2	2	1-C-7214	21.50
10	16	1		2	3	3	2	2-C-7214	24.50
11	100			2	2	2	2	1-C-7214	23.00
12	100	1		2	3	3	2	2-C-7214	26.00
13	500			2	2	2	2	1-C-7214	25.50
14	500	1		2	3	3	2	2-C-7214	28.50
15	1000			2	2	2	2	1-C-7214	26.00
16	1000	1		2	3	3	2	2-C-7214	29.00

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RE-ISSUE NOV. 1907

1133

SUPPLEMENT No. 3
TO
1902 CATALOGUE—SECTION No. 14

R. S. A. RELAY

The Union Switch & Signal Co.
Swissvale, Pa.

October, 1908.

R. S. A. RELAY.

D. C. NEUTRAL LOW VOLTAGE TYPE.

This relay, illustrated on the following plates, in addition to complying with the specifications of the Railway Signal Association, embodies certain improvements, among which the following may be mentioned:

First: All metal parts except the wire terminals are protected against oxidization or corrosion by being enclosed.

Second: The wire terminals are all in one vertical plane on the front of the relay and **below** the mechanism. This simplifies the application and inspection of the connecting wires without obscuring the mechanism.

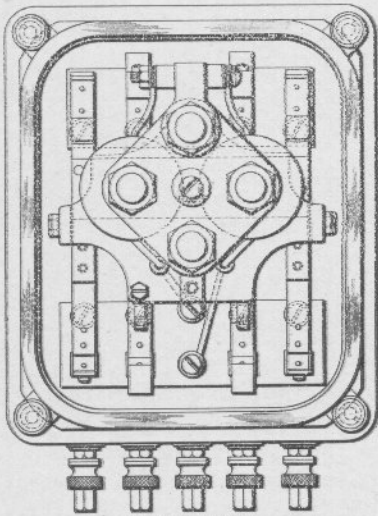
Third: The glass shield is secured to the porcelain base by four screws, a gasket being inserted between the ground surfaces of the glass and porcelain. This, in addition to affording a clear view of all parts of the mechanism, insures against danger from moisture.

Fourth: The front and back contact springs are separated from each other by a $\frac{3}{8}$ -inch air gap and connected to separate terminals. Eight **independent** circuits can therefore be controlled by this relay, which occupies practically the same space as other relays limited to the control of four independent circuits.

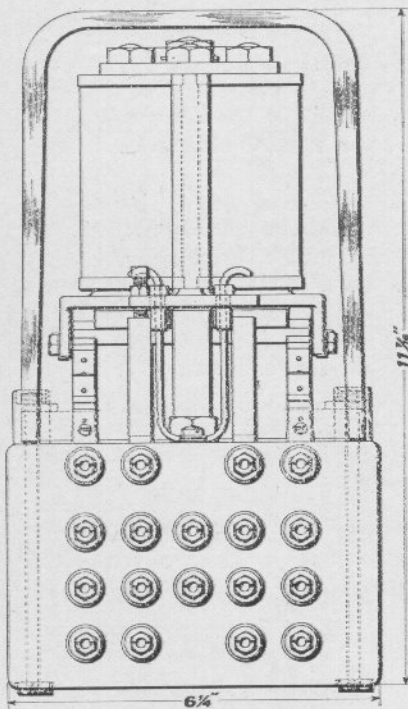
Fifth: The base, which is made of the finest grade of electrical porcelain, supports both the mechanism and wire terminals, thus eliminating the use of insulating bushings entirely.

Sixth: If desired this relay can be furnished with a disc or semaphore indicator attachment, designed for application to the magnet bracket. This attachment is operated by the two middle armature bars.

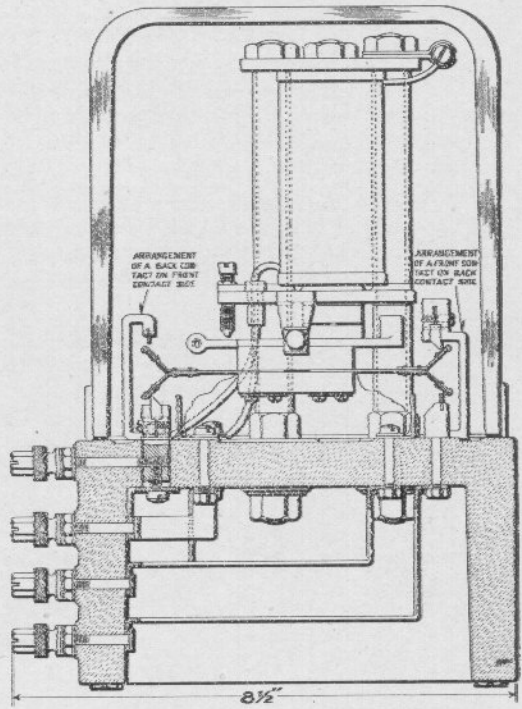
This relay is always furnished with an even number of contacts as shown in the following list. The contacts are electrically independent of each other. The front contacts are made of graphite, and the back contacts and contact springs of silver.



PLAN VIEW
GLASS CASE SECTIONED



FRONT VIEW
GLASS CASE SECTIONED



SECTIONAL SIDE VIEW

R. S. A. RELAY—HIGH BASE.

R. S. A. RELAY—HIGH BASE.

When more than four front or four back contacts are desired, by the use of special contact posts front contacts can be made on the back contact side of the relay, and also back contacts on the front contact side, as shown in the side view on the opposite plate, thus making it possible to furnish relays with as many as eight front or eight back contacts as are listed below. The relay shown on the opposite plate has four front and four back contacts.

Order by Plate and Figure.

The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

Fig.	Magnet Resistance Ohms	Number of Contacts		Drawing Reference	List Price
		Front	Back		
1	$\frac{1}{10}$	8	0	C-7247	56 00
2	$\frac{1}{10}$	6	2	C-7247	56 00
3	$\frac{1}{10}$	6	0	C-7247	50 00
4	$\frac{1}{10}$	4	4	C-7247	56 00
5	$\frac{1}{10}$	4	2	C-7247	50 00
6	$\frac{1}{10}$	4	0	C-7247	40 00
7	$\frac{1}{10}$	2	6	C-7247	56 00
8	$\frac{1}{10}$	2	4	C-7247	50 00
9	$\frac{1}{10}$	2	2	C-7247	40 00
10	$\frac{1}{10}$	2	0	C-7247	40 00
11	$\frac{1}{10}$	0	8	C-7247	56 00
12	$\frac{1}{10}$	0	6	C-7247	50 00
13	$\frac{1}{10}$	0	4	C-7247	40 00
14	$\frac{1}{10}$	0	2	C-7247	40 00
15	4	8	0	C-7247	56 00
16	4	6	2	C-7247	56 00
17	4	6	0	C-7247	50 00
18	4	4	4	C-7247	56 00
19	4	4	2	C-7247	50 00
20	4	4	0	C-7247	40 00
21	4	2	6	C-7247	56 00
22	4	2	4	C-7247	50 00
23	4	2	2	C-7247	40 00

R. S. A. RELAY—HIGH BASE.

Order by Plate and Figure.

Fig.	Magnet Resistance Ohms	Number of Contacts		Drawing Reference	List Price
		Front	Back		
24	4	2	0	C-7247	40 00
25	4	0	8	C-7247	56 00
26	4	0	6	C-7247	50 00
27	4	0	4	C-7247	40 00
23	4	0	2	C-7247	40 00
29	5	8	0	C-7247	56 00
30	5	6	2	C-7247	56 00
31	5	6	0	C-7247	50 00
32	5	4	4	C-7247	56 00
33	5	4	2	C-7247	50 00
34	5	4	0	C-7247	40 00
35	5	2	6	C-7247	56 00
36	5	2	4	C-7247	50 00
37	5	2	2	C-7247	40 00
38	5	2	0	C-7247	40 00
39	5	0	8	C-7247	56 00
40	5	0	6	C-7247	50 00
41	5	0	4	C-7247	40 00
42	5	0	2	C-7247	40 00
43	9	8	0	C-7247	56 00
44	9	6	2	C-7247	56 00
45	9	6	0	C-7247	50 00
46	9	4	4	C-7247	56 00
47	9	4	2	C-7247	50 00
48	9	4	0	C-7247	40 00

R. S. A. RELAY—HIGH BASE.

Order by Plate and Figure.

Fig.	Magnet Resistance Ohms	Number of Contacts		Drawing Reference	List Price
		Front	Back		
49	9	2	6	C-7247	56 00
50	9	2	4	C-7247	50 00
51	9	2	2	C-7247	40 00
52	9	2	0	C-7247	40 00
53	9	0	8	C-7247	56 00
54	9	0	6	C-7247	50 00
55	9	0	4	C-7247	40 00
56	9	0	2	C-7247	40 00
57	16	8	0	C-7247	56 00
58	16	6	2	C-7247	56 00
59	16	6	0	C-7247	50 00
60	16	4	4	C-7247	56 00
61	16	4	2	C-7247	50 00
62	16	4	0	C-7247	40 00
63	16	2	6	C-7247	56 00
64	16	2	4	C-7247	50 00
65	16	2	2	C-7247	40 00
66	16	2	0	C-7247	40 00
67	16	0	8	C-7247	56 00
68	16	0	6	C-7247	50 00
69	16	0	4	C-7247	40 00
70	16	0	2	C-7247	40 00
71	100	8	0	C-7247	56 00
72	100	6	2	C-7247	56 00
73	100	6	0	C-7247	50 00
74	100	4	4	C-7247	56 00
75	100	4	2	C-7247	50 00

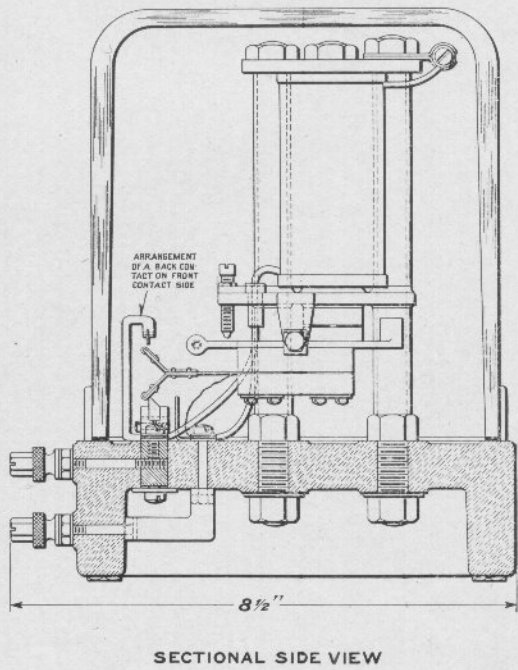
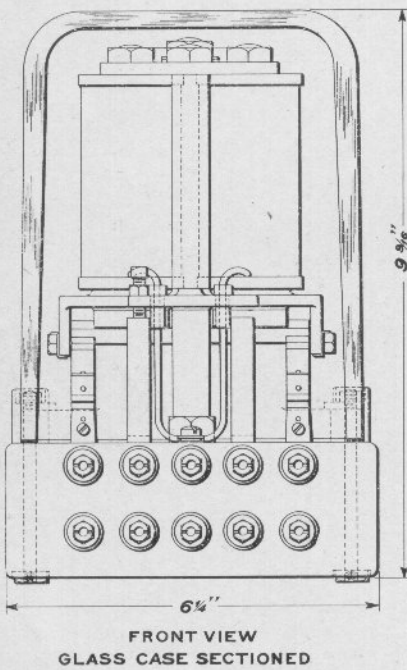
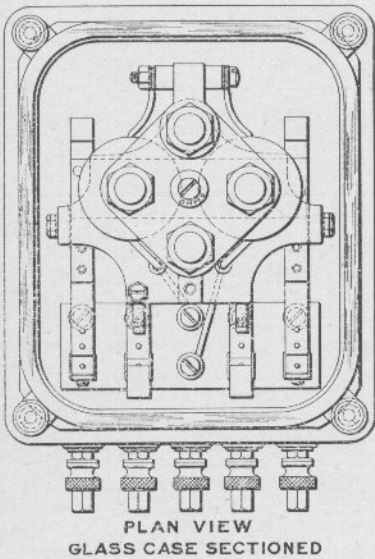
R. S. A. RELAY—HIGH BASE.

Order by Plate and Figure.

Fig.	Magnet Resistance Ohms	Number of Contacts		Drawing Reference	List Price
		Front	Back		
76	100	4	0	C-7247	40 00
77	100	2	6	C-7247	56 00
78	100	2	4	C-7247	50 00
79	100	2	2	C-7247	40 00
80	100	2	0	C-7247	40 00
81	100	0	8	C-7247	56 00
82	100	0	6	C-7247	50 00
83	100	0	4	C-7247	40 00
84	100	0	2	C-7247	40 00
85	500	8	0	C-7247	60 00
86	500	6	2	C-7247	60 00
87	500	6	0	C-7247	54 00
88	500	4	4	C-7247	60 00
89	500	4	2	C-7247	54 00
90	500	4	0	C-7247	44 00
91	500	2	6	C-7247	60 00
92	500	2	4	C-7247	54 00
93	500	2	2	C-7247	44 00
94	500	2	0	C-7247	44 00
95	500	0	8	C-7247	60 00
96	500	0	6	C-7247	54 00
97	500	0	4	C-7247	44 00
98	500	0	2	C-7247	44 00
99	1000	8	0	C-7247	60 00
100	1000	6	2	C-7247	60 00
101	1000	6	0	C-7247	54 00

R. S. A. RELAY—HIGH BASE.**Order by Plate and Figure.**

Fig.	Magnet Resistance Ohms	Number of Contacts		Drawing Reference	List Price
		Front	Back		
102	1000	4	4	C-7247	60 00
103	1000	4	2	C-7247	54 00
104	1000	4	0	C-7247	44 00
105	1000	2	6	C-7247	60 00
106	1000	2	4	C-7247	54 00
107	1000	2	2	C-7247	44 00
108	1000	2	0	C-7247	44 00
109	1000	0	8	C-7247	60 00
110	1000	0	6	C-7247	54 00
111	1000	0	4	C-7247	44 00
112	1000	0	2	C-7247	44 00



R. S. A. RELAY—LOW BASE.

R. S. A. RELAY—LOW BASE.

This relay is similar to the relay shown on Plate 1410, excepting that the front and back contacts are on the front contact side only, therefore reducing the size of the porcelain base as shown in the side view on the opposite plate, thus making it possible to furnish relays with as many as four front or four back contacts, as listed below. The relay shown on the opposite plate has two front and two back contacts.

Order by Plate and Figure.

The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

Fig.	Magnet Resistance Ohms	Number of Contacts		Drawing Reference	List Price
		Front	Back		
1	$\frac{1}{10}$	4	0	C-7247	40 00
2	$\frac{1}{10}$	2	2	C-7247	40 00
3	$\frac{1}{10}$	2	0	C-7247	40 00
4	$\frac{1}{10}$	0	4	C-7247	40 00
5	4	4	0	C-7247	40 00
6	4	2	2	C-7247	40 00
7	4	2	0	C-7247	40 00
8	4	0	4	C-7247	40 00
9	5	4	0	C-7247	40 00
10	5	2	2	C-7247	40 00
11	5	2	0	C-7247	40 00
12	5	0	4	C-7247	40 00
13	9	4	0	C-7247	40 00
14	9	2	2	C-7247	40 00
15	9	2	0	C-7247	40 00
16	9	0	4	C-7247	40 00
17	16	4	0	C-7247	40 00
18	16	2	2	C-7247	40 00
19	16	2	0	C-7247	40 00
20	16	0	4	C-7247	40 00
21	100	4	0	C-7247	40 00
22	100	2	2	C-7247	40 00
23	100	2	0	C-7247	40 00
24	100	0	4	C-7247	40 00
25	500	4	0	C-7247	44 00

R. S. A. RELAY—LOW BASE.

Order by Plate and Figure.

Fig.	Magnet Resistance Ohms	Number of Contacts		Drawing Reference	List Price
		Front	Back		
26	500	2	2	C-7247	44 00
27	500	2	0	C-7247	44 00
28	500	0	4	C-7247	44 00
29	1000	4	0	C-7247	44 00
30	1000	2	2	C-7247	44 00
31	1000	2	0	C-7247	44 00
32	1000	0	4	C-7247	44 00

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SECTION 15

**MECHANICALLY OPERATED
CIRCUIT CONTROLLERS**

REPRINT OF THE FIRST EDITION
REPRINT 1908

PREFACE

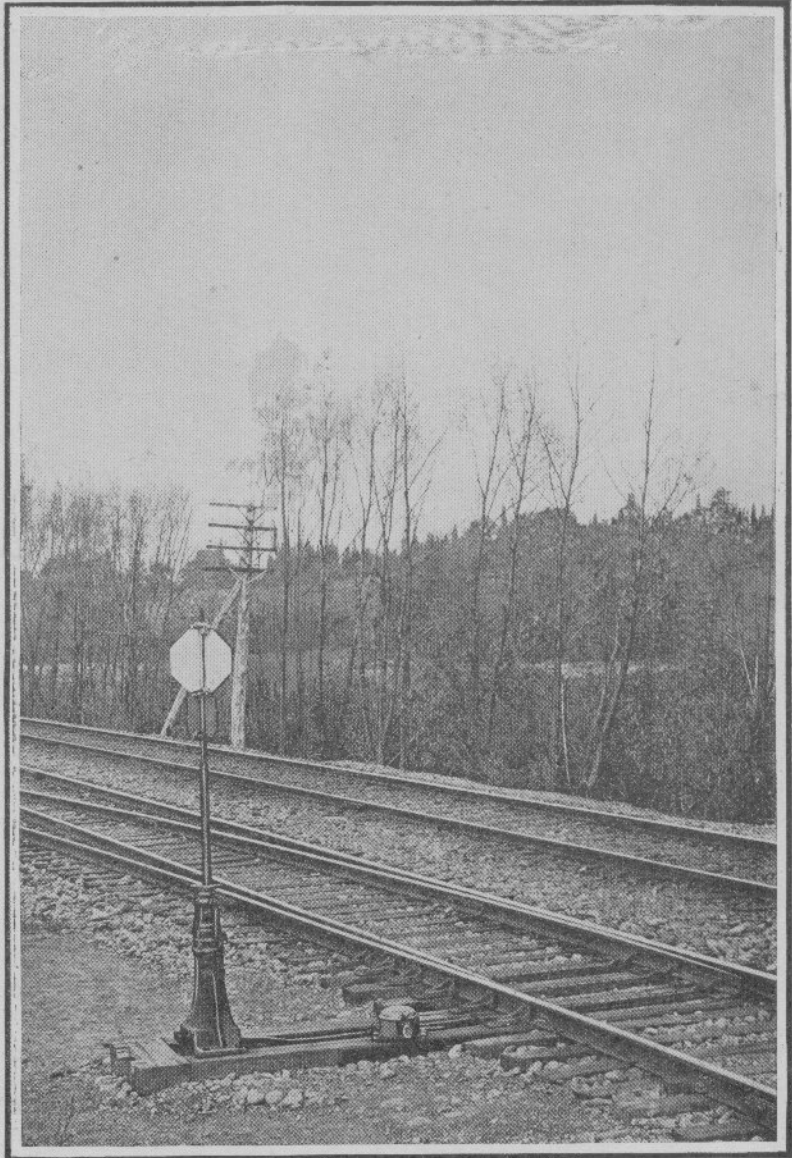
AS OUR supply of Bulletin 8, issued in February, 1902, has become exhausted, and as the matter therein belongs more to a catalogue than a descriptive bulletin, we have embodied the contents in this Section of our 1902-3 Catalogue, under the same title, "Mechanically Operated Circuit Controllers," together with such additions and revisions as appeared to be necessary.

Though somewhat contrary to the method heretofore followed in compiling our New Catalogue, we have included the diagrams and descriptions formerly contained in Bulletin 8, since we believe that in this instance they will not be out of place.

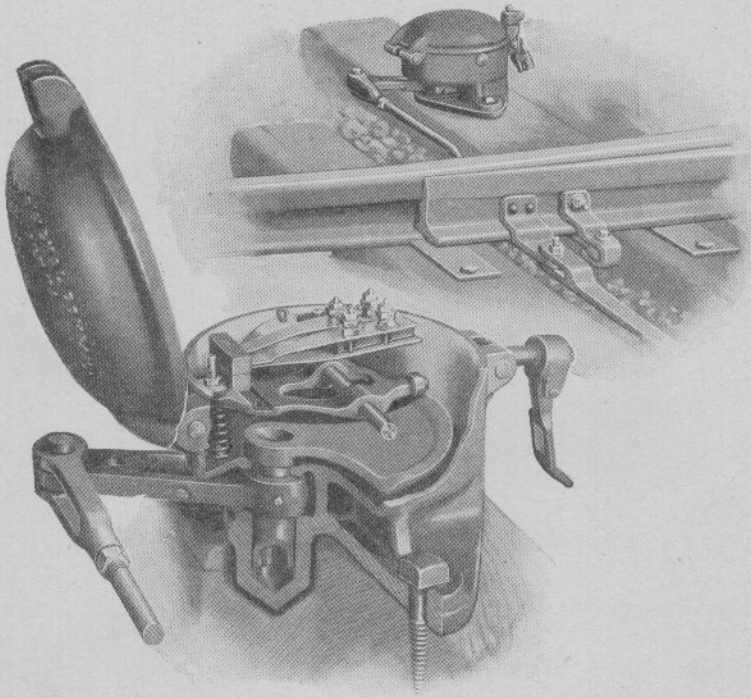
The large demand for our various makes of Circuit Controllers since Bulletin 8 was issued, confirms our belief in their fitness for modern signal requirements both in design and workmanship.

The Union Switch & Signal Co.

*Swissvale, Pa.,
Jan. 1, 1903*



**View Showing the Application of a Vertical Rotary
Switch Circuit Controller to a Main
Line Switch**



**Vertical Rotary Switch Circuit Controller
(Switch Box)**

Model 2

The principal features in which this instrument differs from the original design shown on Page 10 are as follows :

The total height of the instrument has been cut down to seven inches.

The shaft of the vertical rotary cam has been made hollow, and the lower bearing in which it works has been closed at the bottom to retain the oil used for lubrication.

The rubber plate carrying the contact springs has been replaced by one of metal, suitably insulated.

Vertical Rotary Switch Circuit Controller

Model 2

This instrument is especially designed for use in automatic rail-circuit block signaling, where the movement of a switch from the main line is required to hold at or to move to danger the signal or signals governing the block in which the switch is located.

It possesses many advantages over former devices of this character, the most important of which are enumerated as follows :

It is both dust and weather proof.

Its contacts, which are formed of heavy bronze strips tipped with platinum, are exempt from the wear that takes place in the contacts of other boxes where a vibratory motion is given to them by each car wheel passing over the switch. In the present design this vibration is absorbed by the vertical rotary cam, which is substantially constructed for this reason, and is normally dis-engaged from the contact shifter, thus imparting to it no movement save when the switch is operated.

It can be placed on either side of the switch, and is suited to switches having a stroke of five inches or less without any modification whatever.

Being of spherical outline it is well designed to withstand the blows such devices occasionally receive from coal and other matter falling from passing cars.

Its parts are simple, easily inspected and repaired, and, projecting but seven inches above base of rail, the device presents no obstruction to snow plows or flangers when of necessity placed close to the track.

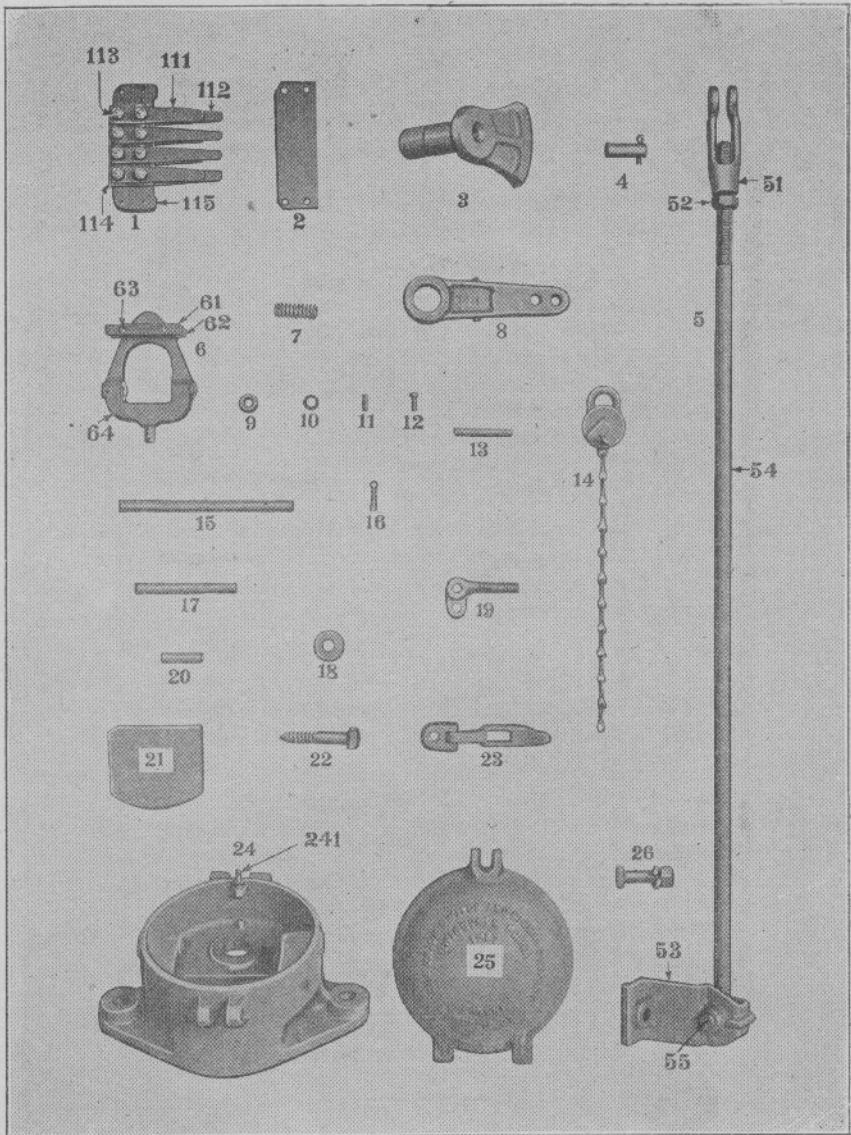
Unless otherwise specified each instrument is furnished with four pairs of normally open contact springs. These springs are held open in service by the switch to which the instrument is attached, when properly set for the main line. The opening of the switch points closes these contacts, and thus establishes shunts on one or more track circuits as required. It may, obviously, be otherwise fitted.

Over 3000 of these boxes have been applied during the past few years, all of which are giving entire satisfaction.

ORDER BY PLATE AND NUMBER

No.		List Price
1	Vertical rotary switch circuit controller, Model 2, with rod, foot pins, jaws, lag screws and cotters.....	\$30 00
2	Vertical rotary switch circuit controller only.....	28 50

For List of Detail Parts see Page 9



Details of Vertical Rotary Switch Circuit Controller

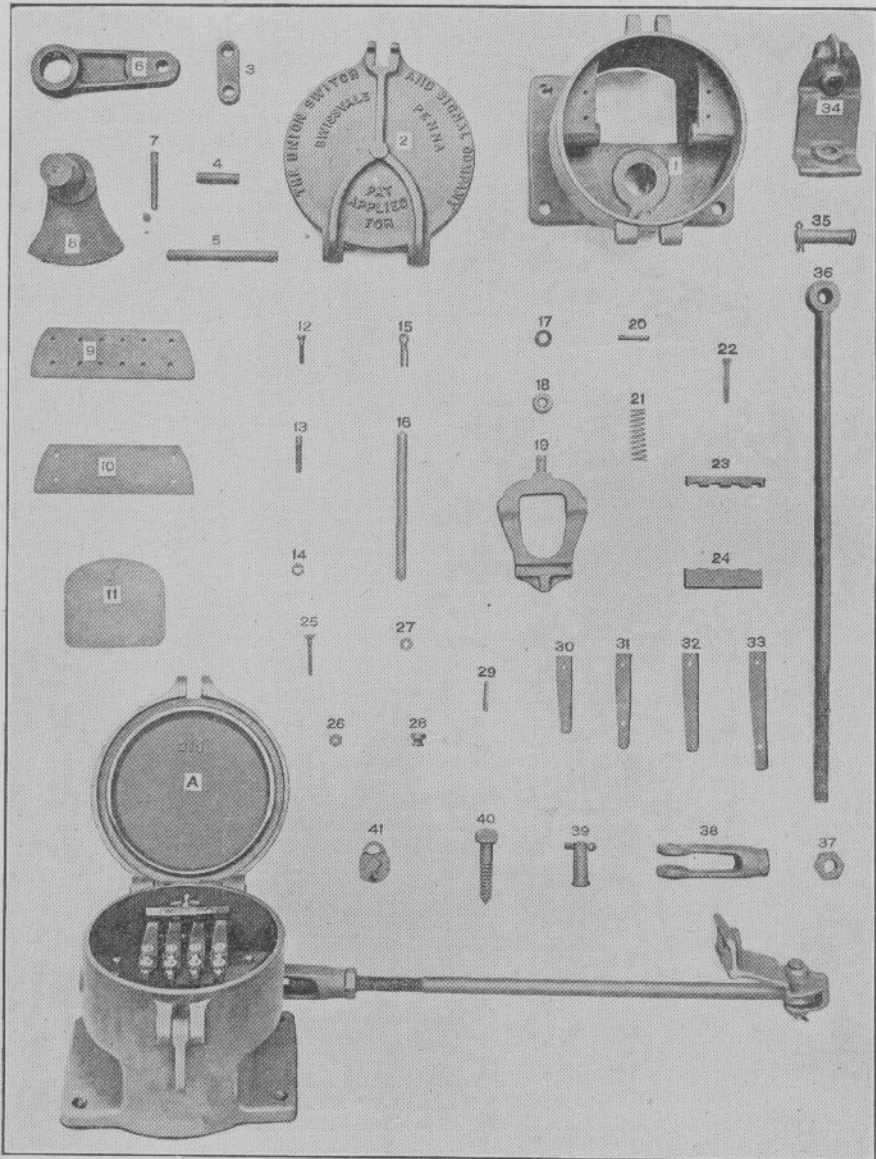
Model 2

Vertical Rotary Switch Circuit Controller

Model 2

ORDER BY PLATE AND NUMBER

No.		List Price
1	Cast iron plate, complete with contact springs, binding posts and insulations	\$10 53
111	Short contact spring, with platinum points	1 14
112	Long contact spring, with platinum points	1 14
113	Binding posts, complete with nuts, washers and insulation	45
114	Mica insulation strip	36
115	Cast iron plate, for carrying contact spring	27
2	Insulating plate	57
3	Vertical rotary cam	2 43
4	Pin and cotter for No. 51	12
5	Rod, lug and jaw complete	1 71
51	Screw jaw	30
52	Lock nut	06
53	Switch point lug	48
54	Connecting rod	51
55	Pin and cotter for No. 53	12
6	Rocker, complete with rubber strips and screws	1 62
61	Rubber cleat securing springs to rocker	27
62	Rubber support for above	15
63	Screws for securing Nos. 61 and 62 to No. 64	02
64	Rocker only	90
7	Coiled spring for No. 6	18
8	Operating arm	63
9	Roller for No. 6	09
10	Washer for No. 6	03
11	Pin for No. 6	04
12	Tap bolt for securing No. 1 to No. 24	03
13	Pin for securing No. 8 to No. 3	42
14	Pad-lock, chain and key	1 95
15	Pivot-pin for rocker	06
16	Cotter for securing No. 15 to No. 24	01
17	Hinge-pin for lid	95
18	Washer for lag screw	03
19	Hasp, male end	09
20	Hasp-pin	03
21	Wooden filler for wire duct	15
22	$\frac{3}{4}$ " x 4" lag screw	09
23	Hasp, female end	57
24	Box	6 09
241	Adjusting screw and nut	06
25	Lid with felt gasket	1 29
26	Bolt, nut and washer for securing No. 53 to rail	12



Details of Vertical Rotary Switch Circuit Controller

Model 1

This plate represents the original design of this instrument, and is inserted here merely for convenience in ordering parts by those of our patrons who may have this instrument in use. For the latest design of this device see pages 6 and 8.

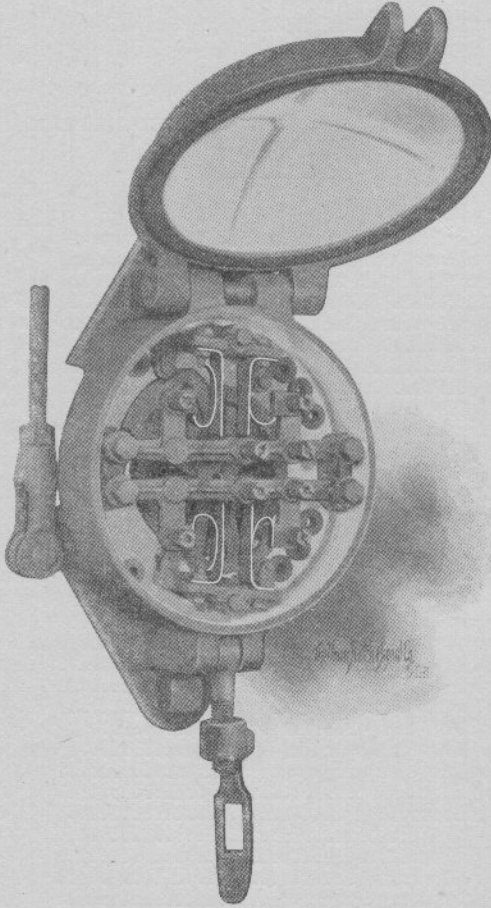
Vertical Rotary Switch Circuit Controller

Model 1

(For Later Design, see pages 6 and 8.)

ORDER BY PLATE, NUMBER AND LETTER

No.		List Price
A	Vertical rotary switch circuit controller, Model 1, complete as shown, with rod, foot pins, jaws, lag screws and cotters.....	\$30 00
1	Box.....	6 09
2	Lid with felt gasket.....	1 29
3	Hasp link.....	12
4	Pin for No. 3.....	03
5	Pin for No. 2.....	04
6	Operating arm.....	63
7	Pin for securing No. 6 and No. 8.....	42
8	Vertical Rotary cam.....	2 43
9	Rubber plate for contact springs.....	1 02
10	Insulating plate.....	57
11	Wooden filler for wire duct.....	15
12	Screw for securing Nos. 9 and 10 to No. 1.....	03
13	Adjusting screw.....	03
14	Nut for No. 13.....	03
15	Cotter for securing No. 16 to No. 1.....	01
16	Pivot pin for rocker.....	06
17	Washer for No. 19.....	03
18	Roller for No. 19.....	09
19	Rocker.....	2 13
20	Pin for securing Nos. 17 and 18 to No. 19.....	03
21	Coiled spring for No. 19.....	18
22	Screw for securing Nos. 23 and 24 to No. 19.....	02
23	Rubber cleat securing springs to rocker.....	27
24	Rubber support for above.....	15
25	Binding post.....	06
26	Hex nut for No. 25.....	03
27	Washer for No. 25.....	01
28	Thumb nut for No. 25.....	06
29	Pin for securing Nos. 16 and 19.....	03
30	Contact spring.....	} 1 23
31	Contact spring.....	
32	Contact spring.....	
33	Contact spring.....	} 1 23
34	Switch point lug.....	
35	Pin and cotter for No. 34.....	12
36	Connecting rod.....	54
37	Lock nut for No. 36.....	06
38	Screw jaw.....	33
39	Pin and cotter for No. 38.....	12
40	$\frac{3}{4}$ " x 4" lag screw.....	09
41	Pad-lock and key.....	1 95



Duplex Rotary Circuit Controller

General View

(For Various Methods of Application, see Pages 16 and 17)

Duplex Rotary Circuit Controller

In designing this instrument, the general principles embodied in the vertical rotary switch circuit controller, Plate 1500, have been followed, and the chief advantages of the latter, described on page 7, are common to both.

It is designed to control from one to four separate circuits, or to reverse the polarity of one or two independent circuits.

It may be substituted for the vertical rotary switch circuit controller referred to above, or it may be operated by any signal arm as shown on page 17, or by interlocking levers or similar devices.

The operating cams being adjustable, the instrument can be arranged to operate the contacts simultaneously at any one point, or independently at any two points in the travel of its operating connection. The operating arm generally furnished permits a travel ranging from one to five inches, but if longer stroke is desired an arm of special length will be furnished if specified.

The operating arm is applied as shown unless ordered projecting to the right of the instrument, the former being the "left hand" and the latter the "right hand" patterns.

When the instrument is applied in a horizontal position, the right or left handed patterns are interchangeable, hence either may be used. If applied vertically, as shown on page 17, it is desirable to have the lid open upward, and as it is not always possible to have the operating connection on the left hand side, the reversal of the operating arm is at times necessary, and the device should be ordered to correspond.

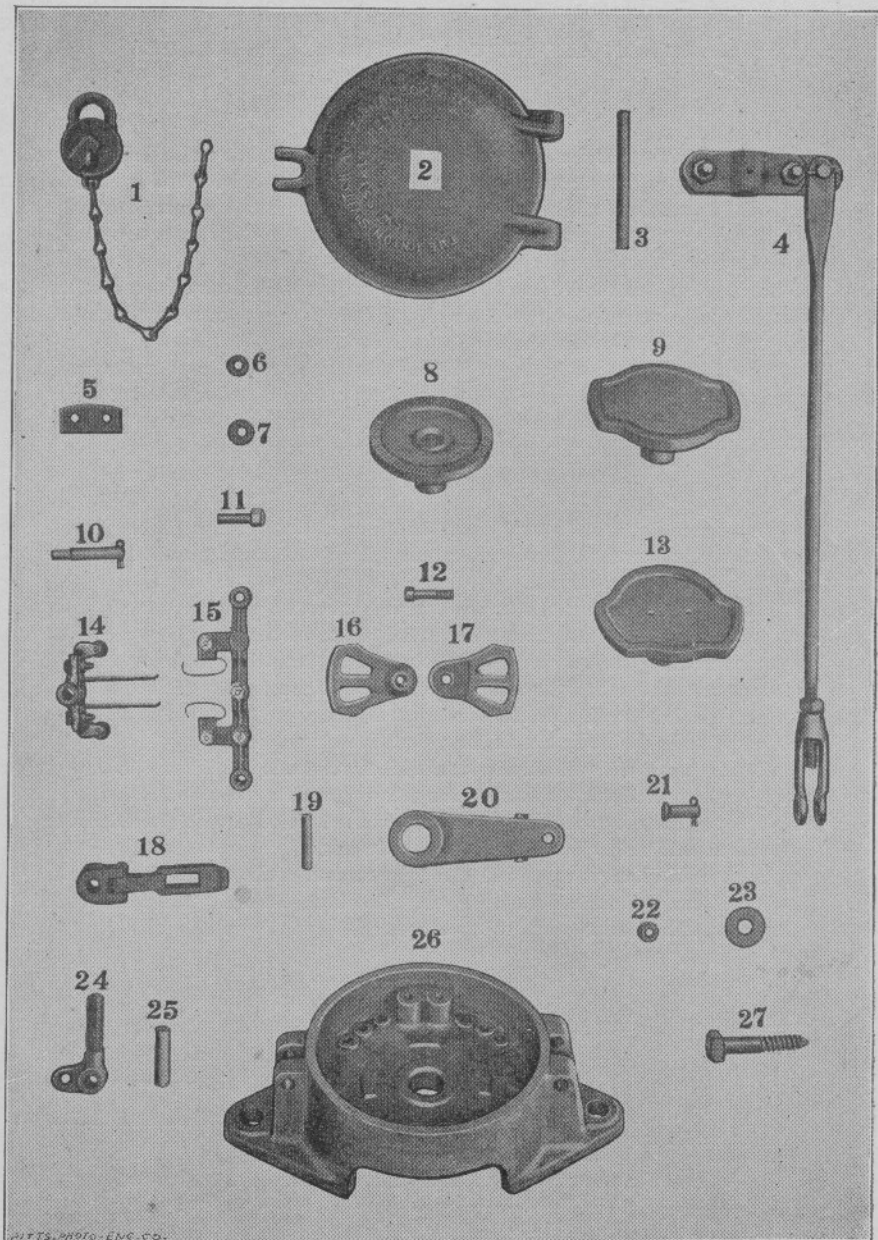
If the purpose for which the instrument is intended is known, it can at times be furnished with either of the non-adjustable cams and dies shown on page 14, Plate 1504, Figs. 9 and 13, but unless otherwise specified the instrument will be furnished with adjustable cams.

Each instrument is equipped with four contact springs, and four double (front and back) fixed contacts. It may, however, be equipped with eight independent fixed contacts if so specified.

ORDER BY PLATE AND NUMBER

No.		List Price
1	Duplex Rotary Circuit Controller, complete as shown, with connection (Refer to Plate 1510, page 22, for connection required).....	\$33 00
2	As above, no connection.....	30 50

For List of Detail Parts, see Page 15



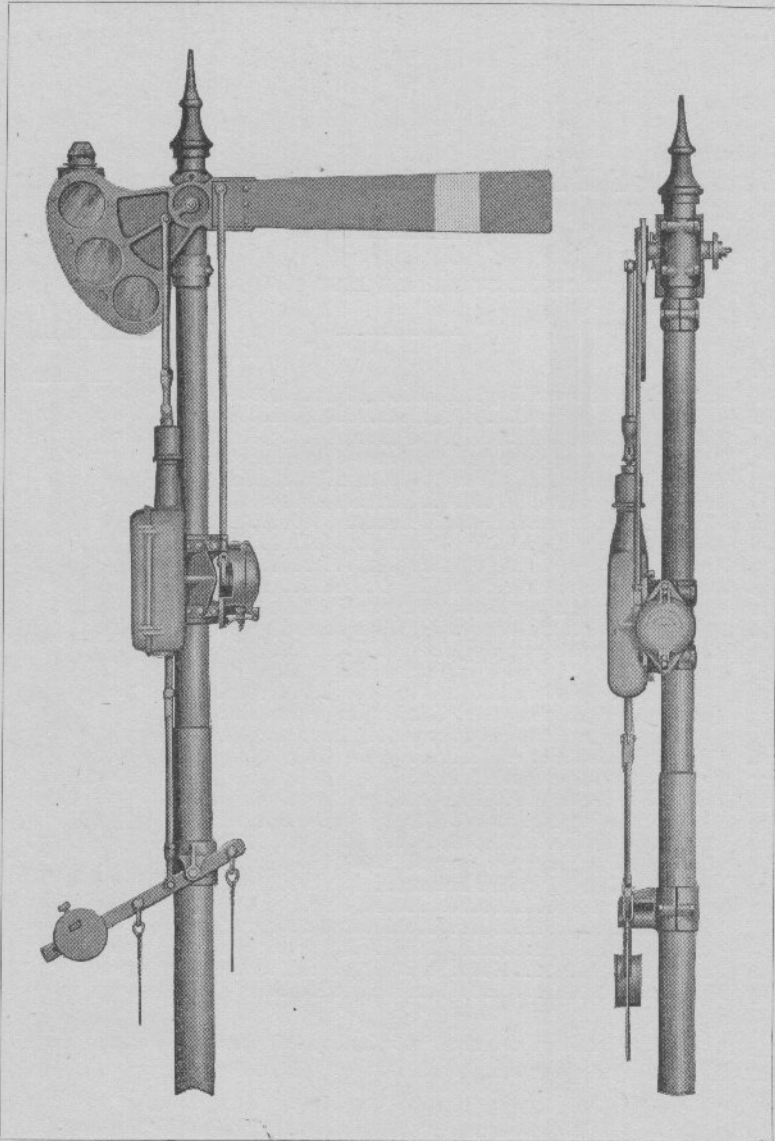
Details of Duplex Rotary Circuit Controller

Details of Duplex Rotary Circuit Controller

ORDER BY PLATE AND NUMBER

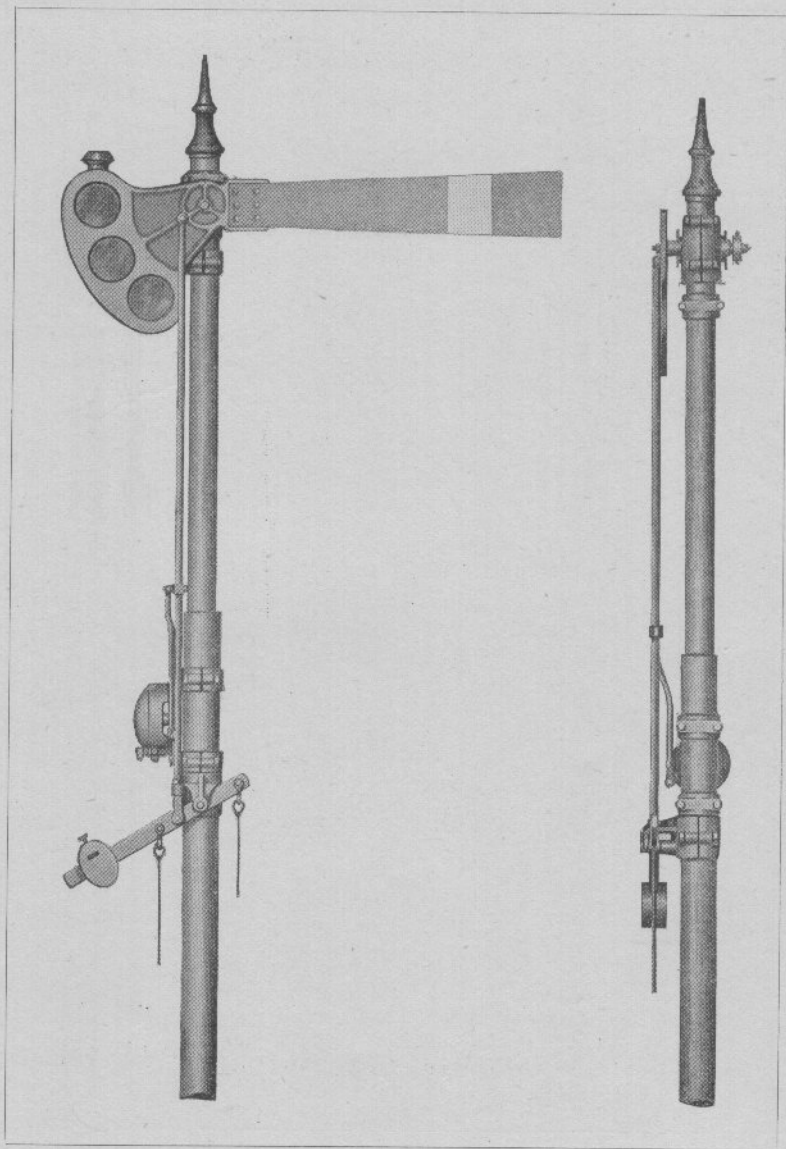
No.		List Price
1	Pad-lock, chain and key.....	\$1 95
2	Lid with felt gasket.....	1 29
3	Hinge-pin for lid.....	06
*4	Rod with clamps, jaws and pins, complete as shown....	2 25
5	Mica insulation.....	06
6	Brass washer.....	01
7	Mica washer.....	01
8	Rotary disc for adjustable cams.....	2 97
9	Rotary disc with cams.....	
10	Pivot-pin for No. 24.....	06
11	Lap-bolt for securing No. 15 to No. 26.....	03
12	Fillister head screw, for securing Nos. 16 and 17 to No.8	01
13	Rotary disc with cams.....	
14	Rocker, complete with contact springs, steel rollers, etc., as shown.....	3 03
15	Contact bracket, complete with binding posts and cop- per connections, as shown.....	3 30
16	Upper adjustable cam.....	2 07
17	Lower adjustable cam.....	2 07
18	Hasp, female end.....	57
19	Pin for securing No. 20 to 8.....	03
20	Operating arm.....	63
21	Pin and cotter for screw jaw of No. 4.....	12
22	Rubber bushing for wire holes.....	03
23	Iron washer.....	01
24	Hasp, male end.....	09
25	Hasp-pin.....	03
26	Box.....	7 08
27	Lag screw.....	09

*For other forms of connections suited to this device in various capacities, see Plate 1510, page 24.



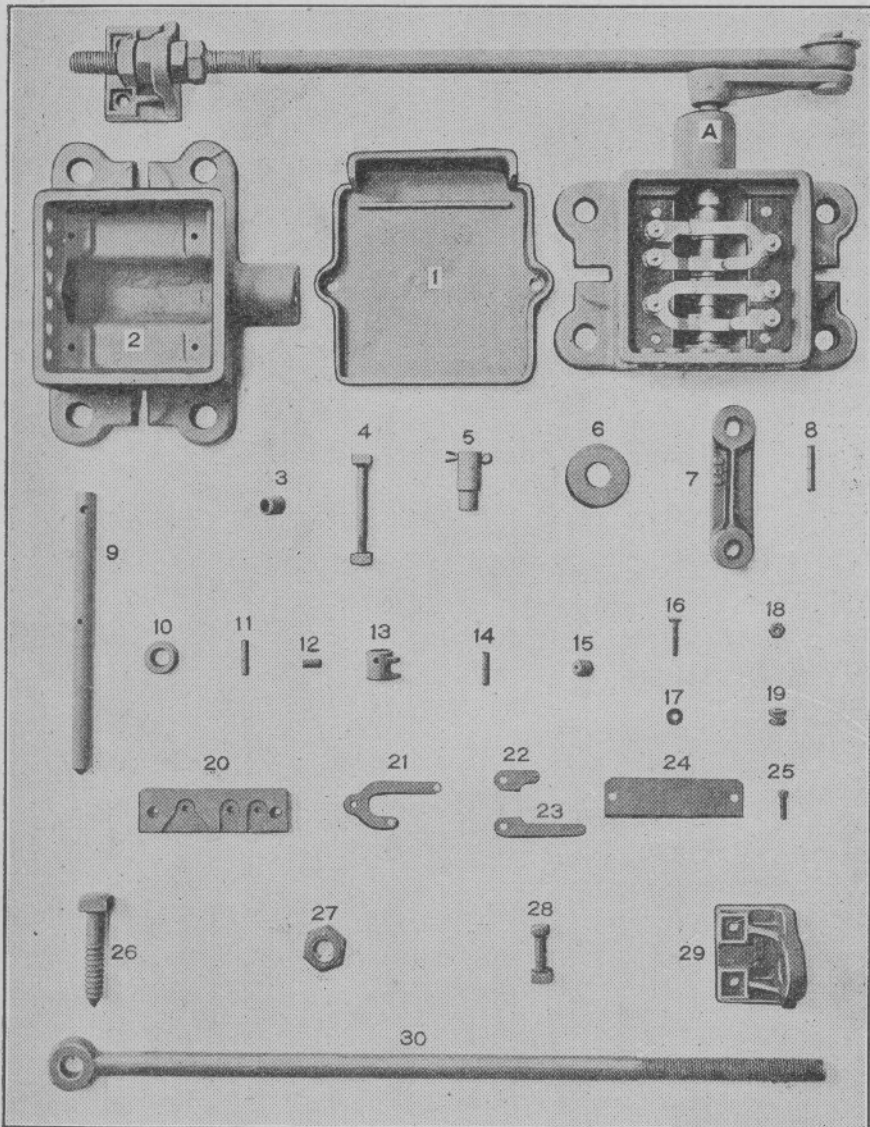
Duplex Rotary Circuit Controller

VIEWS SHOWING ITS APPLICATION TO AN ELECTRICALLY SLOTTED MECHANICAL SIGNAL



Duplex Rotary Circuit Controller

VIEWS SHOWING ITS APPLICATION TO A MECHANICAL SIGNAL



Double Horizontal Rotary Circuit Controller

Model 1

Spring Contact Type

Double Horizontal Rotary Circuit Controller

Model 1

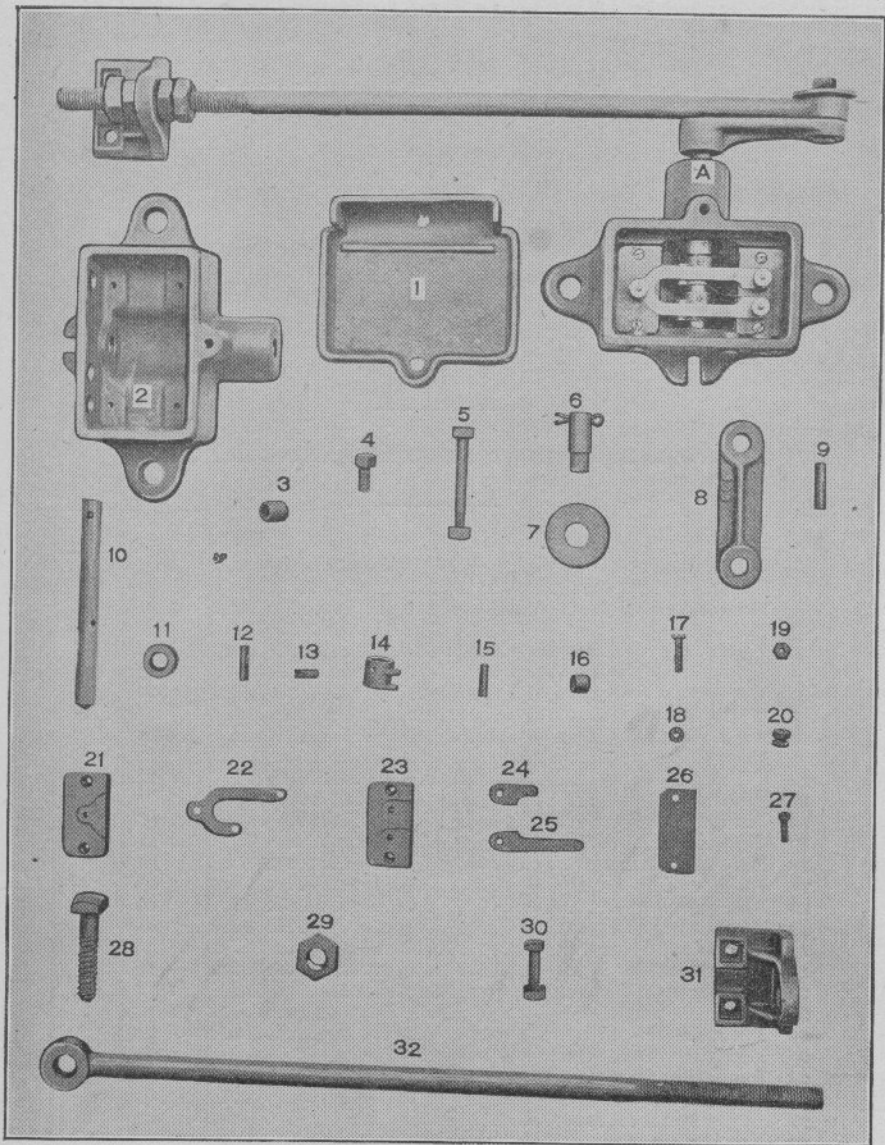
Spring Contact Type

While originally designed as switch circuit controllers, this device and the one illustrated on Page 20 have been almost entirely superseded for this purpose by the vertical rotary type shown on Page 6, and their use is now mostly confined to interior work. They are here illustrated principally for convenience in ordering renewal parts.

ORDER BY PLATE, NUMBER AND LETTER

No.		List Price
A	Controller complete, with rod, lug and nut as shown	\$15 65
1	Cover	60
2	Box	2 61
3	Rubber bushing for wire holes	03
4	Bolt and nut for securing Nos. 1 and 2	06
5	Stud and cotter for No. 7	09
6	Washer for No. 5	01
7	Operating arm	27
8	Pin for securing Nos. 7 and 9	01
9	Main shaft	12
10	Collar for No. 9	12
11	Pin for No. 10	01
12	Pin for No. 15	01
13	Cam	24
14	Pin for securing No. 13 to No. 9	01
15	Rubber roller for No. 13	09
16	Binding post	06
17	Washer for No. 16	01
18	Hex nut for No. 16	03
19	Thumb nut for No. 16	06
20	Rubber plate for contact springs	1 35
21	Phospher bronze contact springs	1 74
22	Phospher bronze contact springs	75
23	Phospher bronze contact springs	78
24	Insulating plate	54
25	Screw for securing Nos. 20 and 24 to No. 2	02
26	Lag screw	09
27	Nut for No. 30	06
28	Bolt and nut for securing No. 29 to switch point	06
29	Lug for switch point connection	18
*30	Connecting rod	39

*For other forms of connections suited to this device in various capacities, see Plate 1510, page 24.



Single Horizontal Rotary Circuit Controller

Model 1

Spring Contact Type

Single Horizontal Rotary Circuit Controller

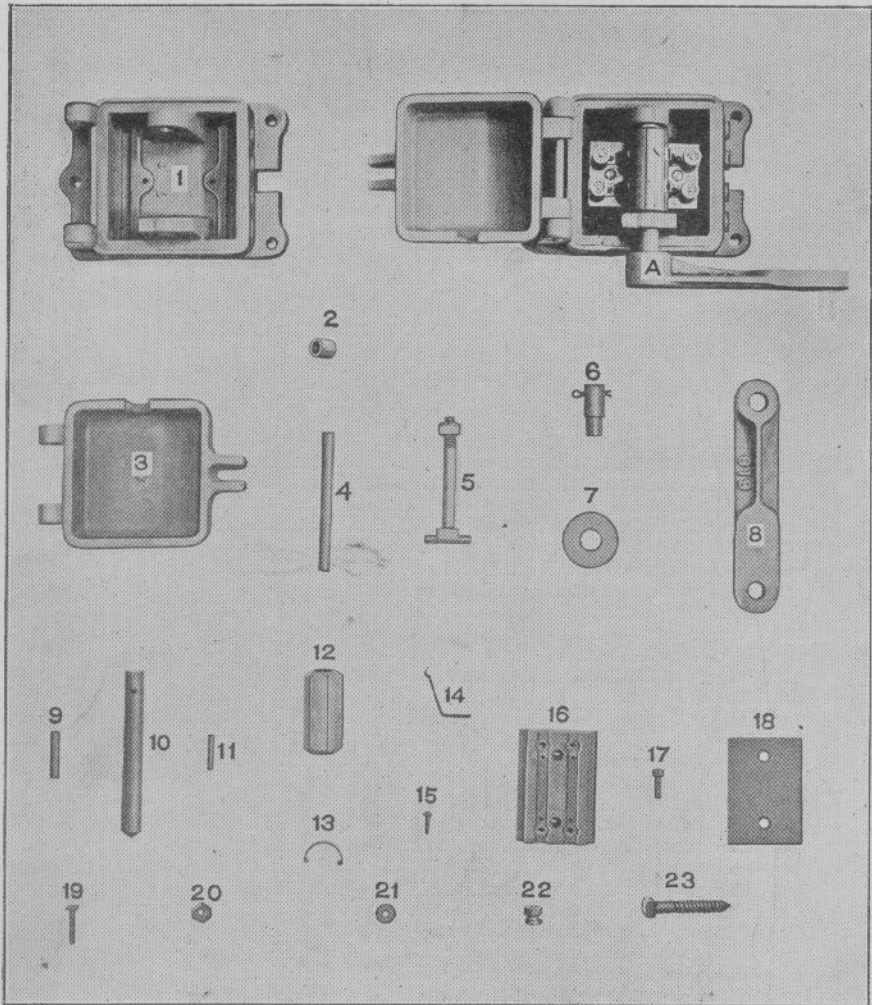
Model 1

Spring Contact Type

ORDER BY PLATE, NUMBER AND LETTER

No.		List Price
A	Controller, complete with rod, lugs and nuts as shown	\$10 65
1	Cover	33
2	Box	1 95
3	Rubber bushing for wire holes	03
4	Tap bolt for securing Nos. 1 and 2	03
5	Bolt and nut for securing Nos. 1 and 2	06
6	Stud and cotter for No. 8	09
7	Washer for No. 5	01
8	Operating arm	27
9	Pin for securing Nos. 8 and 10	01
10	Main shaft	09
11	Collar for No. 10	12
12	Pin for No. 11	01
13	Pin for No. 16	01
14	Cam	24
15	Pin for securing No. 14 to No. 10	01
16	Rubber roller for No. 14	09
17	Binding post	06
18	Washer for No. 17	01
19	Hex nut for No. 17	03
20	Thumb nut for No. 17	06
21	Rubber plate for No. 22	90
22	Phosphor bronze contact spring	1 74
23	Rubber plate for Nos. 24 and 25	90
24	Phosphor bronze contact spring	75
25	Phosphor bronze contact spring	78
26	Insulating plate	36
27	Screw for securing Nos. 21, 23 and 26 to No. 2	02
28	Lag screw	09
29	Nut for No. 32	06
30	Bolt and nut for securing No. 31 to switch point	06
31	Lug for switch point connection	18
*32	Connecting rod	39

*For other forms of connection suited to this device in various capacities, see Plate 1510, page 24.



Horizontal Rotary Circuit Controller

Model 2

Roller Contact Type

This design of instrument has been in use for a number of years with satisfactory results, and is still in considerable demand. It is principally designed for operation by a signal arm, or mechanical lever.

While the instrument illustrated is adapted for the control of two separate circuits, larger sizes can be furnished, to control any number up to and including ten circuits.

For various methods of application see Plate 1512, page 28.

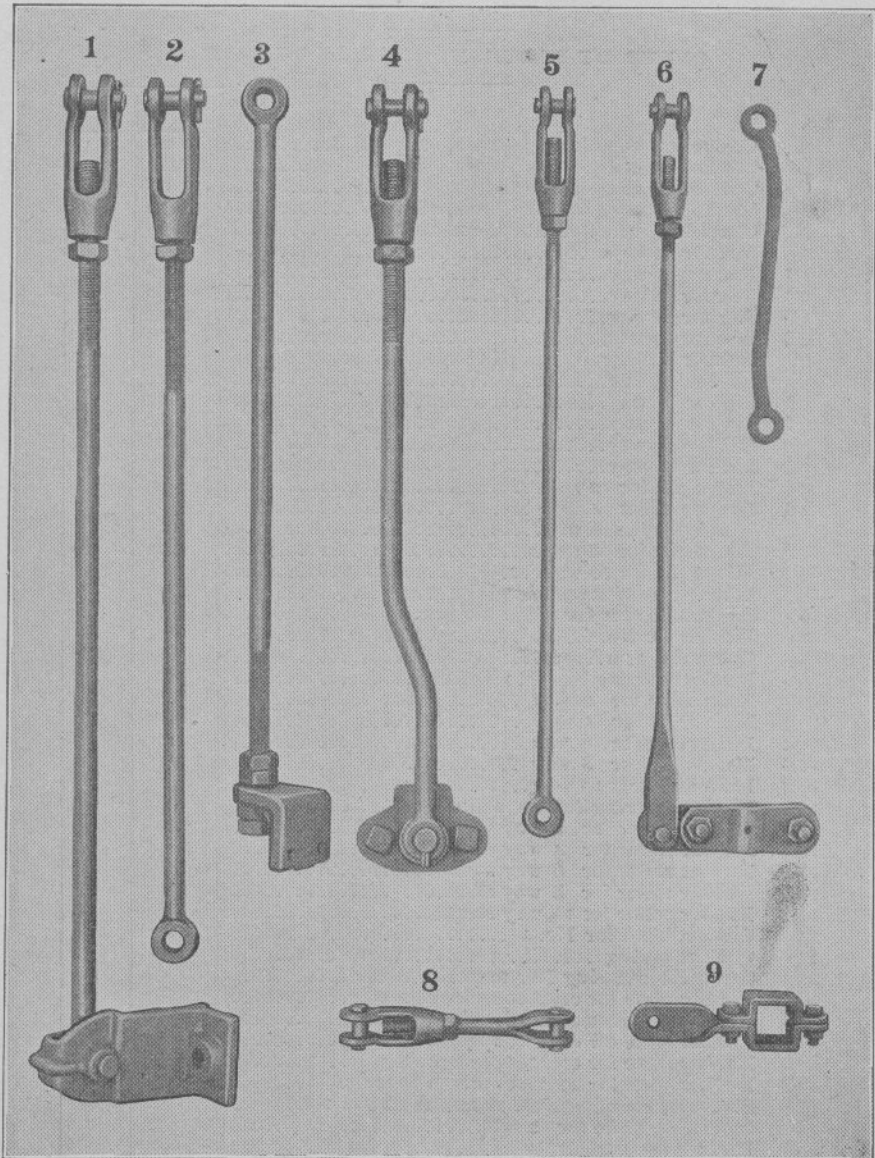
Horizontal Rotary Circuit Controller

Model 2.—Roller Contact Type

ORDER BY PLATE, NUMBER AND LETTER

No.		List Price
A	Controller, complete as shown, 2 way.....	\$10 25
B	Controller, complete as shown, 4 way.....	14 20
C	Controller, complete as shown, 6 way.....	17 00
D	Controller, complete as shown, 8 way.....	21 50
E	Controller, complete as shown, 10 way.....	23 50
I	Box for 2 way.....	75
1B	Box for 4 way.....	90
1C	Box for 6 way.....	90
1D	Box for 8 way.....	I 14
1E	Box for 10 way.....	I 14
2	Rubber bushing for wire holes.....	03
3	Lid for 2 way.....	21
3B	Lid for 4 way.....	27
3C	Lid for 6 way.....	27
3D	Lid for 8 way.....	27
3E	Lid for 10 way.....	27
4	Hinge pin for 2 way.....	03
4B	Hinge pin for 4 way.....	03
4C	Hinge pin for 6 way.....	03
4D	Hinge pin for 8 way.....	06
4E	Hinge pin for 10 way.....	06
5	Bolt and nut for securing lid.....	06
6	Stud and cotter for operating arm.....	06
7	Washer for No. 6.....	01
8	Operating arm.....	30
9	Pin for securing No. 8 to No. 10.....	01
10	Main shaft for 2 way.....	06
10B	Main shaft for 4 way.....	09
10C	Main shaft for 6 way.....	09
10D	Main shaft for 8 way.....	15
10E	Main shaft for 10 way.....	15
11	Pin for securing No. 12 to No. 10.....	01
12	Rubber roller for 2 way shaft.....	96
12B	Rubber roller for 4 way shaft.....	I 65
12C	Rubber roller for 6 way shaft.....	I 65
12D	Rubber roller for 8 way shaft.....	2 13
12E	Rubber roller for 10 way shaft.....	2 13
13	Contact band for No. 12.....	12
14	Contact spring.....	09
15	Screw for securing No. 14 to No. 15.....	01
16	Rubber plate for contact springs 2 way.....	87
16B	Rubber plate for contact springs 4 way.....	I 80
16C	Rubber plate for contact springs 6 way.....	I 80
16D	Rubber plate for contact springs 8 way.....	2 73
16E	Rubber plate for contact springs 10 way.....	2 73
17	Screw for securing Nos. 16 and 18 to No. 1.....	03
18	Insulating plate for 2 way.....	51
18B	Insulating plate for 4 way.....	51
18C	Insulating plate for 6 way.....	51
18D	Insulating plate for 8 way.....	78
18E	Insulating plate for 10 way.....	78
19	Binding post.....	06
20	Hex nut for No. 19.....	03
21	Washer for No. 19.....	03
22	Thumb nut for No. 19.....	06
23	Lag screw.....	06

For forms of connections suited to this device in various capacities, see Plate 1510, page 24.



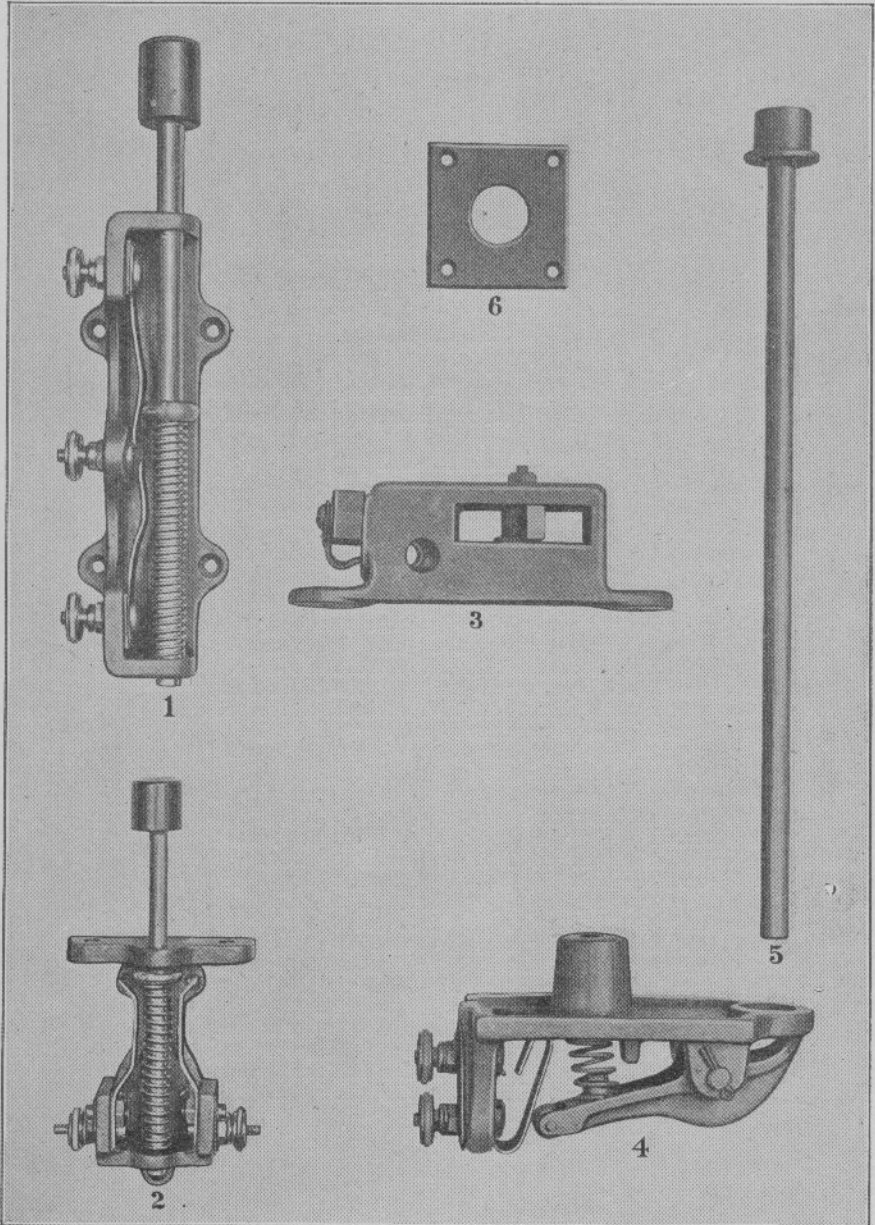
Various Forms of Connections for Operating
Circuit Controllers

Various Forms of Connections for Operating Circuit Controllers

The lengths given in the following list are standard, center to center, but
can be varied to suit requirements when specified.

ORDER BY PLATE AND NUMBER

No.		List Price
1	Rod, lug and screw jaw, with $\frac{5}{8}$ " pin for attaching circuit controllers to switch point; new style; length, 3' 0"	\$1 71
2	Straight rod with eye, screw jaw, $\frac{5}{8}$ " pin and cotter, length, 2' 3"	1 08
3	Eye rod, with lug and nuts, for attaching horizontal circuit controllers to switch point; old style; length, 2' 0"	72
4	Offset rod, with trunnion clamps, bolts, eye, screw jaw, $\frac{5}{8}$ " pin and cotter; length, 2' 0"	1 56
5	Straight rod, with eye, screw jaw, $\frac{1}{2}$ " pin and cotter; length, 2' 0"	75
6	Straight rod, with solid and screw jaws, clamps, $\frac{1}{2}$ " pins and cotter; length, 2' 0"	2 25
6a	Clamp only	60
7	Offset rod for attaching circuit controllers to signal-operating rod, 10 $\frac{1}{4}$ ". Rods Nos. 5 and 6 are now generally used for this purpose.	1 02
8	Adjustable link, with $\frac{1}{2}$ " pins and cotters; length, 6 $\frac{3}{4}$ "	1 14
9	Wrought-iron arm for operating circuit controllers from locking shaft of Saxby & Farmer interlocking machine. Malleable iron arm can be furnished if desired	2 94



Circuit Controllers for Interior Use

THE TYPES SHOWN ARE GENERALLY OPERATED BY FOOT PRESSURE

Circuit Controllers for Interior Use

ORDER BY PLATE AND NUMBER

No.		List Price
1	Double circuit controller for use in connection with mechanical interlocking machines.....	\$3 78
2	Single circuit controller. Generally used in connection with the Union Lock and Block System..	2 79
3	Cam circuit controller. Designed to be placed underneath the top plate of an interlocking machine and operated by the lever striking the small dog projecting to one side.....	6 66
4	Union floor push. This instrument is especially designed for use in interlocking towers to automatically cut off the current from an electric lock when the lever controlled by it is not being operated. The circuit controller, No. 4, is attached to the ceiling of the lower room, and the rod, No. 5, passing up between the joists from the short end of the arm, extends through the plate No. 6, which is screwed to the floor above. Before attempting to unlatch the lever controlled by the electric lock, the operator presses down with his foot on the end of the rod, No. 5, extending through the plate, thereby closing the contacts in the controller, No. 4. (For application see Plate 1512, page 28).....	3 81
5		24
6		45
	The principal advantage of this design is, that when water is used on the operating floor of an interlocking tower it will not run onto the contacts, as in the earlier designs.	

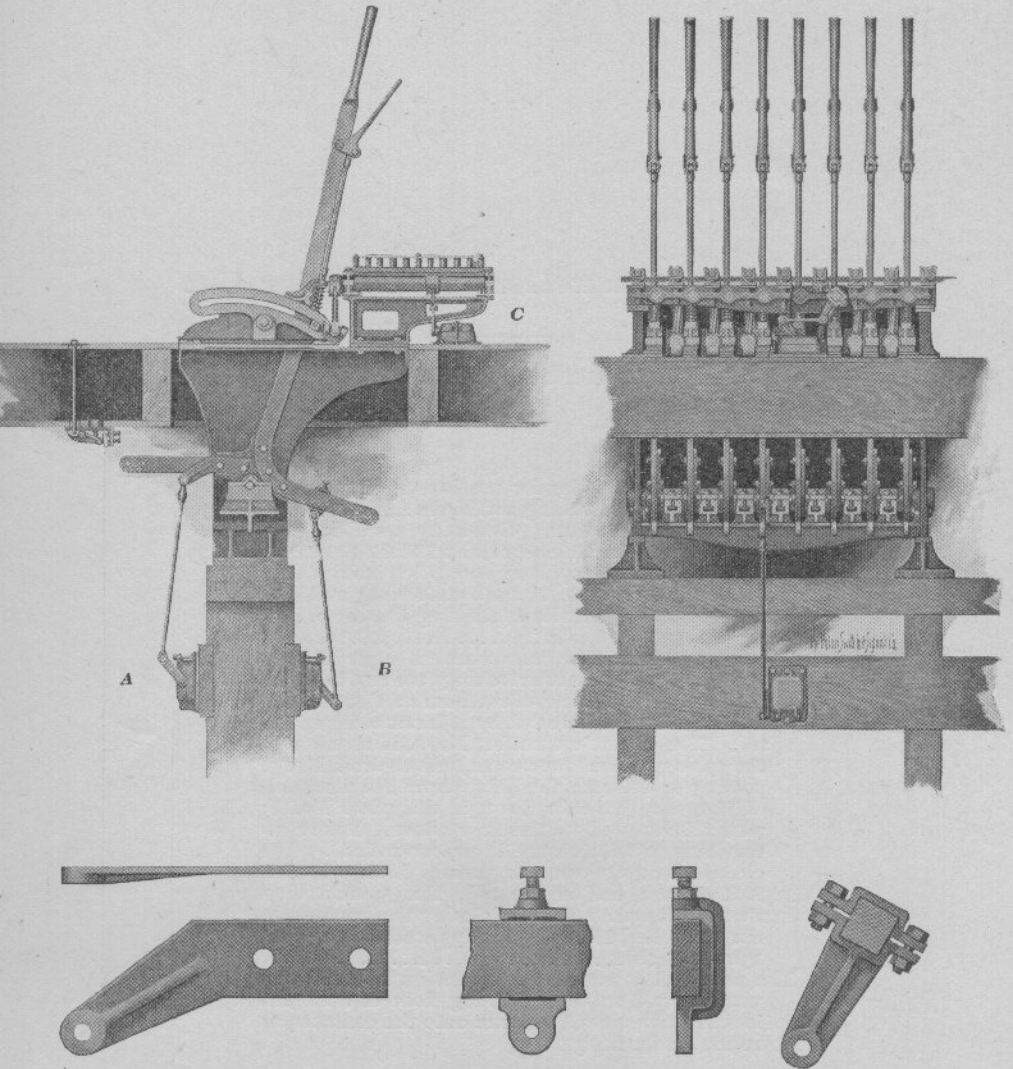


Fig. 1

Fig. 2

Fig. 3

**Sectional View of Saxby and Farmer Interlocking Machine,
Showing Various Methods of Applying Horizontal
Rotary Circuit Controller**

Also illustrating application Fig. 4 of Union Floor Push Button Circuit Controller, shown in detail on page 26.

**Figures 1, 2 and 3 illustrate attachments employed in making
Circuit Controller Connections**

Horizontal Rotary Circuit Controller, Applied to Saxby and Farmer Interlocking Machine

Also Parts Used In Making Connections

ORDER BY PLATE, AND DESIGNATING LETTERS AND FIGURES

Application A.—Including two-way Horizontal Rotary Circuit Controller, connecting rod and tail lever attachment (Fig. 1) with bolts for making rigid connection to machine.

Application B.—Including two-way Horizontal Rotary Circuit Controller, connecting rod and adjustable clamp (Fig. 2) for attaching Circuit Controller either to front or tail lever of machine.

Application C.—Including two-way Horizontal Rotary Circuit Controller, connecting rod and clamp arm (Fig. 3) for making attachment to locking shaft of machine.

(For details of Circuit Controller see page 22.)

	List Price
Fig. 1.—Tail Lever Attachment for making attachment to lever shoe of machine, furnished with bolts unless otherwise specified.....	\$ 30
Fig. 2.—Adjustable Clamp for connecting either to front or tail lever.....	54
Fig. 3.—Clamp arm for connecting to locking shaft.....	57
Fig. 4.—Union Floor Push (see page 26).....	

Single and Double Pole Switch

ORDER BY PLATE AND FIGURE

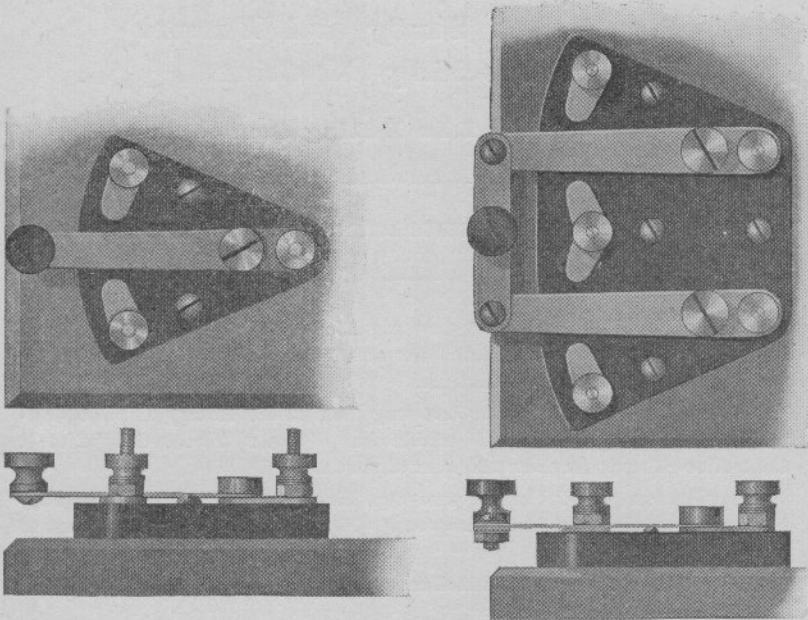


Fig. 1

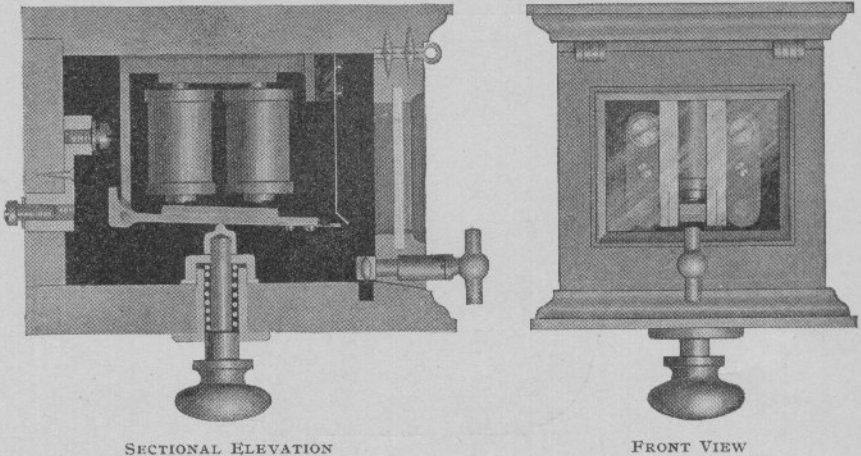
Fig. 2

Fig. 1 illustrates the Single Pole Switch used for throwing battery current alternately on to either one of two circuits, or for throwing either one of two batteries alternately on to one circuit.

Fig. 2 illustrates the Double Pole Switch, in which the circuit is broken at both poles of battery or generator, instead of at one pole only. It may also be used as pole changing switch.

Magnet Circuit Controller, With Normally Open Contact

ORDER BY PLATE NUMBER



In this circuit controller the contact is closed mechanically by pushing upward the knob or button under the instrument. By the closing of this contact, current is allowed to flow through the magnet coils, as well as also through the external circuit with which they are in series, thus keeping the magnets charged and holding the contacts closed until the circuit is opened again at some point external to the instrument, which then resumes its normal condition, as shown in illustration.

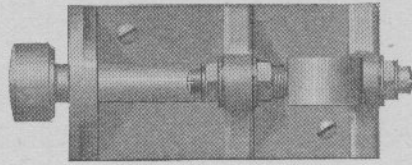


Fig. 1

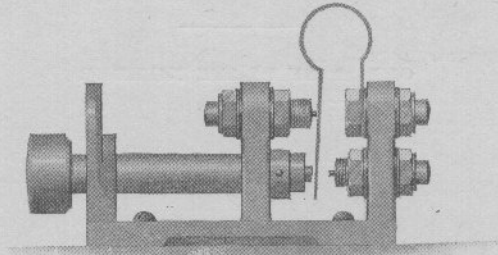
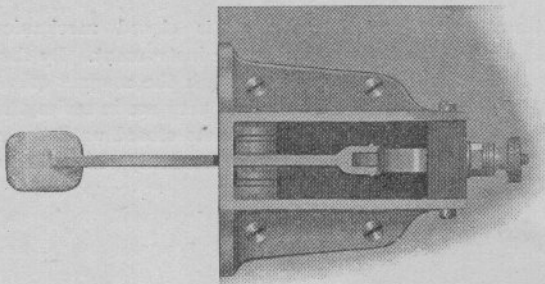
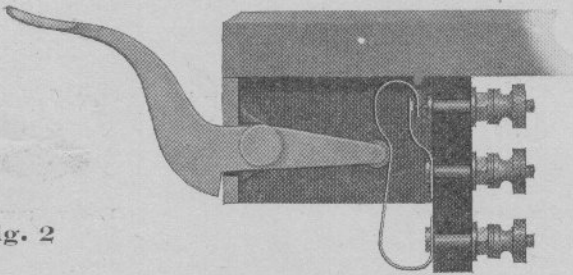


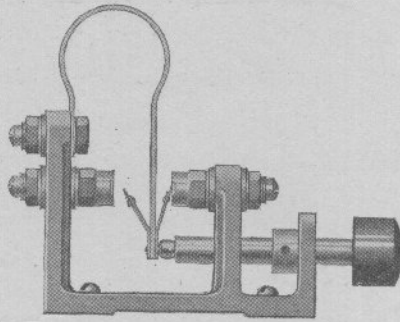
Fig. 2



Three Types of Double Circuit Controllers

VIEWS SHOWING PLAN AND ELEVATION

Fig. 3



Double Circuit Controllers

ORDER BY PLATE AND FIGURE

Fig. 1 shows the Double Circuit Controller, often used in connection with The Union Lock and Block System. It may be operated either by hand or by foot pressure, and applied to meet convenience.

Fig. 2 shows another form of Double Circuit Controller, and is one which may be placed either under the edge of a table or desk, or may be situated in any position most convenient for being operated by the towerman.

Fig. 3 shows an improved design made after principles employed in Fig. 1. Owing to the rough usage often given instruments by careless operators, this design was planned to prevent contact points from being worn and broken by such usage by pushing the button too hard. A collar secured to the plunger, in this design, receives the blow when violently operated and the contacts are thus saved from injury.

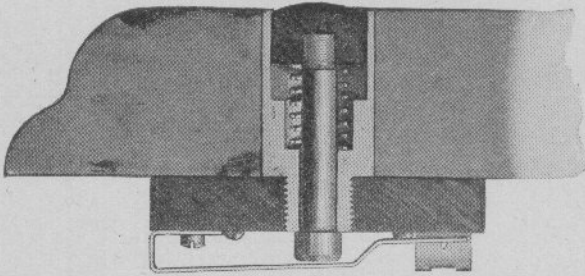


Fig. 1

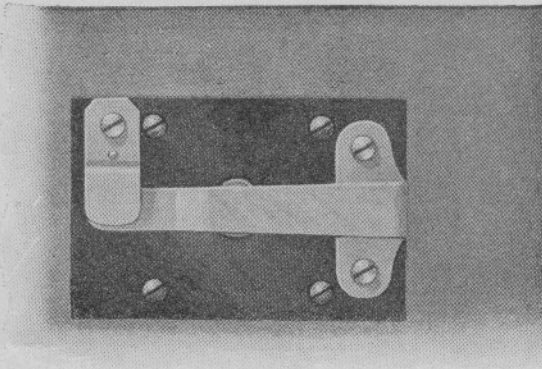
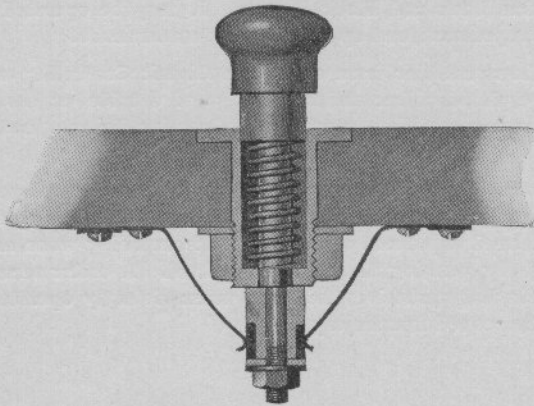


Fig. 2



Normally Open and Normally Closed Circuit Controllers

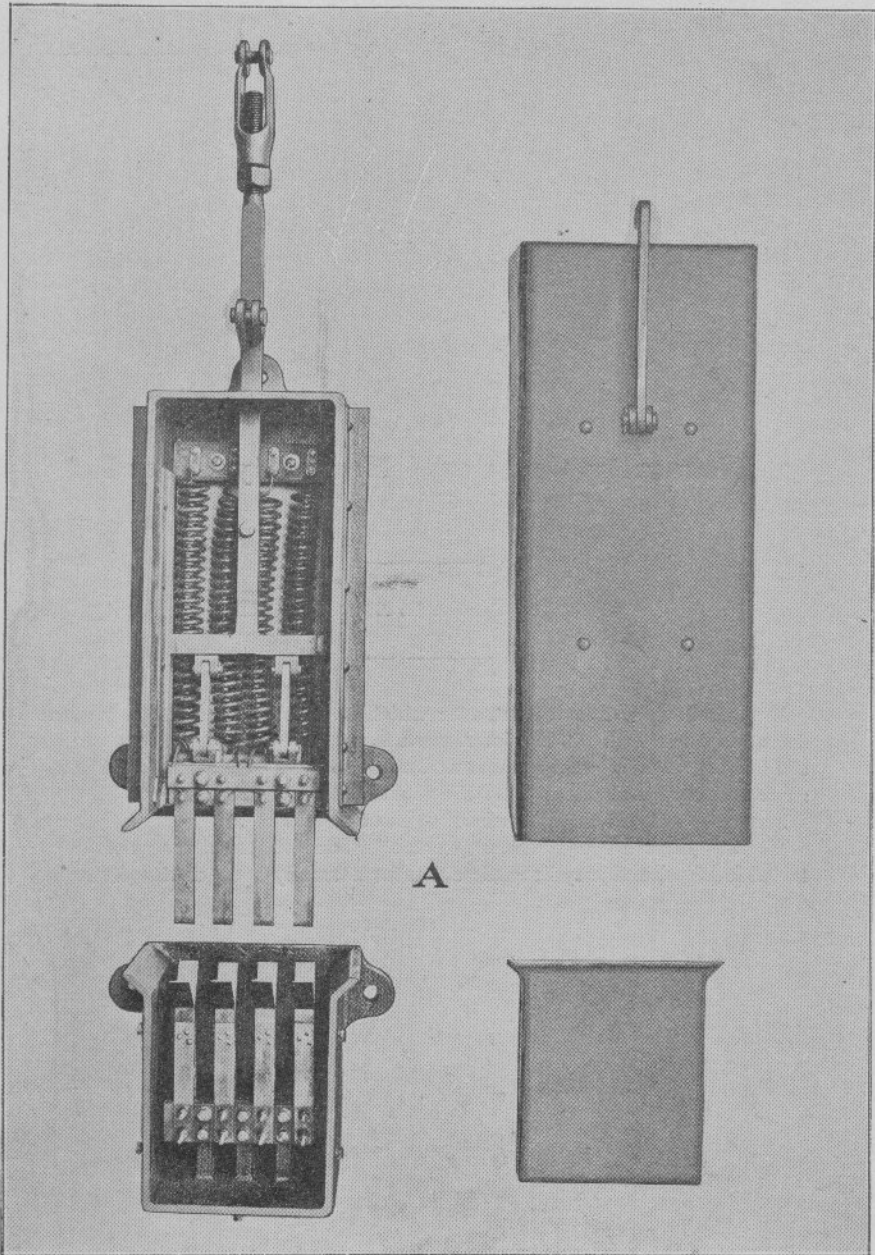
Normally Open and Normally Closed Circuit Controllers

ORDER BY PLATE AND FIGURE

Fig. 1 shows a Circuit Controller which is generally let into a table or desk, as illustrated. This instrument is especially designed for use in connection with Electro-Pneumatic Interlocking Machines, when it is desired to control a circuit outside the usual scope of the machine itself.

It may be ordered either normally open or closed.

Fig. 2 shows a type of Circuit Controller somewhat similar to that illustrated in Fig. 1, and may be made either for normally open or closed circuit.



Electric Bridge Coupler

Assembled Parts

(For Details, see Page 38)

Electric Bridge Coupler

This coupler was designed with the view of meeting the demand for a device whereby circuits could be conveniently, and by automatic means, carried across the break between a drawbridge and the abutment. It ordinarily takes the place of a submarine cable, and in cases where it is employed to operate track circuits or other devices located on the draw span it avoids the resistance or other objections belonging to a submarine cable, and offers the additional advantage that it serves as a means, aside from other circuit breaking devices, of controlling the circuits which operate signals governing traffic over the draw.

The chief point of merit in this coupler consists in overcoming the ordinary horizontal and vertical vibration or misalignment of the draw with the abutment, in the contact parts, and transferring such movement to parts more readily adapted to the purpose, such as a flexible wire serving as a conductor only.

Each circuit makes contact at four points in multiple, and as these parts are practically self cleaning, little or no trouble is experienced.

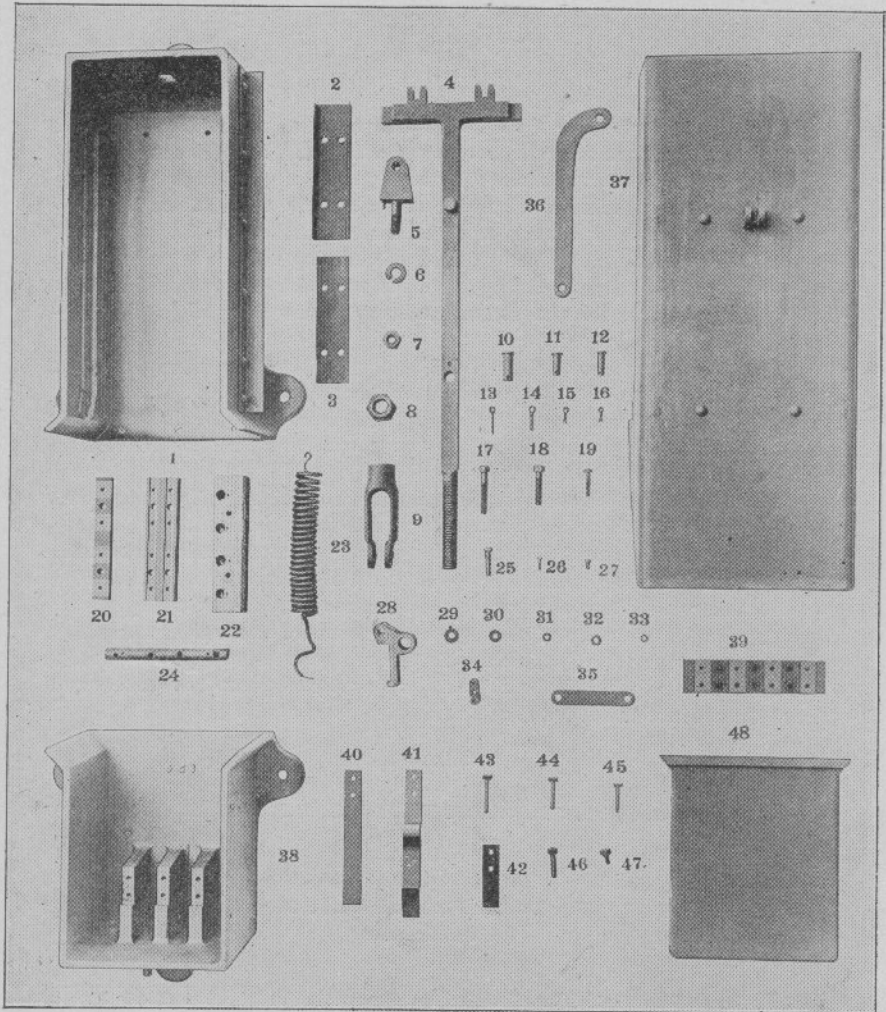
The movable element of the coupler (usually in that part located on the draw) is mechanically connected to and operated by some part of the bridge mechanism which has a movement preliminary to that of swinging the bridge. In the operation of closing, the sequence is, of course, reversed.

The cover is so designed that with the bridge either opened or closed, the contacts and other internal parts are protected from the weather and from the accumulation of dirt and cinders.

ORDER BY PLATE, LETTER AND NUMBER

(For Detail Plate see Page 38)

No.		List Price.
A	4-way Electric Bridge Coupler, as shown.....	178 60
Aa	4-way " " " with six $\frac{3}{4}$ " x 4" lag screws.....	179 15
Ab	8-way " " " as shown.....	314 00
Ac	8-way " " " with six $\frac{3}{4}$ " x 4" lag screws.....	314 55



Electric Bridge Coupler

Detail Parts

(For Assembled Parts, see Page 36)

Electric Bridge Coupler—Continued

ORDER BY PLATE, LETTER AND NUMBER

No.		List Price
1	Base, 4-way, only for Bridge Casting	10 85
1a	“ 4-way, with angle strips.....	31 75
1b	“ 4-way, with angle strips, terminal block and terminals.....	34 65
1c	“ 8-way, only for Bridge Casting	12 70
1d	“ 8-way, with angle strips.....	33 60
1e	“ 8-way, with angle strips, terminal block and terminals.....	39 50
2	Channel Piece, for Contact Springs, 4-way.....	55
2a	Channel Piece, for Contact Springs, 8-way.....	1 10
3	Fiber, $\frac{1}{8}$ " x 2" x $7\frac{3}{4}$ ", for Contact Springs, 4-way.....	65
3a	Fiber, $\frac{1}{8}$ " x 2" x $16\frac{1}{4}$ ", for Contact Springs, 8-way.....	1 25
4	Slide Bar, 4-way, as shown.....	3 00
4a	“ “ 4-way, with screw jaws, nut, pin and cotter.....	3 75
4b	“ “ 4-way, with link jaws, pin and cotter.....	4 65
4c	“ “ with cover, link jaw, pin, cotter, dowel, pin and stud.....	6 70
4d	“ “ 8-way, long straight piece only.....	1 90
4e	“ “ 8-way, long straight piece only, with screw jaw, nut, pin and cotter.....	2 45
4f	“ “ 8-way complete with cross piece, braces, rivets, screw jaw, with pin and cotter.....	7 00
4g	“ “ 8-way, complete with cross piece, braces, rivets, screw jaw with pin and cotter for link jaw.....	7 10
5	Cover Link Jaw.....	1 80
5a	Cover Link Jaw, with nut, washer, dowel pin.....	1 95
6	Nut Lock, $\frac{3}{8}$ ", for No. 5.....	03
7	Hex. Nut, $\frac{5}{8}$ ", for No. 5.....	03
8	Hex. Nut, 1", for No. 4.....	12
9	Screw Jaw, only for No. 4.....	42
10	Turned Pin, $\frac{5}{8}$ " x $1\frac{5}{8}$ ", with cotter.....	13
11	“ “ $\frac{1}{2}$ " x $1\frac{9}{16}$ ", “.....	08
12	“ “ $\frac{3}{8}$ " x $1\frac{1}{8}$ ", “.....	05
13	Cotter for No. 10.....	01
14	“ “ No. 11.....	01
15	“ “ No. 12.....	01

Electric Bridge Coupler—Continued

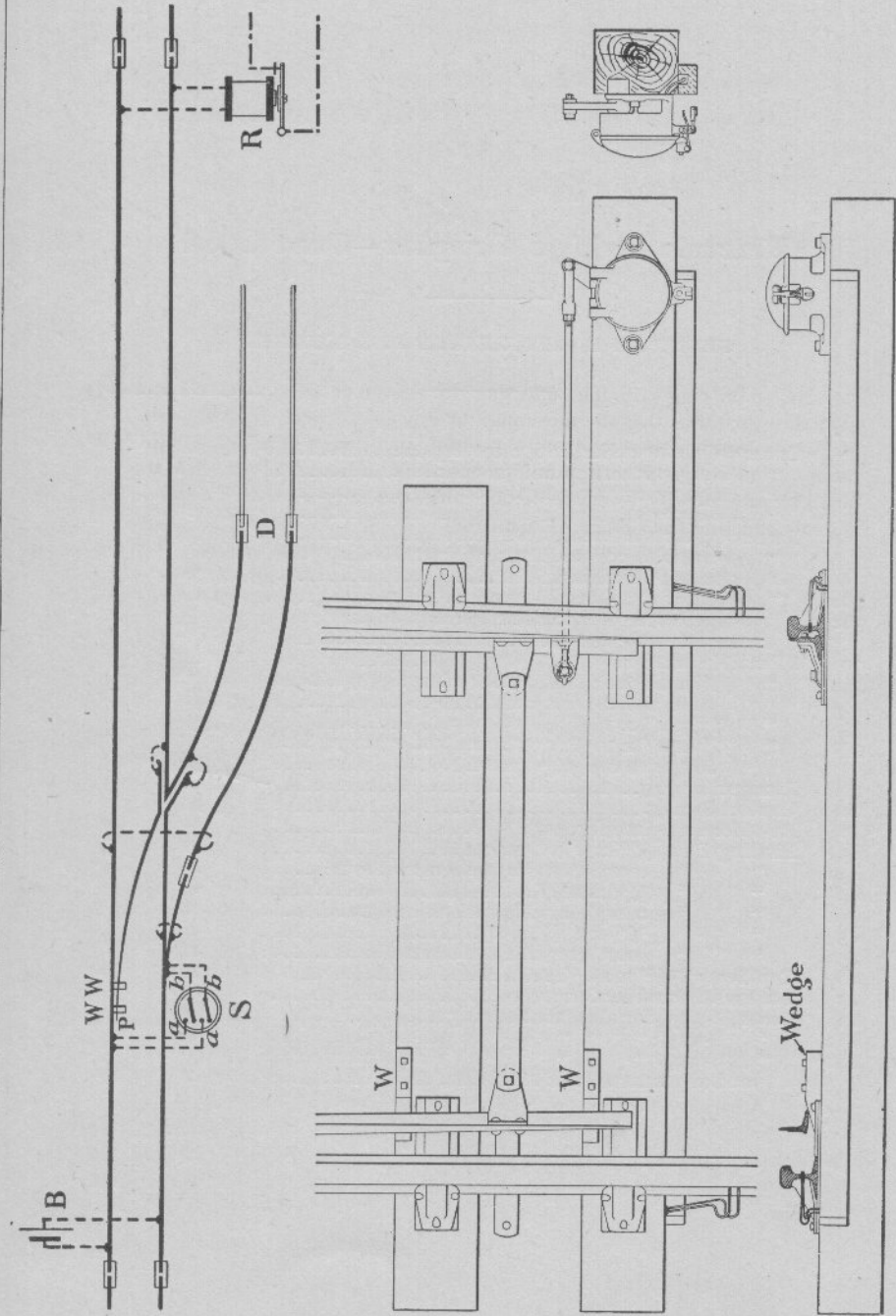
ORDER BY PLATE, LETTER AND NUMBER

No.		List Price
16	Cotter, $\frac{3}{32}$ " x $\frac{3}{4}$ "	01
17	Cap Screw, $\frac{3}{8}$ " x $2\frac{1}{8}$ "	12
18	Cap Screw, $\frac{3}{8}$ " x $2\frac{5}{8}$ "	12
19	Machine Screw, $1\frac{1}{2}$ ", 18-16 R. H.	04
20	Fiber, $\frac{1}{2}$ " x 1 " x $7\frac{3}{4}$ ", for 4-way	80
20a	" $\frac{1}{2}$ " x 1 " x $16\frac{1}{4}$ ", for 8-way	1 65
21	" $\frac{1}{2}$ " x 2 " x $7\frac{3}{4}$ ", for 4-way	1 10
21a	" $\frac{1}{2}$ " x 2 " x $16\frac{1}{4}$ ", for 8-way	2 20
22	Terminal Block Wood, 4-way	60
22a	" " " 4-way, with term'ls and screws	2 40
22b	" " " 8-way	95
22c	" " " 8-way, with term'ls and screws	4 55
23	Hexible Connections	3 80
24	Hard Rubber Rod, $\frac{3}{4}$ " diam., $7\frac{1}{2}$ " long for 4-way	36
24a	Hard Rubber Rod, $\frac{3}{4}$ " diam., $16\frac{1}{4}$ " long for 8-way	72
25	Binding Post, $\frac{1}{4}$ " x $1\frac{3}{8}$ "	06
25a	Binding Post, $\frac{1}{4}$ " x $1\frac{3}{8}$ ", with washer and nuts	18
26	Wood Screw, 1 ", No. 6 for fastening No. 34 to No. 22	01
27	Machine Screw Brass, for No. 34	03
28	Lug for Contact Block, 4-way	90
28a	" " " " 4-way, with pin and cotter	95
28b	" " " " 8-way	2 30
28c	" " " " 8-way, with pin and cotter	2 35
29	Washer, $\frac{3}{8}$ ", for Nos. 17, 18 and 46	01
30	" for No. 34, $\frac{1}{4}$ "	01
31	" $\frac{1}{4}$ " Brass, for Nos. 25, 43, 44 and 45	01
32	Hex. Nut, $\frac{3}{8}$ ", for Nos. 17, 18 and 46	02
33	Hex. Nut, $\frac{1}{4}$ " Brass, for No. 34	03
34	Binding Post, 2-way, complete	39
35	Link, $\frac{3}{8}$ " x 1 " x $4\frac{7}{8}$ ", for connecting No. 4 with No. 28	60
36	Cover Link	70

Electric Bridge Coupler—Continued

ORDER BY PLATE, LETTER AND NUMBER

No.		List Price
37	Cover only, 4-way, for bridge casting.....	13 20
37a	“ 4-way, with stops and jaw for link.....	16 50
37b	“ only, 8-way, for bridge casting.....	19 40
37c	“ 8-way, with stops and jaw for link.....	23 30
38	Base only, for abutment, 4-way.....	9 60
38a	“ 4-way, with contact block, springs, binding posts, studs and bushings.....	42 70
38b	“ only, for abutment, 8-way.....	9 60
38c	“ 8-way, with contact block, springs, binding posts, studs and bushings.....	78 90
39	Fiber, $\frac{7}{8}$ " x 2" x 8", for 4-way.....	2 10
39a	“ $\frac{7}{8}$ " x 2" x 8", with contact springs, binding posts and cap screws.....	31 90
39b	“ $\frac{7}{8}$ " x 2" x 16 $\frac{1}{4}$ ", for 8-way.....	4 10
39c	“ $\frac{7}{8}$ " x 2" x 16 $\frac{1}{4}$ ", with contact springs, binding posts and cap screws.....	63 70
40	Plunger Spring.....	1 00
41	Contact Spring.....	3 00
42	Re-enforcing piece for 41.....	45
43	Binding Post, $\frac{1}{4}$ " x 2 $\frac{1}{8}$ ", only.....	07
43a	“ “ complete with washers and nuts.....	21
44	“ “ $\frac{1}{4}$ " x 1 $\frac{3}{8}$ ".....	06
44a	“ “ complete with washers and nuts.....	18
45	“ “ $\frac{1}{4}$ " x 1 $\frac{3}{8}$ ", only.....	06
45a	“ “ complete with washers and nuts.....	18
46	Cap Screw, $\frac{3}{8}$ " x 2 $\frac{5}{8}$ ".....	12
47	Stud with shoulder for cover.....	12
48	Cover, 4-way, for abutment casting.....	5 40
48a	“ 8-way, “ “ “.....	8 00
48b	“ 8-way, “ “ “ with brace piece and rivets.....	9 00



Methods of applying Vertical Rotary Switch Circuit Controllers to main line, single and crossover switches, with dia- grams of Electrical Connections

Plate 1518

An underlying principle, affecting the design of all devices for railway signaling, requires that the movement of any switch, either in the main line or in connections thereto, from a position insuring a maximum degree of safety from collision with simultaneous train movements on other tracks, shall be preceded by, or immediately cause the movement to danger of all signals affecting the route so jeopardized.

Where such switches are operated conjointly with the signals through the medium of an interlocking apparatus, the means for securing the results desired are obtained by the mechanical locking between levers in the apparatus.

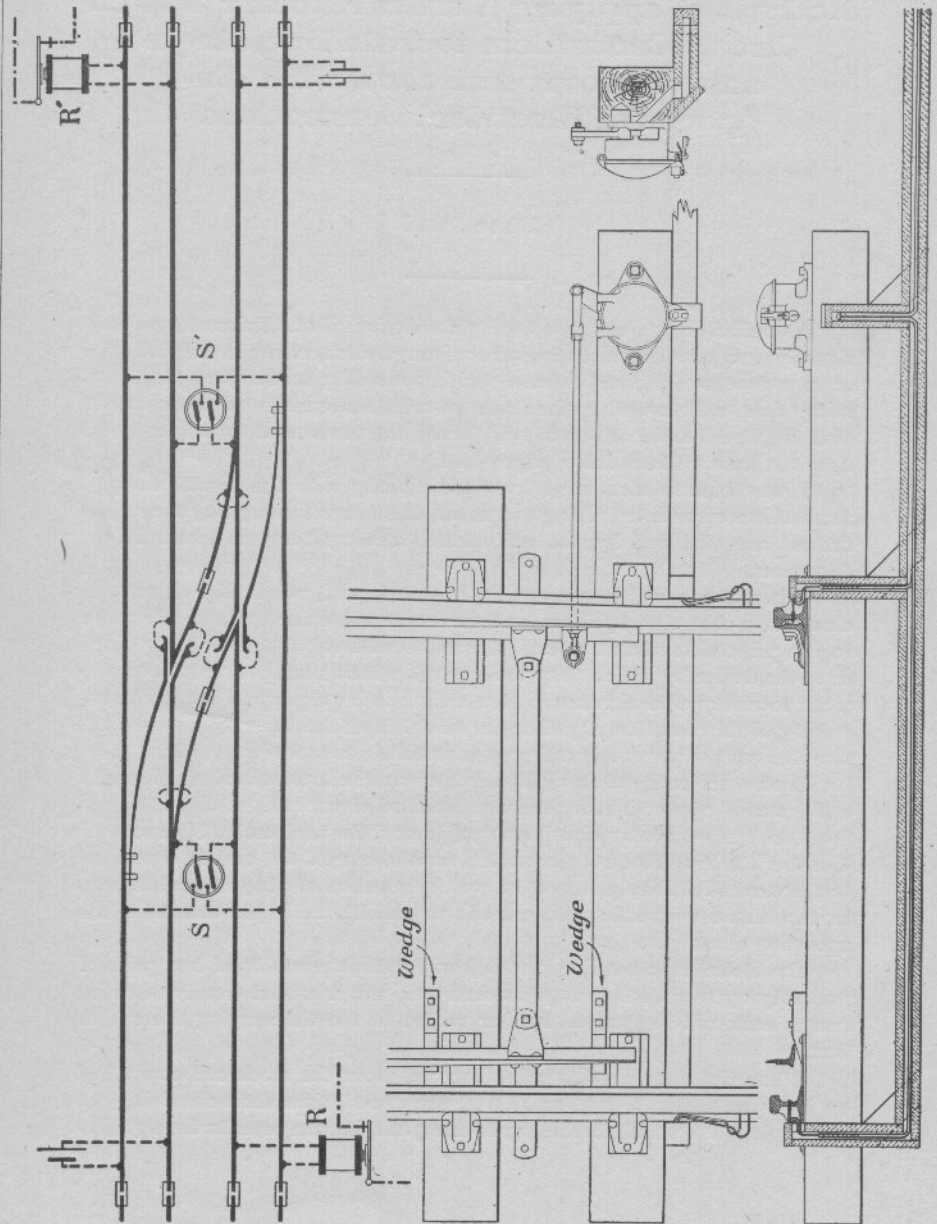
When the switches are not so operated, and where the signals are electrically controlled by them, or by train movement, or by both, adherence to the principle referred to compels an attachment to the switch points, or to the device by which they are moved, which shall prevent the movement to safety of a signal until the switch is in proper position, and, conversely, shall cause the signal to assume danger the instant the switch is moved from the position insuring greatest safety to main-line traffic.

Such a device is shown applied in the opposite illustration, together with a diagram of connections for the usual method of control.

The vertical rotary circuit controller or "Switch Box" (S) is secured to either the head block of the switch or to a special tie, and is connected to the *normally closed* point of the switch by means of a lug secured thereto, from which a connecting rod extends to an adjustable jaw secured to the operating arm of the box.

From the four binding posts forming the terminals of two pairs of normally open-contact springs in each box, two insulated copper wires are run to each rail in grooved lumber nailed to the tie carrying the switch box.

When the closed switch point is moved from the stock rail over $\frac{1}{8}$ of an inch the contacts (a a) and (b b) are closed, thus short-circuiting the track relay (R), which, becoming de-energized, in turn permits the signal to



assume danger. The signal remains in that position until the switch is again thrown completely back to its normal position.

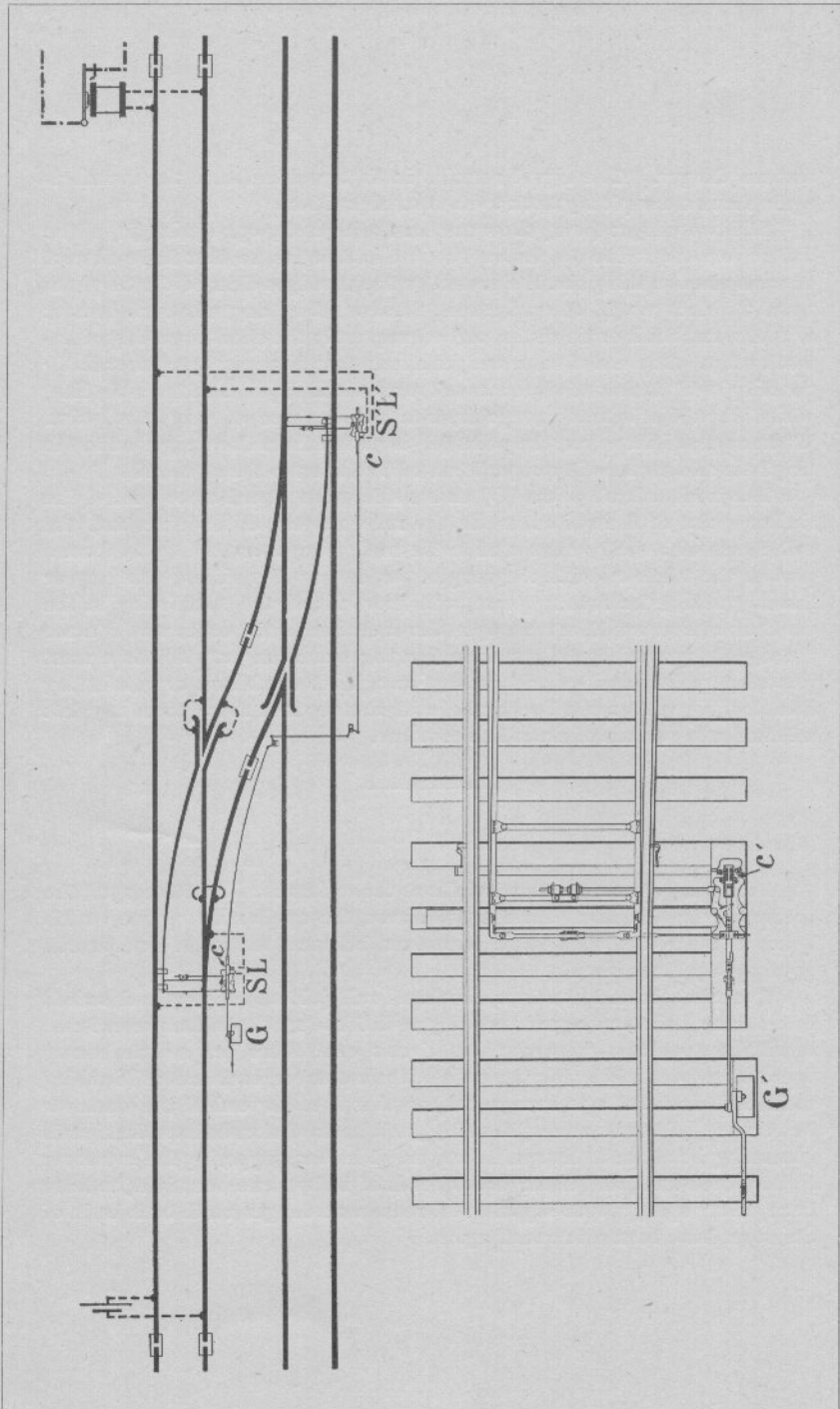
The two wedges (w w) shown under the normally open point (P) of the switch, are secured to the first and second switch ties, so that in its normal or open position this point is elevated by these wedges clear of the tie plates upon which it would otherwise rest, thus avoiding any electrical contact with the stock rail or tie plates, and consequently the short-circuiting of the track relay. The use of these wedges eliminates the necessity of electrically "cutting out" the switch by means of two insulated joints in the main line, which is a distinct advantage from a maintenance of way standpoint. When reversed, however, the point (P) is moved from the wedges on to the tie plates and assumes its proper level with relation to the stock rail.

The insulated rail joints (D) on the siding are placed at or behind the fouling point of the switch, while the rails between these joints and the switch are electrically connected to the main line, so as to virtually form a part of the track circuit. Any engine or car on the siding, standing or moving within the fouling point, will short-circuit the track relay in the same manner as would a train upon the main line, and hence, would cause the signal governed by this track section to assume danger. This is a most important point, as it affords protection against cars blown or gravitating into fouling with main line traffic, and also against those carelessly left within fouling points of main line switches.

Plate 1519

Following out the same principles as those illustrated in Plate 1518, the accompanying diagram (Plate 1519) shows the application of two switch boxes S S' to the ends of a crossover between the main line tracks governed by block signals.

The track batteries, relays, insulated rail joints, wedges, and switch boxes are all shown diagrammatically as in Plate 1518. In the present case it will be seen that there are *two* circuit controllers (or switch boxes) operated respectively by the two ends of the crossover, each switch box being connected electrically to both tracks, so that if *either* end of the crossover be thrown, *both* track relays, R and R', will be short-circuited and the signals governing both tracks thrown to danger. Further, supposing the crossover to have been used, and either or *both* ends of it, by some oversight, to have been left "open," both signals will remain at danger until both ends of crossover have been set normal again.



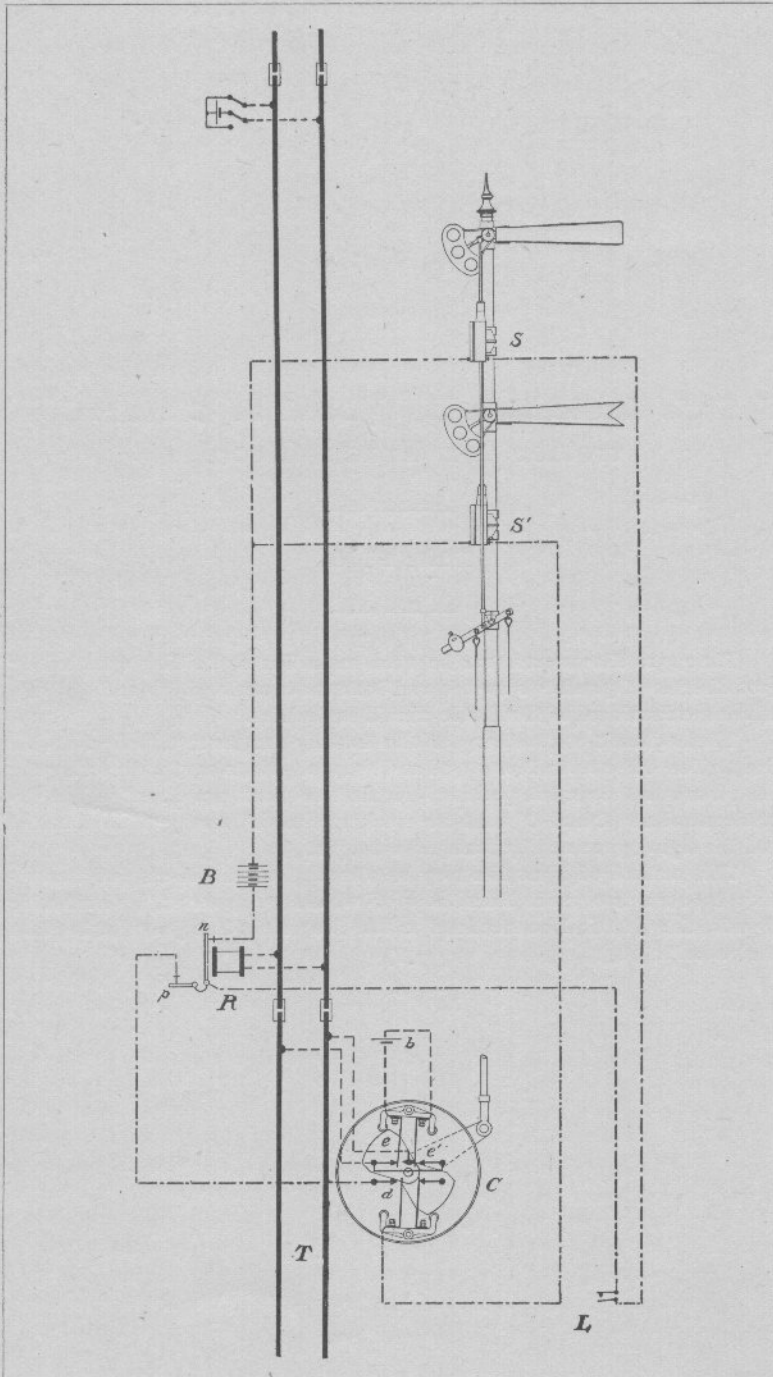
Switch Indication Box, Used as Circuit Controller for Track Circuits

Plate 1520

Plate 1520 shows crossover between main line and siding operated by ground lever (G) and two switch and lock movements (S L) and (S' L') which are furnished with suitable circuit controllers.

These circuit controllers perform exactly the same function as the Switch Boxes shown in Plates 1518 and 1519 ; that is to say, on throwing the crossover into the reverse position, electrical contacts are closed in the circuit controllers (C and C') and the track section is thereby short-circuited and the signal governed by it assumes danger.

This method of operation may be also applied in the case of a crossover between two main lines, *both* of which are governed by automatic signals, the electrical connections to the two tracks being similar to those shown in Plate 1519.



Duplex Vertical Rotary Circuit Controller, as Applied to Manually Operated Signals, Controlled by Polarized Rail Circuits

Plate 1521

Plate 1521 illustrates one of our Duplex Vertical Rotary Circuit Controllers (C), which is shown enlarged in scale compared with the signal and track. In practice this is usually secured to the signal pole and operated by an up and down rod. In the diagram it is shown attached to the upper arm of a home and distant signal fitted for manual operation and automatic control by trains.

This signal is provided with electric slots (S and S'), one for each arm, operated from battery (B) through the points of the polarized track relay (R). The slot (S) is governed by the neutral armature (n) only of relay (R). The slot (S') is governed by both the neutral and polarized armatures (n) and (p) of track relay, and also by the contacts (d) of circuit controller (C).

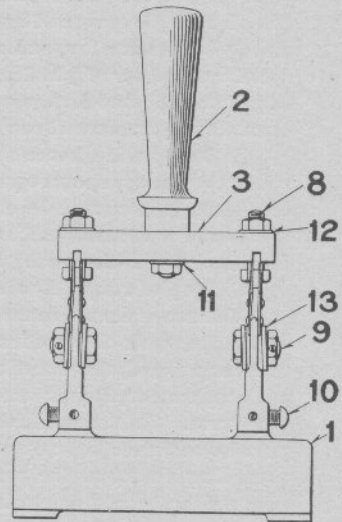
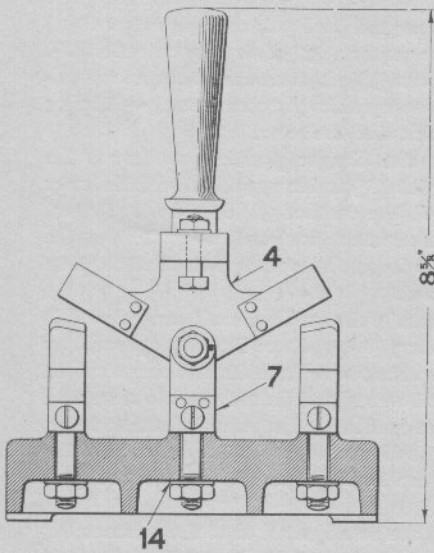
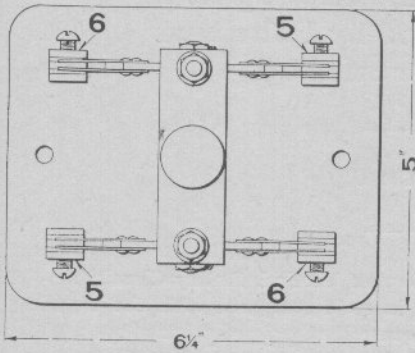
Circuit closer (L) in Circuit with slot (S) is attached to lever controlling signal (S) and for the purpose of economizing in current only—it being open during the normal or danger position of the lever.

So long as the home signal is in the danger position as shown, the contact (d) is open, consequently the slot (S') is demagnetized and the lower or distant arm cannot be cleared until the contact (d) is closed. When, however, the home signal is cleared this contact is closed, thus allowing the distant signal to be cleared also. This is on the assumption that contacts (p) and (n) of relay (R) are both closed.

The two pairs of contacts (e and e') shown in circuit controller (C) constitute a pole changer for track battery (b), and are likewise operated by the home signal, the direction of current in the rail circuit (T) being reversed with each successive movement of the home signal from danger to clear, and vice versa. This reversal, through the medium of a polarized track relay, permits or prevents the operation of the distant signal at the entrance of the preceding block, as the position of the home signal to which the pole changer is attached determines.

The cams in circuit controller (C) are so adjusted that the contact (d) is not closed, nor the polarity of (b) reversed until the crank has virtually completed its stroke—that is, until the home signal has practically completed its movement to the clear position.

Plate 1521 shows only one of the number of possible applications of the Duplex Vertical Rotary Circuit Controller. It is evident that it may be used in a great variety of ways where pole changers or circuit controllers are required, and may manifestly be operated from any device capable of imparting to it the motion required.



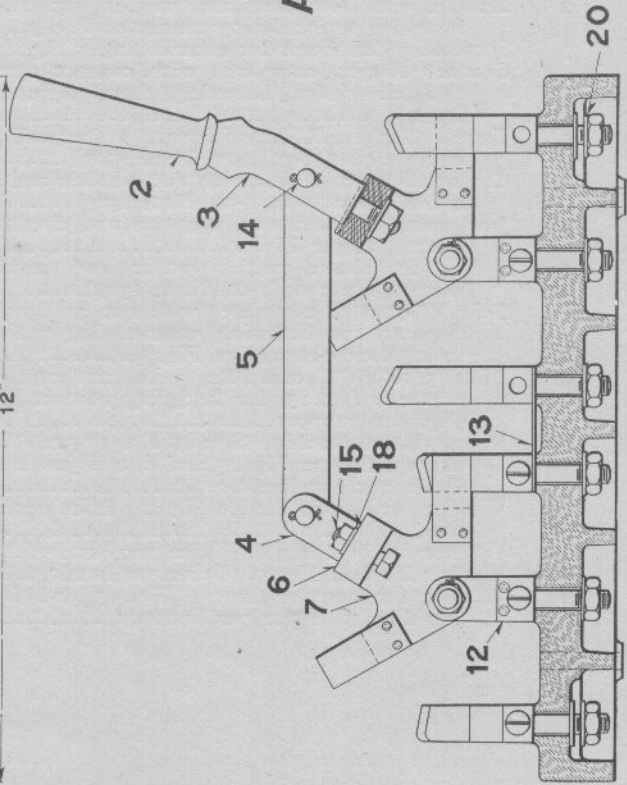
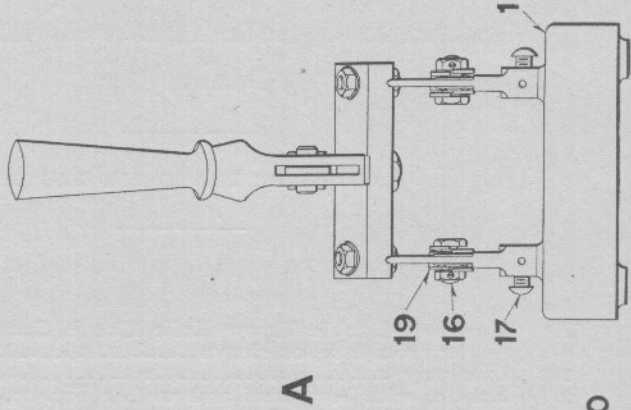
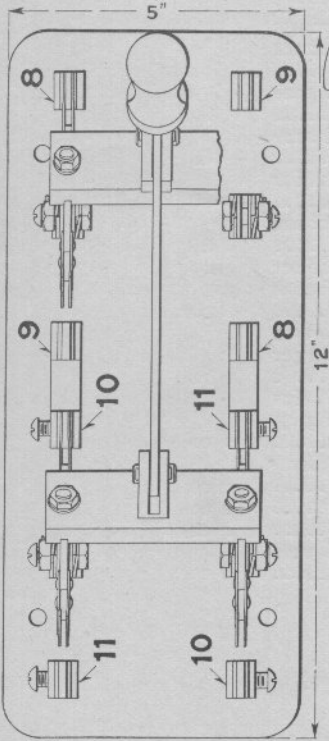
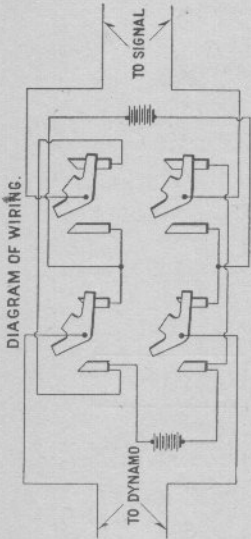
A

Two-Pole Double Throw Knife Circuit Controller

Two-Pole Double Throw Knife Circuit Controller

ORDER BY PLATE AND FIGURE

Fig.		List Price
A	Two-Pole Double Throw Knife Circuit Controller, complete, as shown.....	10 00
1	Base only	1 40
2	Handle, with bolt, nuts and washer Fig. 11, for fastening to insulating connector Fig. 3.....	50
3	Insulating Connector for contact finger Fig. 4....	16
4	Contact Finger, complete, with contact springs and rivets for fastening them to contact finger	90
5	Contact Finger, R. H., with nut, washer and machine screw (1-14, 1-10, Plate 1523).....	60
6	Contact Finger, L. H., with nut, washer and machine screw (1-14, 1-10, Plate 1523).....	60
7	Jaw, complete, with nut, supports and rivets, for contact finger Fig. 4.....	80
7a	as above, with washer and machine screw (1-7, 1-14, 1-10, Plate 1523).....	86
8	Bolt $\frac{1}{4}$ "-32x $\frac{7}{8}$ ", complete, with nut and washer Fig. 12, for fastening contact finger Fig. 4 to insulating connector Fig. 3.....	10
9	Bolt, $\frac{5}{16}$ "x $\frac{5}{8}$ ", complete, with nut and two washers Fig. 13, for fastening contact finger Fig. 4 to support.....	10
10	Round Head Machine Screw, No. 12-32x $\frac{3}{8}$ ", for contact fingers Figs. 5 and 6, and jaw Fig. 7. Price per hundred.....	2 00
11	Washer for bolt in handle Fig. 2. Price per hundred	2 00
12	Washer for bolt Fig. 8. Price per hundred.....	2 00
13	Washer for bolt Fig. 9. Price per hundred.....	4 00
14	Washer for contact fingers Figs. 5 and 6 and jaw Fig. 7. Price per hundred.....	2 00



Four-Pole Double Throw Knife Circuit Controller
(Battery Charging Switch)

Four-Pole Double Throw Knife Circuit Controller

(Battery Charging Switch)

ORDER BY PLATE AND FIGURE

Fig.		List Price
A	Four-Pole Double Throw Knife Circuit Controller, complete, as shown.....	24 00
1	Base only	1 90
2	Handle, with bolt, for fastening to jaw Fig. 3....	40
3	Jaw, with nut, for supporting connecting link and handle	1 00
3a	as above, with washer, pin and cotters (1-3, 1-20, 1-14, Plate 1524).....	1 16
4	Jaw, with nut, for supporting connecting link....	60
4a	as above, with washer, pin and cotters (1-4, 1-20, 1-14, Plate 1524).....	76
5	Connecting Link	60
6	Insulating Connector for contact finger Fig. 7....	16
7	Contact Finger, complete, with contact springs and rivets for fastening them to contact finger	90
8	Long Contact Finger, R. H., with nut and two washers Fig. 20.....	60
9	Long Contact Finger, L. H., with nut and two washers Fig. 20.....	60
10	Short Contact Finger, R. H., with nut, washers and machine screw (2-20, 1-17, Plate 1524)...	60
11	Short Contact Finger, L. H., with nut, washers and machine screw (2-20, 1-17, Plate 1524)...	60
12	Jaw, complete, with nut supports and rivets for contact finger Fig. 7.....	80
12a	as above, with washer and machine screw (1-12, 1-20, 1-17, Plate 1524).....	86
13	Connector between long and short contact fingers	04
14	Pin, $5/16" \times 3/4"$, with cotters for fastening connecting link to jaws Figs. 3 and 4.....	12
15	Bolt, $1/4" - 32 \times 7/8"$, complete, with nut and washer Fig. 18, for fastening contact finger Fig. 7 to insulating connector Fig. 6.....	10
16	Bolt, $5/16" \times 5/8"$, complete, with nut and two washers Fig. 19, for fastening contact finger Fig. 7 to supports.....	10
17	Round Head Machine Screw, No. 12-32 \times $3/8"$, for contact fingers Figs. 10 and 11 and jaw Fig. 12. Price per hundred.....	2 00
18	Washer for bolt Fig. 15. Price per hundred.....	2 00
19	Washer for bolt Fig. 16. Price per hundred.....	4 00
20	Washer for contact fingers Figs. 8, 9, 10 and 11 and jaws Figs. 3, 4 and 12. Price per hundred	2 00

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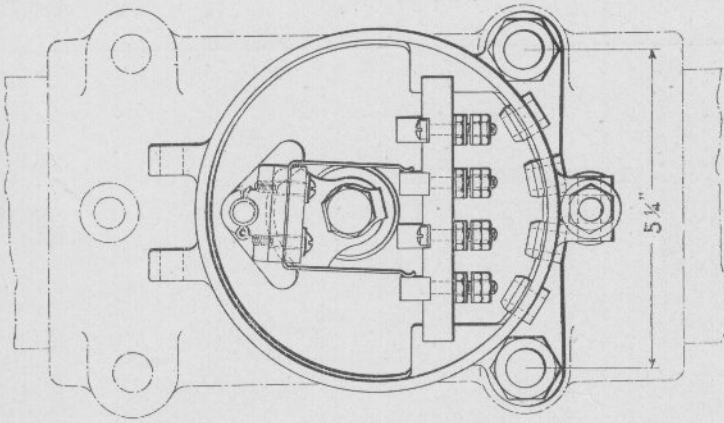
SUPPLEMENT No. 2
1902 CATALOGUE—SECTION 15

ROTARY CIRCUIT CONTROLLER
FOR
SEMAPHORE SHAFTS

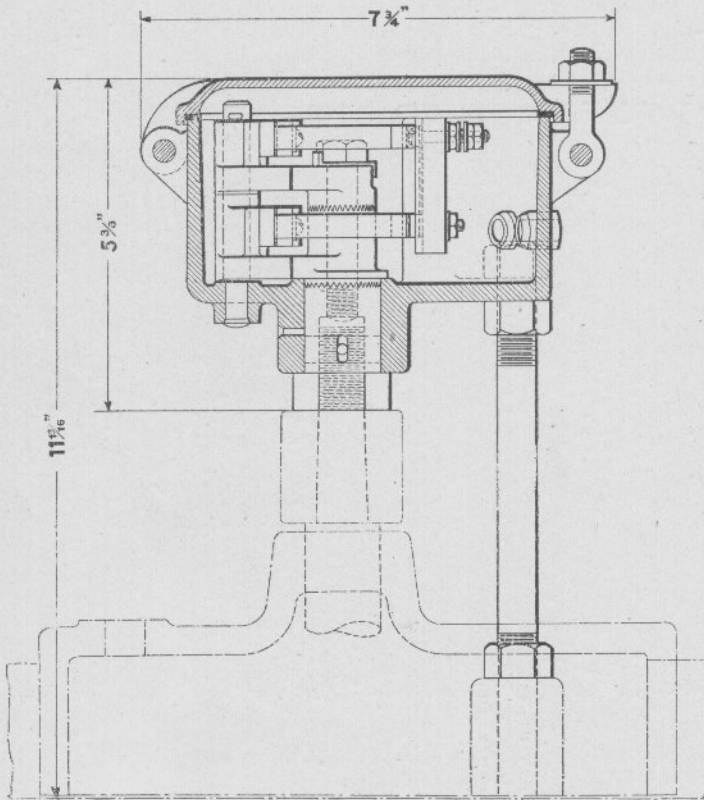
The Union Switch & Signal Co.

Swissvale, Pa.

January, 1908.



FRONT VIEW
COVER REMOVED



SIDE VIEW
CASE SECTIONED

ROTARY CIRCUIT CONTROLLER FOR SEMAPHORE SHAFTS.

**ROTARY CIRCUIT CONTROLLER FOR
SEMAPHORE SHAFTS.**

For Application see Plate 1526.

The circuit controller shown on the opposite plate is designed to be applied to the rear end of the semaphore shaft of a mechanical signal. It is held in place by two stud bolts which replace the lower bolts ordinarily used for holding the semaphore bearing together.

It has two contact springs which control two independent circuits. These springs are actuated by two cams which are connected to the semaphore shaft by a bolt and sleeve as is shown in the side view on the opposite plate. As these cams have corrugated faces it is possible to fasten them at any desired angle so that they will operate the contact springs which close or open the circuits at whatever point in the stroke of the signal may be necessary.

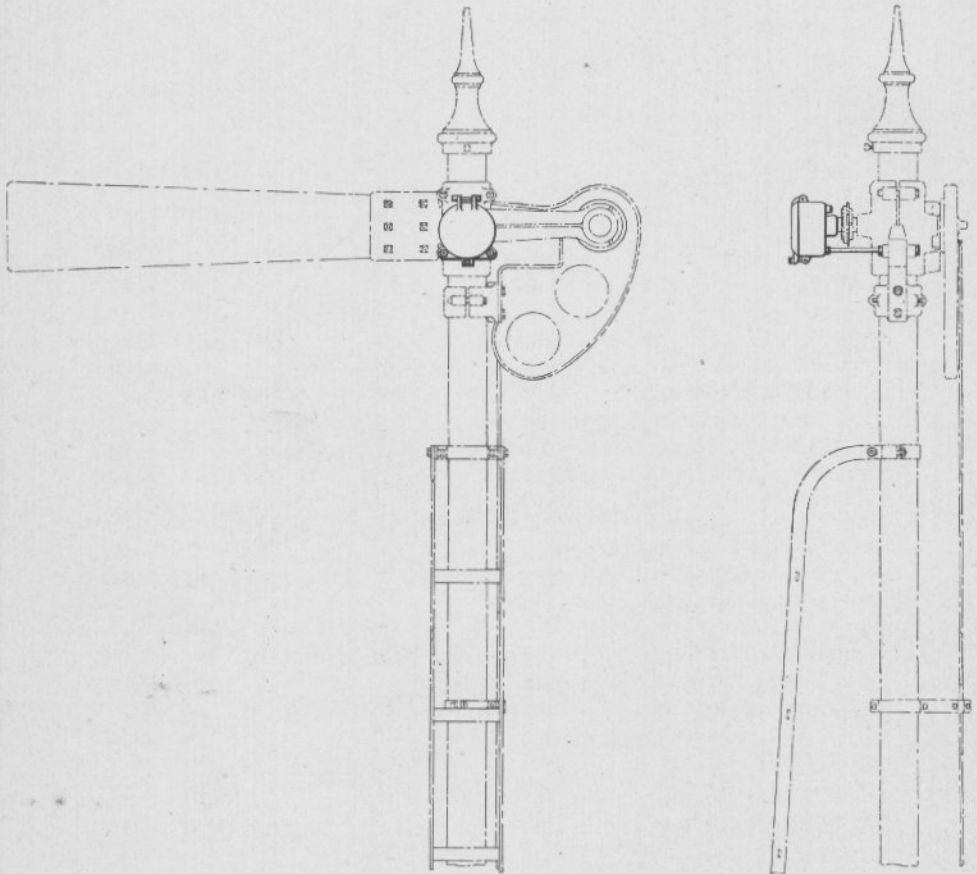
Order by Plate and Figure.

The drawing references are shown merely for convenience in checking material against invoices and shipping lists.

Fig.

A Rotary Circuit Controller, complete, as shown, with stud bolts for fastening to semaphore bearing

Drawing Reference	List Price	
C-7232	15 00	



PARTS SHOWN IN DOT AND DASH LINES
ARE ADJACENT PARTS OF THE SIGNAL
AND ARE NOT INCLUDED WITH CIRCUIT
CONTROLLER COMPLETE

ROTARY CIRCUIT CONTROLLER FOR SEMAPHORE SHAFTS
APPLIED TO A MECHANICAL SIGNAL.

**ROTARY CIRCUIT CONTROLLER FOR SEMAPHORE
SHAFTS APPLIED TO A MECHANICAL SIGNAL.**

The opposite plate shows the application of the circuit controller listed on the preceding plate to a mechanical signal. The parts included with the circuit controller are shown in full lines while the signal and its ordinary fittings are shown in dot and dash lines. To attach circuit controller it is only necessary to replace the lower bolts of semaphore bearing with the stud bolts supporting the case and to replace the nut at the rear end of the semaphore shaft with the sleeve projecting from the case, the entire operation taking but a few minutes.

The Union Switch & Signal Company's Publishing Department,
Swissvale, Pa.

Press of the Enterprise Printing Company,
Wilkinsburg, Pa.

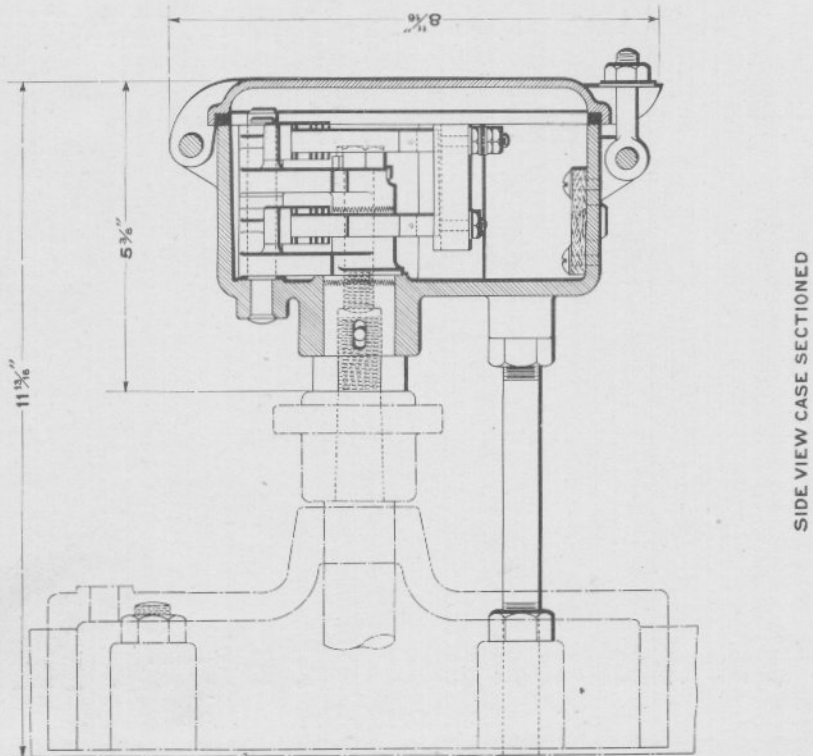
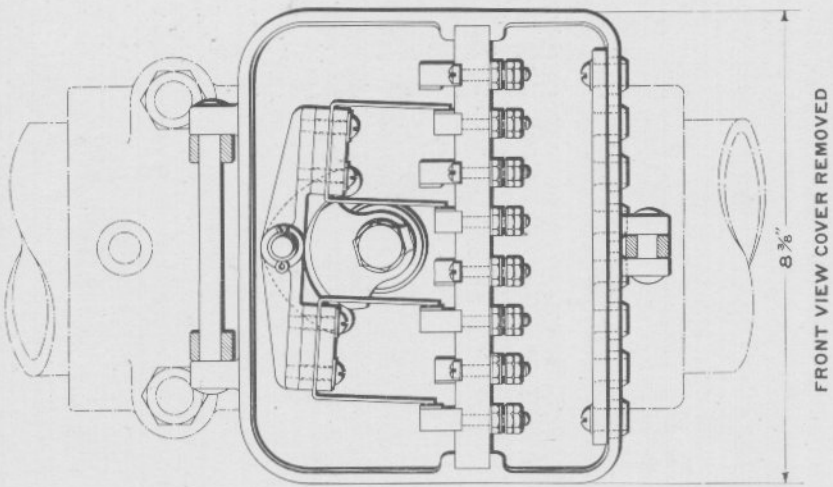
SUPPLEMENT No. 3
1902 CATALOGUE---SECTION 15

ROTARY CIRCUIT CONTROLLER
FOR
SEMAPHORE SHAFT.

The Union Switch & Signal Co.

Swissvale, Pa.

FEBRUARY, 1908



ROTARY CIRCUIT CONTROLLER FOR SEMAPHORE SHAFT
(Four-Way)

**ROTARY CIRCUIT CONTROLLER FOR
SEMAPHORE SHAFT**

For Application see Plate 1526, Supplement No. 2, Section 15

The circuit controller shown on the opposite plate is designed to be applied to the rear end of the semaphore shaft of a mechanical signal. It is held in place by two stud bolts which replace the lower bolts ordinarily used for holding the semaphore bearing together.

It has four contact springs which control four independent circuits. The springs are actuated by two cams which are connected to the semaphore shaft by a bolt and sleeve as is shown in the side view on the opposite plate. As the cams have corrugated faces it is possible to fasten them at any desired angle so that they will operate the contact springs which close or open the circuits at whatever point in the stroke of the signal may be necessary.

ORDER BY PLATE AND FIGURE

The drawing references are shown merely for convenience in checking material against invoices and shipping lists.

Fig.

A Rotary Circuit Controller, 4-way, complete as shown, with stud bolts for fastening to semaphore bearing.....

Drawing Reference	List Price
2-C-7232	\$24.00

The Union Switch & Signal Company's Publishing Department,
Swissvale, Pa.

Press of Murdoch, Kerr & Co., Pittsburgh, Pa.

SECTION XVI

INDICATORS, ANNUNCIATORS,
TRAIN DESCRIBERS, &C.

Revised Reprint of First Edition, 1907

NOTE:

In reprinting this issue plates 1600, 1630, 1635, 1636, and 1637 showing disc, switch and multiple indicators have been omitted.

Plate 1630 $\frac{1}{2}$ supersedes plate 1630.

Plate 1638 illustrates our latest development of multiple unit indicator.

Plate 1720 omitted and Plate 1720 $\frac{1}{2}$ added.

PREFACE

With the issue of this combined section of our catalogue we will complete the 1902 Edition of Electrical Appliances. Sections 18 and 19 are not to be published as a part of our 1902 Catalogue, but will be embodied in our 1908 Edition.

On account of the limited matter that was assigned to Sections 16 and 17 it was deemed advisable to combine the two sections in one volume.

It will be understood that much of the apparatus herein illustrated is but typical of various designs that are capable of many modifications in which the main type is an underlying feature. The method of applying an insulation to a pipe line may be used equally as well on a head rod or a lock rod or *vice versa*.

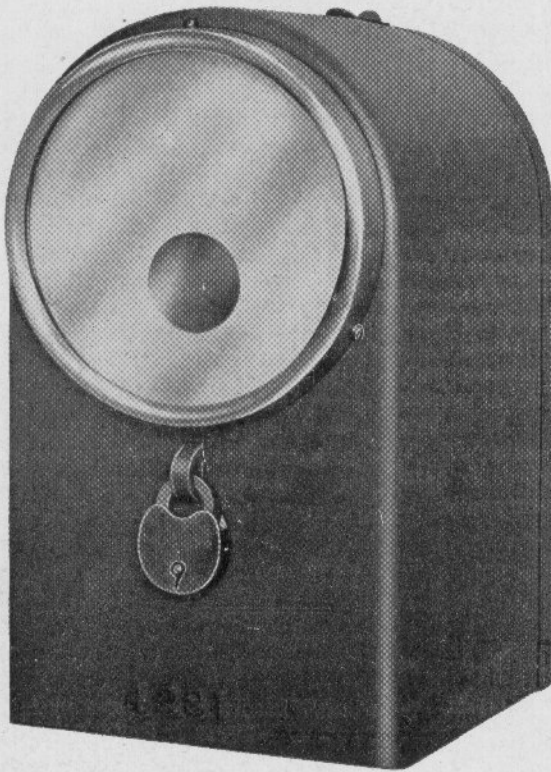
Indicators and annunciators may be of an endless variety. Any type of single indicator may be combined to form a multiple indicator. The disc pattern may be used with the semaphore in one case to give indications that are to be distinct from each other to avoid confusion, or either of the foregoing type may be as readily combined with the pointer design. Then the drop indicator may be a component of the above combinations. So it will be evident that the number and variety of combinations will be unlimited.

There are situations where it is desired that an audible announcement be given to attract attention to a visual signal. This may be accomplished by adding a vibratory bell to the indicator case. When a bell is desired it should be so stated, giving the diameter of the gong desired.

From the following illustrations and lists it is hoped that our patrons may be able to make clear their wishes, and upon any combination not shown we will gladly furnish prices and other information upon request.

The Union Switch & Signal Co.

Swissvale, Pa., September, 1905.



**Iron Case Disc Indicator
Neutral Type**

IRON CASE DISC INDICATOR
Neutral Type

This design of drop indicator is used principally in towers. A modification of this is shown by Plate 1610 wherein the semaphore arm replaces the disc. It can be made with three (3) front and three (3) back contacts or any combination of these.

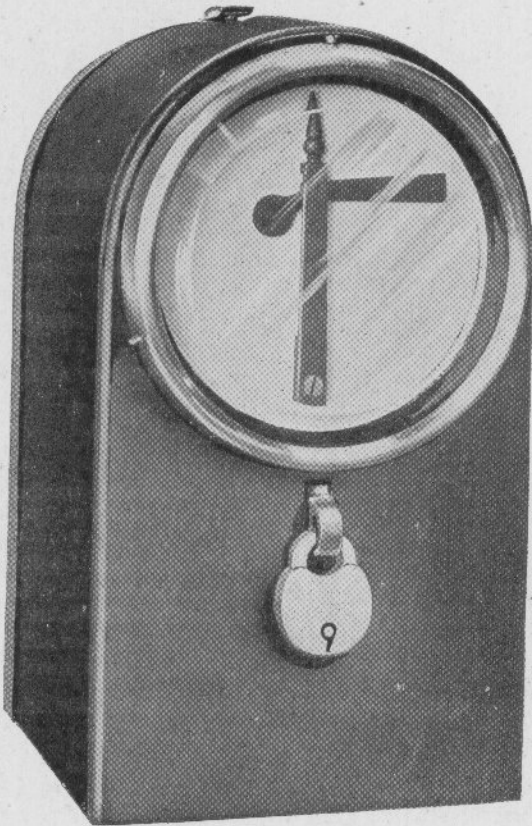
At times two sets of distinct indications may be desired in the same tower which is readily accomplished by using the semaphore type for one and the disc for the other.

When ordering specify the resistance of the magnets required.

ORDER BY PLATE AND LETTER OR NUMBER

No.	List Price	
A		Iron Case Indicator, Neutral Type, complete as shown and any resistance not over 1,000 ohms, no contacts.....
A1	27 76	A with one Front Contact add
A2	3 90	A with one Back Contact add
A3	4 26	A with one combined Front and Back Contact add.....
A4	6 50	A with three Front and Back Contacts add
A5	20 86	A with one independent Front and Back Contact add
	7 36	

NOTE—These may be made with three independent front and two independent back contacts.



**Iron Case Semaphore Indicator
Neutral Type**

IRON CASE SEMAPHORE INDICATOR

Neutral Type

This indicator is made primarily for tower use and can be furnished with contacts up to three front and three back, or any combination of these.

When ordering specify the resistance of the magnets required.

ORDER BY PLATE AND LETTER OR NUMBER.

No.		List Price
A	Iron Case Semaphore Indicator, Neutral Type, complete as illustrated, no contacts, and any resistance not over 1,000 ohms.....	27 76
A1	A with one Front Contact add	3 90
A2	A with one Back Contact add	4 26
A3	A with one combined Front and Back Contact add.....	6 50
A4	A with three Front and Back Contacts add	20 86
A5	A with one independent Front and Back Contact add	7 36

NOTE—These can be made with three independent front and two independent back contacts.



**Iron Case Indicator With Enclosed Pointer
Polarized Type**

IRON CASE INDICATOR WITH ENCLOSED POINTER
Polarized Type

This design of indicator was originally manufactured for train describing purposes for use on a third track system where express traffic was in one direction part of the day and in the opposite direction at other period—as express “down” in the morning and “up” in the evening. One tower could notify the other as to the direction a train movement was to be made by a pole changing switch which would set the pointer to “N. B.” or “S. B.” according to the direction the switch was moved.

There are other situations in which this type of indicator may be used which will be apparent upon inspection.

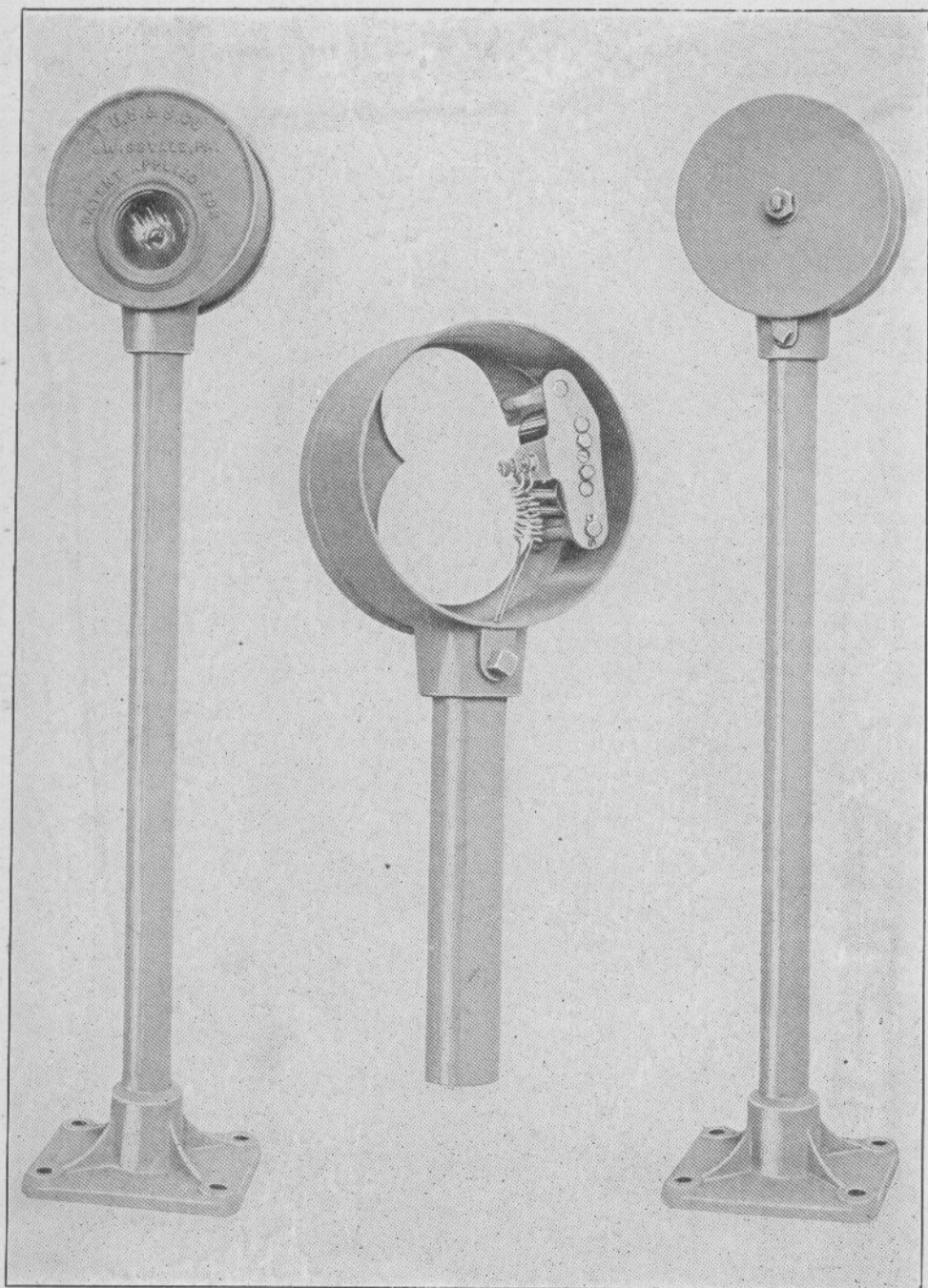
When ordering specify the resistance of the magnets.

ORDER BY PLATE AND LETTER.

No.

A Iron Case Indicator with Enclosed Pointer, Polarized Type, complete as illustrated.....

List Price	
29 64	



Switch Indicator
Disc Type

SWITCH INDICATOR

Disc Type

In this indicator the clear indication is given by the withdrawal of a disc from before an opening in the front of the iron case and *vice versa* the danger indication by the display of a disc.

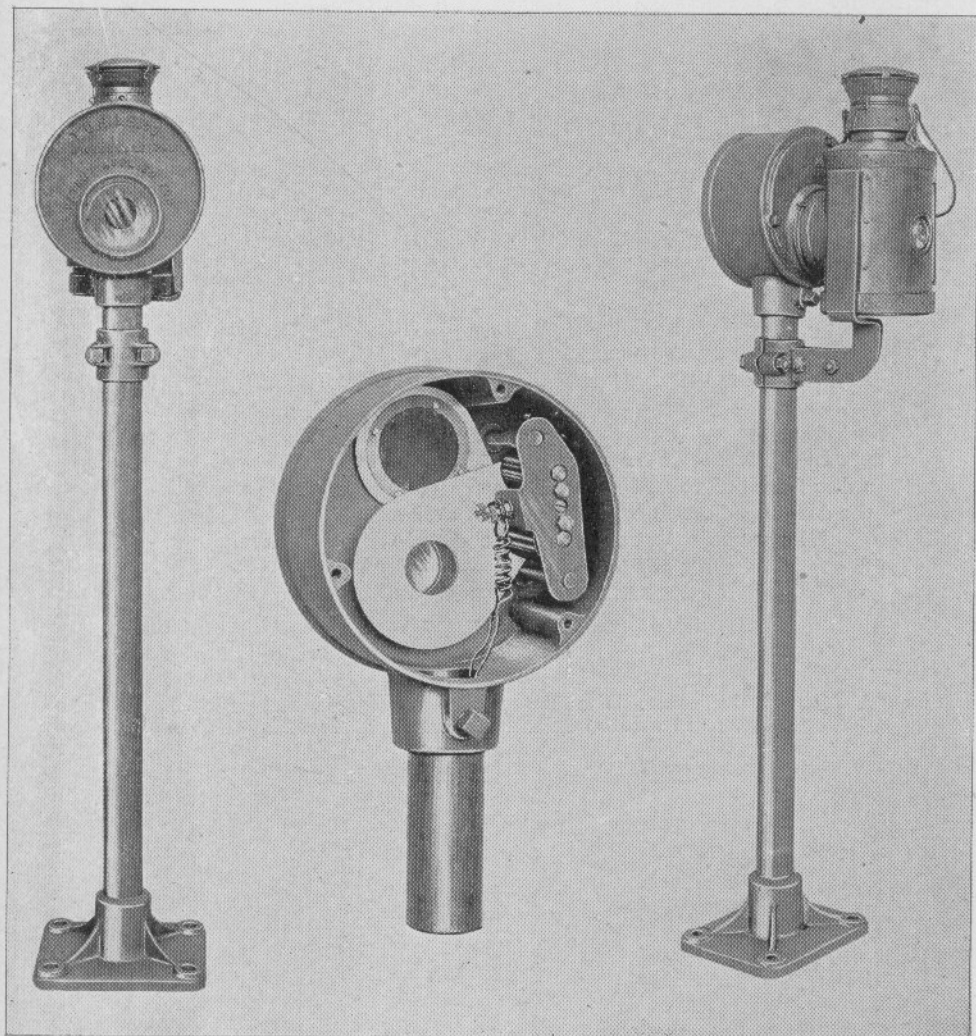
When ordering specify the resistance of the magnets required.

ORDER BY PLATE AND LETTER.

No.

A Switch Indicator, Disc Type, with Iron Case and Post, as illustrated.....

List Price	
29 00	



Illuminated Switch Indicator
Disc Type

ILLUMINATED SWITCH INDICATOR

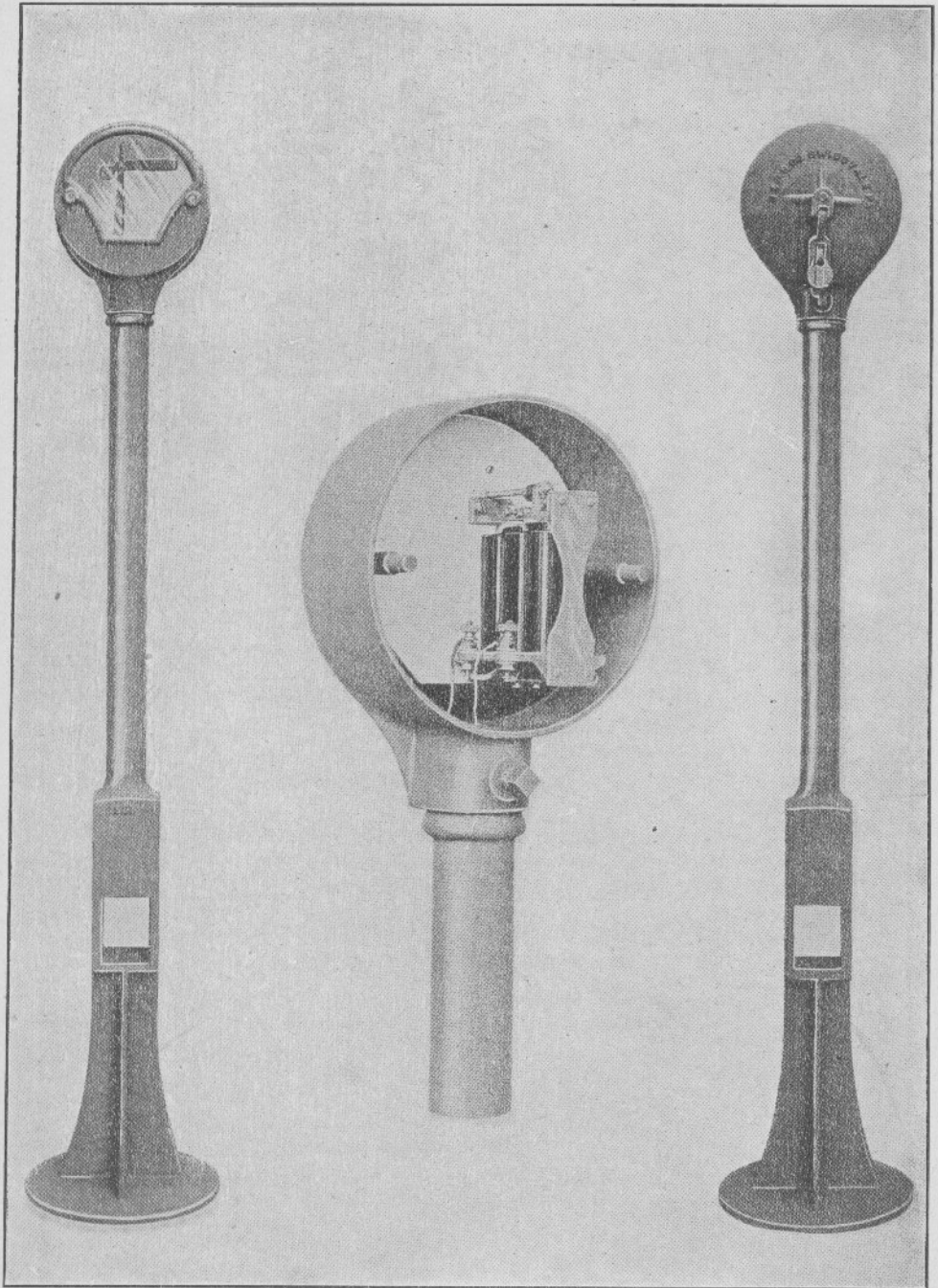
Disc Type

This design is similar to that shown by the Plate 1620 with the addition of the illuminated feature, making the night indication more prominent than given by the former type in which the disc reading may require the use of a lantern in the hands of the trainmen.

When ordering specify the resistance of the magnets required.

ORDER BY PLATE AND LETTER OR NUMBER

No.	List Price	
A Single Enclosed Illuminated Switch Indicator Iron Case and Post, Disc Type, complete without lamp.....	32 60	
B Lamp for above	6 40	



Switch Indicator
Semaphore Type

SWITCH INDICATOR

Semaphore Type

This indicator replaces the disc of the type shown on Plate 1620 by a miniature semaphore arm displayed upon a suitable background.

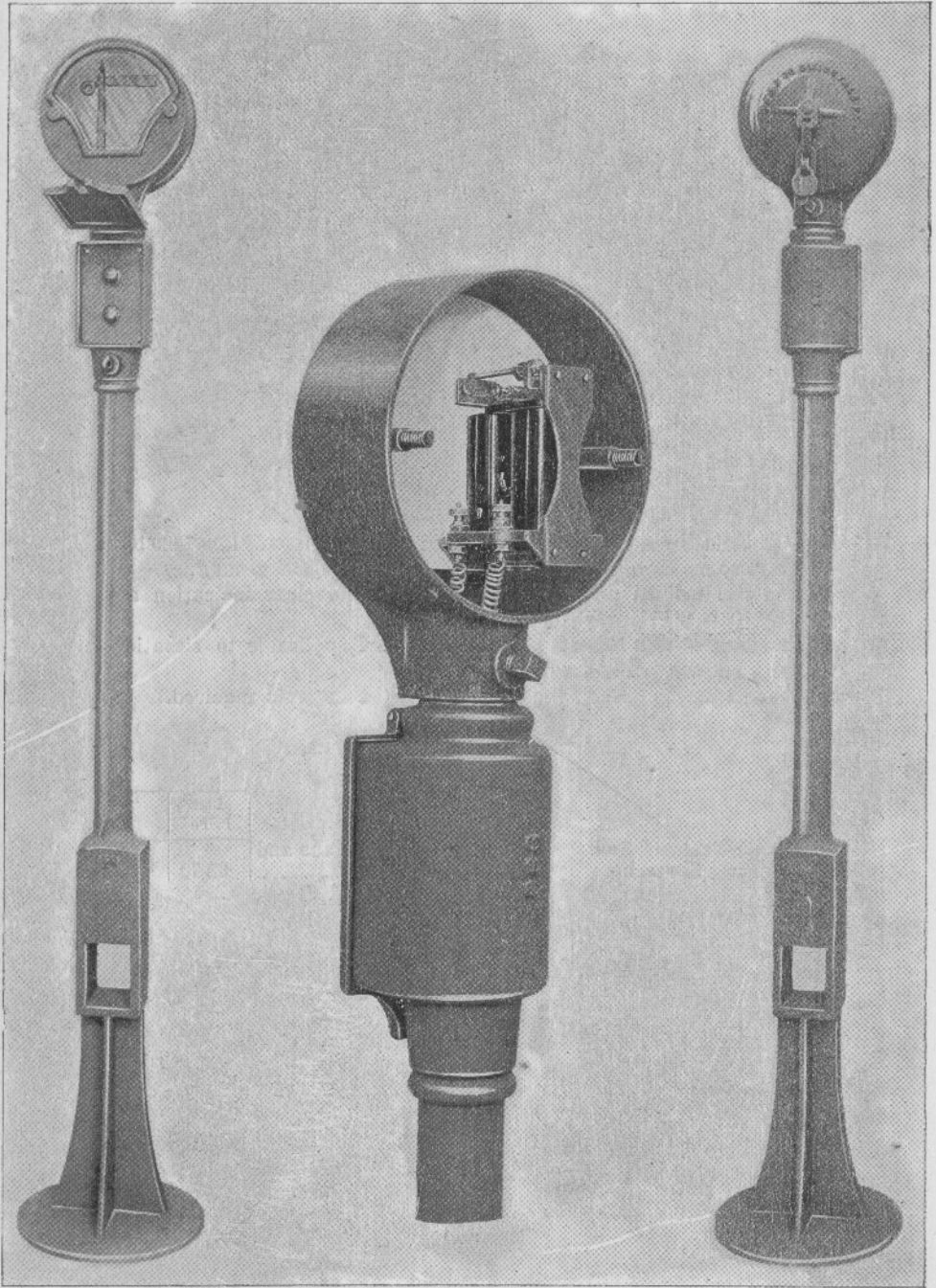
The arm inclined diagonally downward is the clear indication and horizontally is the danger position.

The uses of this indicator are various and applicable to situations requiring but two indications.

When ordering specify the resistance of the magnets required.

ORDER BY PLATE AND LETTER

No.		List Price	
A	Single Enclosed Switch Indicator, with Iron Case and Post, Semaphore Type, as illustrated.....	32 70	



Switch Indicator with Push-Button Attachment
Semaphore Type

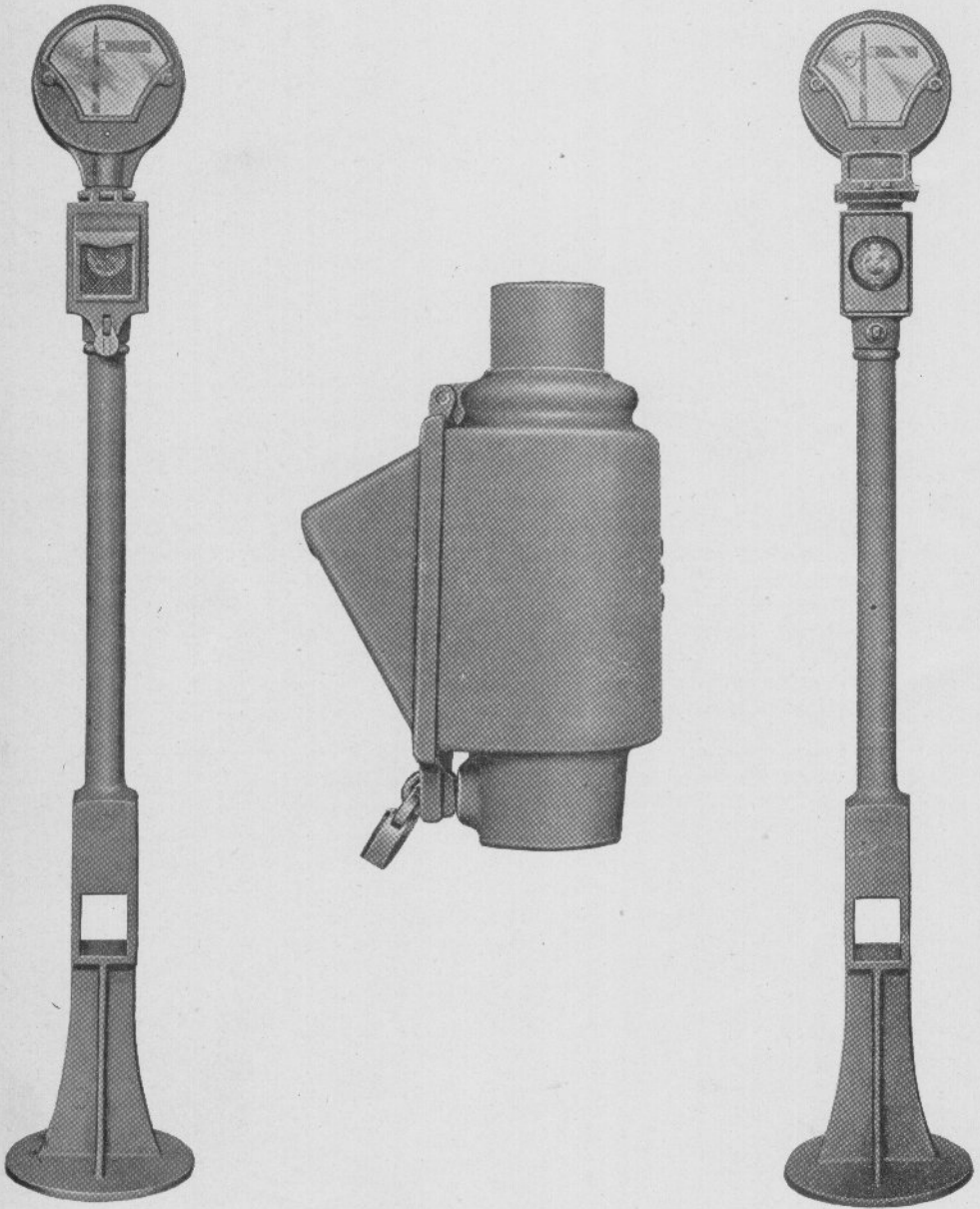
**SWITCH INDICATOR WITH PUSH-BUTTON
ATTACHMENT
Semaphore Type**

This type of indicator is similar to that shown by Plate 1625 with the additional feature of a two-way push button attachment for controlling annunciators, etc.

When ordering specify the resistance of the magnet required.

ORDER BY PLATE AND LETTER

No.	List Price	
A Single Enclosed Switch Indicator with Push-Button Attachment, Iron Case and Post, Semaphore Type, as illustrated	44 70	



Switch Indicator with Vibratory Bell and Box
Semaphore Type

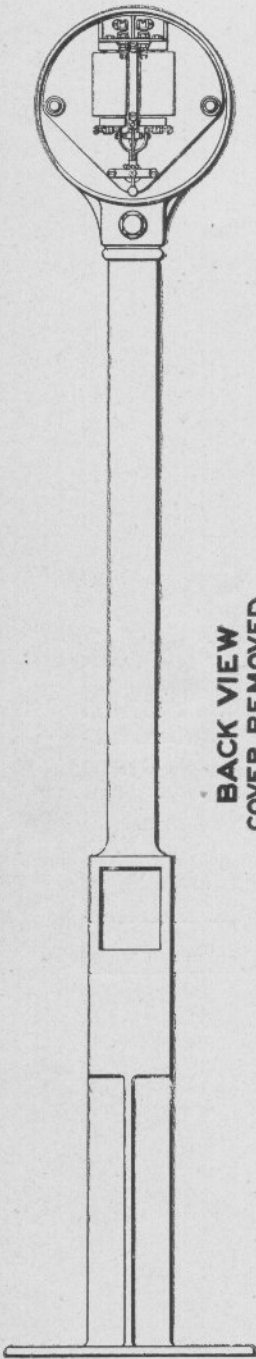
**SWITCH INDICATOR WITH VIBRATORY
BELL AND BOX
Semaphore Type**

This design of indicator is similar to that shown by Plate 1625 with the additional feature of a bell and box so that not only is a visual indication given but also an audible announcement as well.

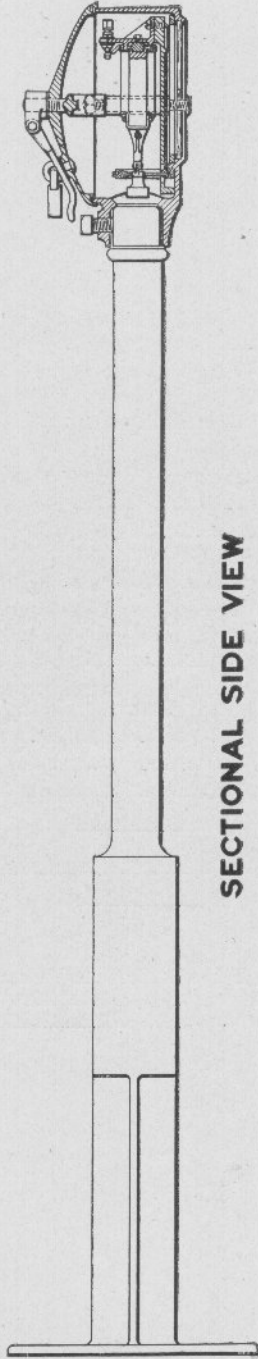
When ordering specify the resistance of the magnets required.

ORDER BY PLATE AND LETTER

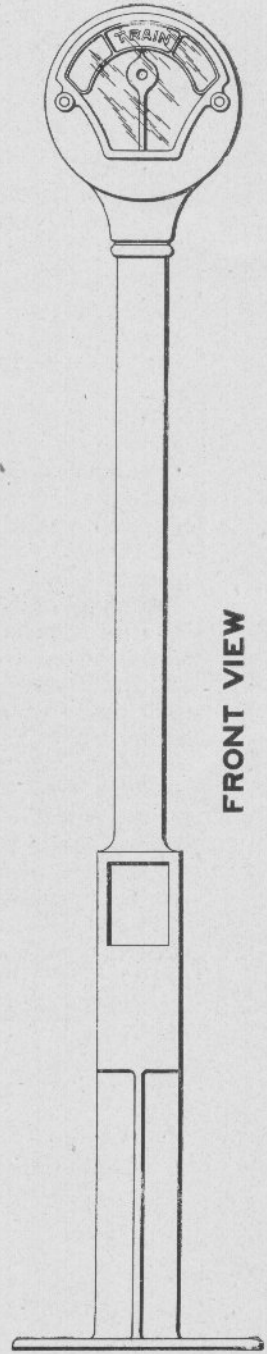
No.	List Price	
A Single Enclosed Switch Indicator with Vibratory Bell and Box, Iron Case and Post, Semaphore Type, as illustrated, with release.....	53 46	



**BACK VIEW
COVER REMOVED**



SECTIONAL SIDE VIEW



FRONT VIEW

**Iron Case Indicator With Enclosed Pointer
Polarized Type**

IRON CASE INDICATOR WITH ENCLOSED POINTER

Polarized Type

This type of indicator was originally designed to cover the field whereby indication at a distance may be had of the condition of two or more devices or mechanisms. It is especially adapted to railroad signaling for indicating to a trainman at an outlying passing siding switch: 1st, the approach of a train; 2d, the movement of the signal controlling the track section in which the switch is located, to a position corresponding to that of the outlying switch.

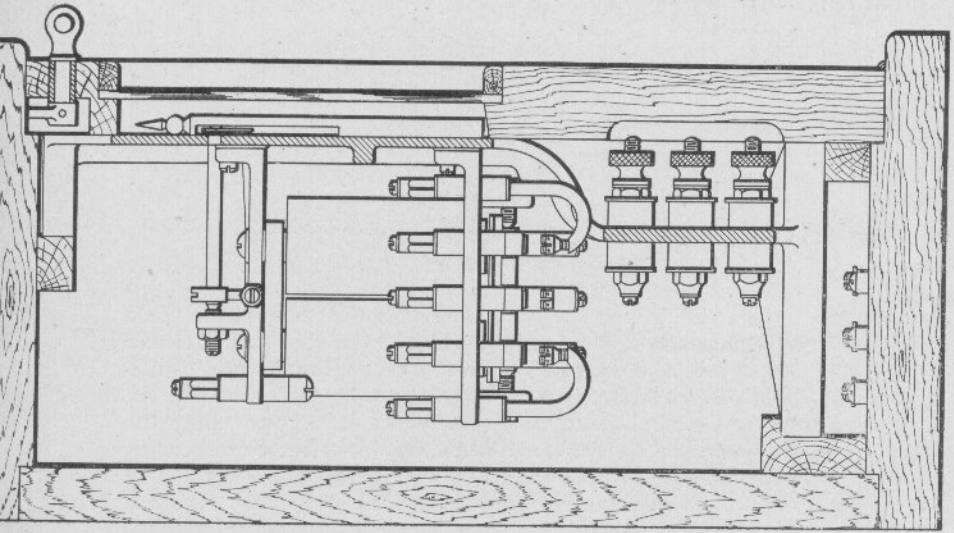
In automatic block signaling it is highly desirable that a trainman has positive information relative to main line conditions, when about to open a switch leading to the main line, and having opened such a switch, that the main line signal has moved to the danger position, and that the opening of the switch was the cause of setting said signal. The ordinary neutral type of indicator does not fulfill these conditions. Should a train enter the main line section at the instant the switch is opened by a trainman, it is possible that the trainman assumes that his act of opening the switch has set the main line signal and his train will move out onto the main line, which may cause delay to an approaching train; or he may assume that a train is at the setting section for the indicator and move out onto the main line expecting the approaching train to be held at the main line signal when in reality the approaching train has passed its signal and is in the block section containing the passing siding switch, thereby causing a collision risk.

Again it may be used at slotted signals of interlocking plants to indicate an approaching train, the clearing of the signal arm and the return of signal arm to the danger position, or it may be used to indicate whether or not a signal light, not visible, is in proper condition at night, etc.

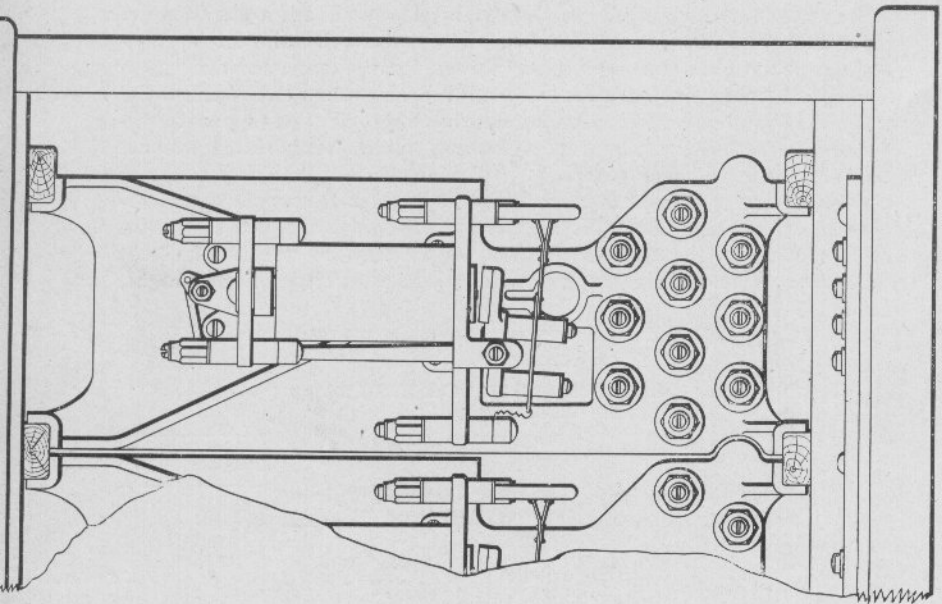
When ordering specify the resistance of the magnets required.

ORDER BY PLATE AND LETTER

No.	List Price	
A Single Iron Case Indicator, with Enclosed Pointer, Polarized Type, complete as illustrated	34 50	



Side View, Showing Arrangement of Coils, Contacts, Binding Posts and Terminal Posts



Rear View of Single Unit

Multiple Unit Indicator

MULTIPLE INDICATORS

Plate 1638 illustrates our latest development of the multiple indicator. In our earlier designs the various mechanisms were mounted on a common plate so that when it was necessary to get at any one of them the entire set was disturbed.

To overcome this feature as well as allowing freedom of access to the mechanisms, we offer our MULTIPLE UNIT INDICATOR with the assurance that it will become a standard type.

Each mechanism is a complete unit in itself and may be built up to any desired combination. The units slide in and out of the holding case on the guides or battens as may be seen by reference to the rear view. The arrangement of the various parts of a unit are shown by the side view.

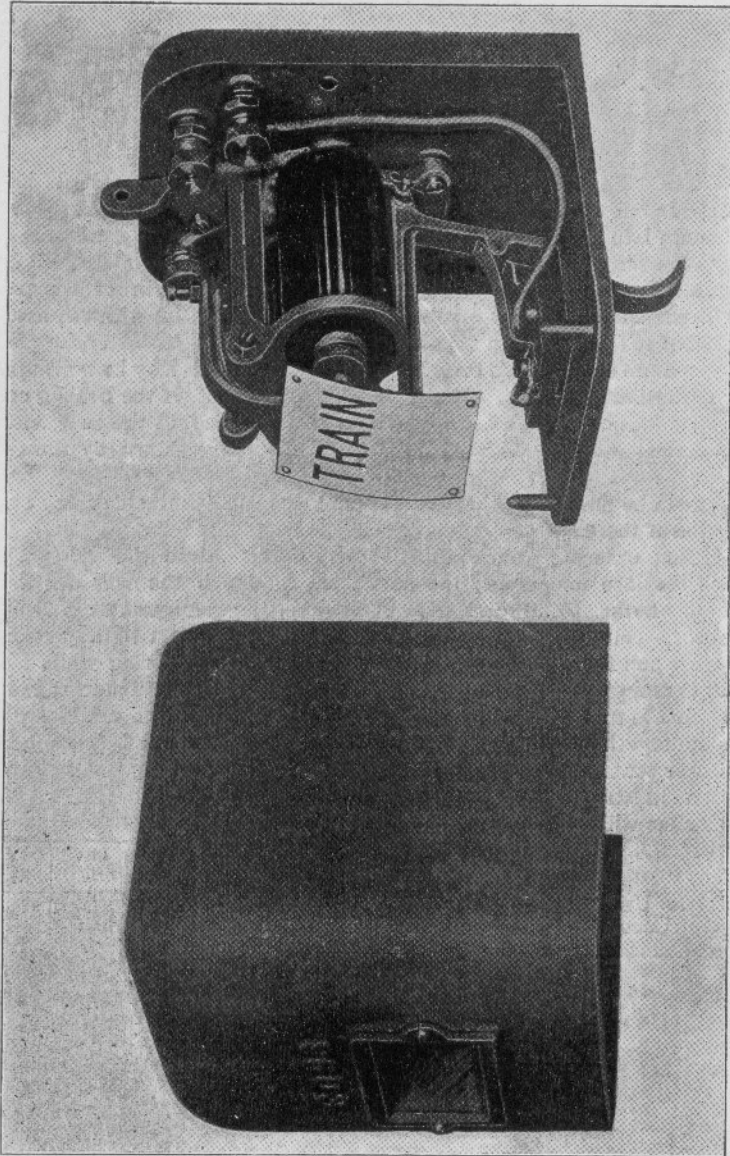
It can be made with three front and three back contacts or any combination of these.

When ordering indicators it is advisable to state the voltage on which they are to operate; the resistance to which the coils are to be wound; whether to be used with a single stroke annunciator bell or a vibratory bell and whether the bell is to be common to the set or a separate bell for each indicator; whether the bell is to ring while indicator is dropping or after, etc. Also it is well to furnish a plan showing just what is to be accomplished, and from where the indicators are to operate together with the other apparatus to be controlled through the indicator contacts.

The illustrations are of indicators without bells.

Prices will be quoted upon application.

	List Price
Multiple Unit Indicator or Annunciator in a Hard Wood Case per way	36 00



Iron Case Drop Annunciator

IRON CASE DROP ANNUNCIATOR

We have from time to time received a number of inquiries from customers for an iron case drop annunciator, durable and reliable in construction, and low in price.

The instrument shown has been designed to meet these requirements.

The drop is released when the coils are energized, displaying the word "train," track No., etc., as the case may be, and at the same time closing a local bell circuit.

By pulling forward the handle which projects from the bottom of the case, the drop is restored and bell circuit is again opened.

The instrument screws to the wall, and when in place with cover removed, permits of easy access to all parts.

All binding posts are inside of case, the connecting wires being brought in through the bottom of the case and near the wall.

Specify resistance of magnets required.

ORDER BY PLATE NUMBER

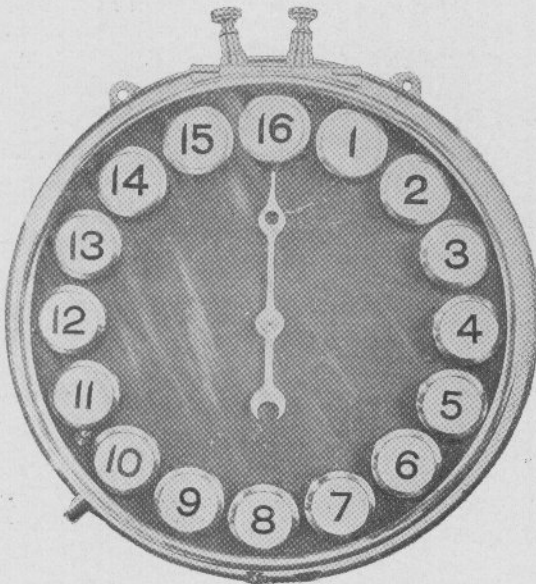
No.

1-way
 2-way }
 4-way } Prices on application.
 8-way }

List Price	
26 00	



Transmitter



Receiver

Train Describing Instruments
Model No. 1

TRAIN DESCRIBING INSTRUMENTS
Models No. 1

These instruments are designed to electrically convey information from one point to another in accordance with an established code. Pressing a button of the transmitter will record by means of a pointer a similar number on the receiver at the other end of the line.

The use of these instruments will greatly facilitate traffic over busy and complex track layouts.

Prices quoted upon application.

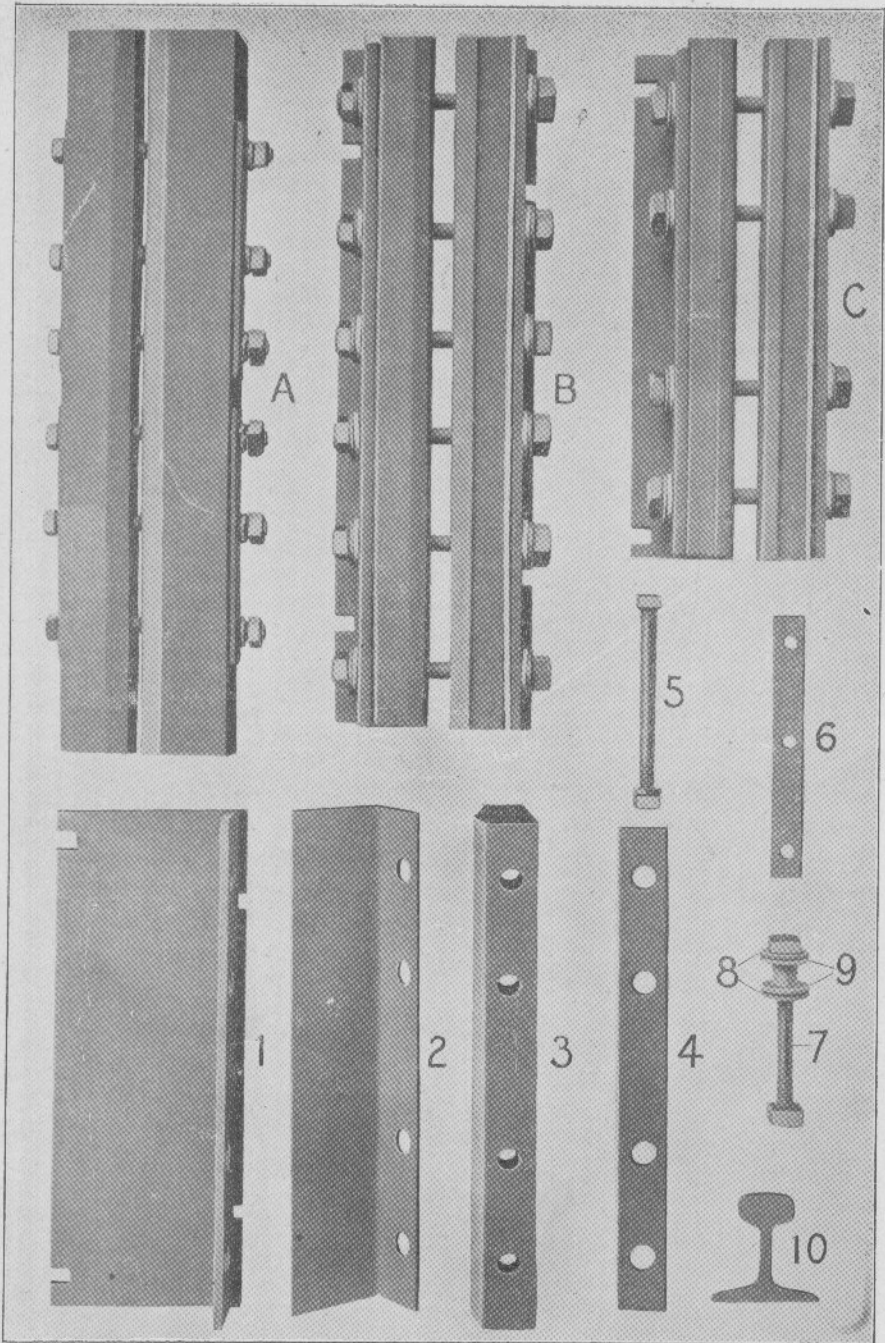
ORDER BY PLATE AND LETTER

No	List Price	
A Model No. 1 Transmitter, complete, as illustrated.....		
B Model No. 1 Receiver, complete, as illustrated,		

SECTION XVII

**RAIL JOINT INSULATIONS, WEDGE BLOCKS,
RAIL CONNECTIONS, TRACK DRILLS,
TRUNKING AND INSULATED
CONNECTIONS.**

Revised Reprint of First Edition, 1907.



Insulated Rail Joints
Models No. 1 and 2

RAIL JOINTS INSULATIONS

Models No. 1 and 2

There is no part of a track circuit equipment that deserves more careful consideration than the insulated joint, in order that the track may maintain its surface and alignment, that the joint be of neat appearance, compact and easily applied, that maintenance and renewals be readily accomplished and that current leakage be a minimum.

Design "A," the ordinary splice wood, is used mainly on secondary or unimportant tracks.

Designs "B" and "C" are for main line or heavy traffic tracks.

When ordering specify:—

1st. The length of joint over all.

2d. The drilling desired—furnish sketch showing distances from center to center of bolt holes and from base of rail to center of bolt holes.

3d. The maker's name and weight of rail with which the joint is to be fitted.

4th. Whether a 6-hole or a 4-hole joint.

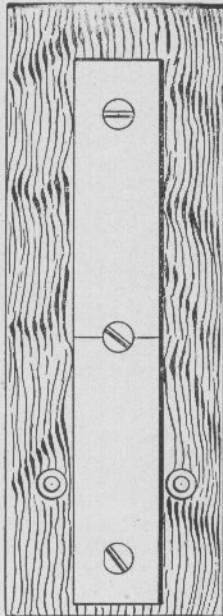
ORDER BY PLATE AND LETTER OR NUMBER.

No		List Price	
A	6-Hole Splice Wood, complete, as illustrated. Model No. 1. (2-3b, 2-6, 6-5, 1-10)		
B	6-Hole, Insulated Joint, complete, as illustrated. Model No. 2.1. (1-1a, 1-2a, 2-3a, 1-4a, 6-7, 12-8, 12-9, 1-10)		
C	4-Hole Insulated Joint, complete, as illustrated. Model No. 2.2. (1-1, 1-2, 2-3, 1-4, 4-7, 8-8, 8-9, 1-10)		
1	Rolled Angle Base for C		
1a	Rolled Angle Base for B		
2	Fibre Angle for C		
2a	Fibre Angle for B		
3	Wood Filler Block for C		
3a	Wood Filler Block for B		
3b	Splice Wood for A		
4	1/2"x2 1/2" Bearing Strap for C		
4a	1/2"x2 1/2" Bearing Strap for B		
5	3/4"x9 1/2" Square Head Bolt with Nut and Nut Lock for A		
6	1/2"x1 1/2" Bearing Strap for A		
7	1/2"x8 1/2" Square Head Bolt with Nut for B and C		
7a	1/2"x8 1/2" Square Head Bolt with Nut for B and C		
8	Pressed Washer for Collar of No. 9		
9	Fibre Collar and Washer for No. 7		
9a	Fibre Collar and Washer for No. 7a		
10	Fibre End Post (specify section of rail with which it is to be used)		

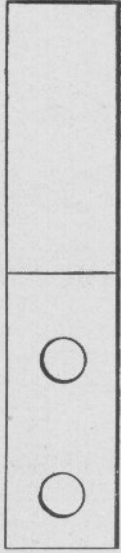
PRICES FURNISHED UPON APPLICATION



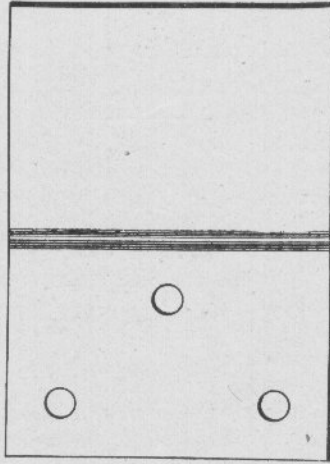
Model No. 1.1



Model No. 2



Model No. 1.2



Model No. 3



Wedge Blocks
Models No. 1, 2 and 3
(For Insulating Switch Points)

WEDGE BLOCKS
Models No. 1, 2 and 3
(For Insulating Switch Points)

These devices are used to eliminate insulated joints. In ordinary practice two wedge blocks will replace two insulated joints in either a single turnout or a crossover.

The wedge blocks are placed under the normally open switch point and secured to the first and second switch ties so as to raise the point clear of the tie plates upon which it usually rests. When the switch is thrown the point moves down the incline and rests in the proper position against its stock rail and at the same time shunts the track circuit.

ORDER BY PLATE AND LETTER

No.		List Price
A	Model No. 1.1 Wedge Block, countersunk for wood screws and two $\frac{1}{4}$ "x4" Wood Screws, complete.....	1 04
B	Model No. 1.2 Wedge Block with two $\frac{3}{4}$ "x4" Lag Screws, complete.....	1 40
C	Model No. 2 Wedge Block, Wooden Base, with three $\frac{1}{4}$ "x2 $\frac{1}{2}$ " Wood Screws, as shown, and two $\frac{5}{16}$ "x3" Wood Screws, complete.....	1 36
D	Model No. 3 Wedge Plate with three $\frac{1}{2}$ "x2 $\frac{1}{2}$ " Lag Screws, complete.....	1 22



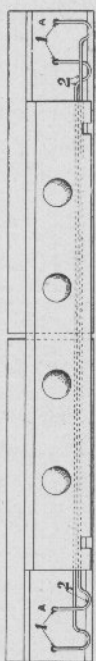
Application C



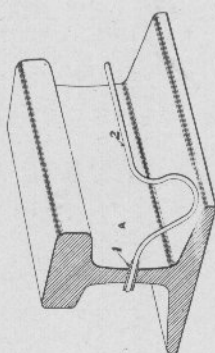
Application D



Application A



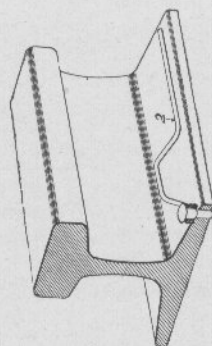
Application B



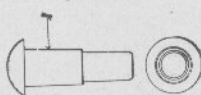
Sectional View of Channel Pin Bonding



Channel Pin



Sectional View of Rivet Bonding



Bond Wire Rivet

Methods of Application of Bond Wires, Bond Wire Rivets and Channel Pins

BOND WIRES, BOND WIRE RIVETS AND CHANNEL PINS

The use of bond wires, bond wire rivets and channel pins is too well known to require an extended description. Applications of each type are illustrated together with a sectional view of a rivet and of a channel pin connection. Each type has its adherents and is much a matter of preference.

The bond wire rivet is galvanized and designed for use in the flange of the rail. The channel pin is coppered and is for use in the web of the rail. Thousands of each type are in use over many miles of track sections for automatic signals, annunciators, crossing bells, electric locking, etc., attesting their fitness for the work for which they are designed.

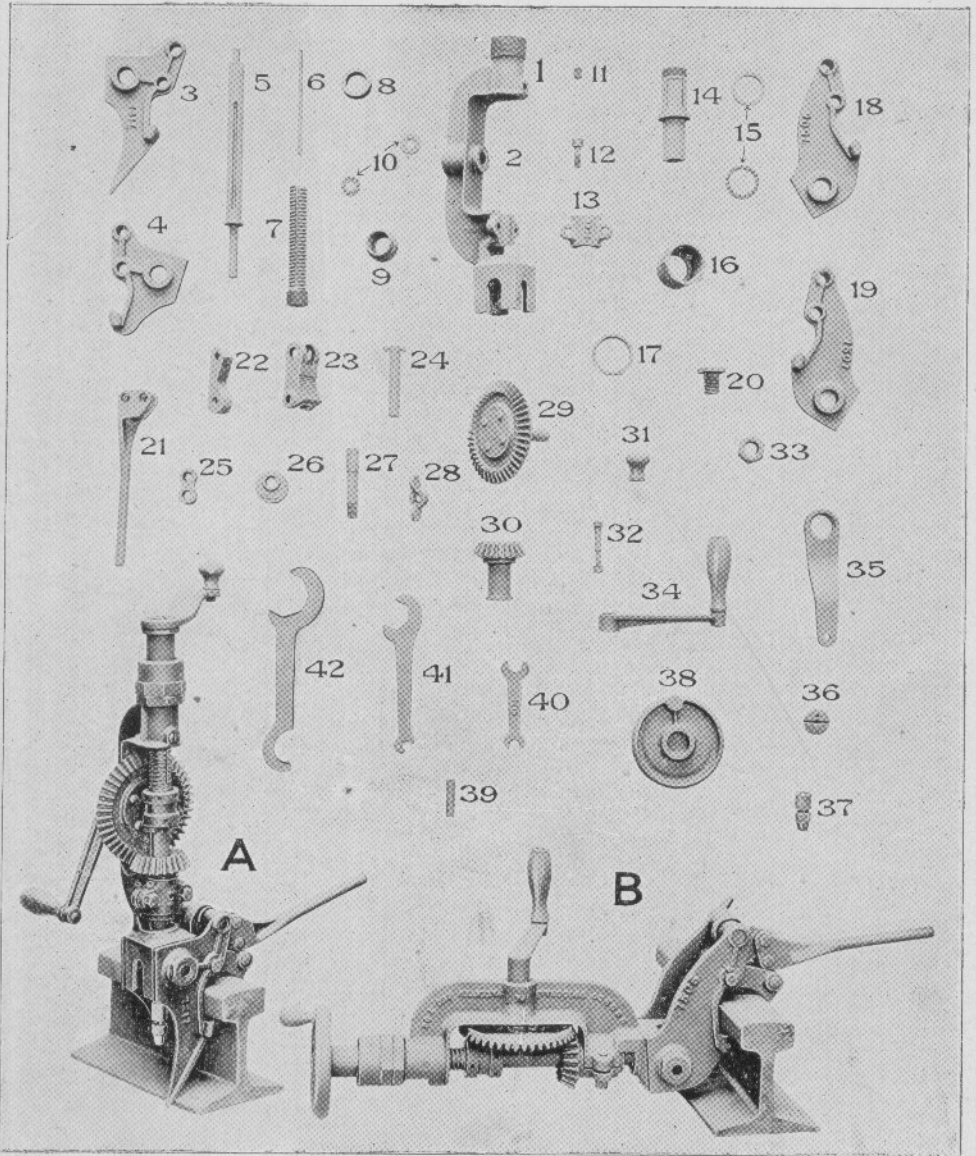
The bond wires are usually of No. 8 E. B. B. galvanized iron wire cut to suitable lengths determined by the rail joint fittings with which they are to be applied. At times No. 9 E. B. B. galvanized iron wire is used and again No. 6 copper wire in unusually bad situations as platforms at stations, planked highway crossings, etc.

The carrying of the wires outside of the splice bars as in applications A. and C, or back of the bars as at B and D, can be adjusted to suit the specifications of the road on which they may be used. For convenience in ordering the following list has been arranged.

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
1	Bond Wire Rivet.....	Per M
1a	Channel Pin for Nos. 2 to 2d and 2j to 2n inclusive	“
1b	Channel Pin for Nos. 2e to 2i inclusive.....	“
2	48" B.W.G., No. 8 E. B. B. Gal. I. B. Wires	“
2a	50" " No. 8 " " "	“
2b	52" " No. 8 " " "	“
2c	60" " No. 8 " " "	“
2d	108" " No. 8 " " "	“
2e	48" " No. 9 " " "	“
2f	50" " No. 9 " " "	“
2g	52" " No. 9 " " "	“
2h	60" " No. 9 " " "	“
2i	108" " No. 9 " " "	“
2j	48" B. & S.G. No. 6 Copper Bond Wires.....	“
2k	50" " No. 6 " " "	“
2l	52" " No. 6 " " "	“
2m	60" " No. 6 " " "	“
2n	108" " No. 6 " " "	“
3	No. 2 with two of No. 1 attached.....	“
3a	No. 2a " " No. 1 " ".....	“
3b	No. 2b " " No. 1 " ".....	“
3c	No. 2c " " No. 1 " ".....	“
3d	No. 2d " " No. 1 " ".....	“
3e	No. 2e " " No. 1 " ".....	“
3f	No. 2f " " No. 1 " ".....	“
3g	No. 2g " " No. 1 " ".....	“
3h	No. 2h " " No. 1 " ".....	“
3i	No. 2i " " No. 1 " ".....	“
3j	No. 2j " " No. 1 " ".....	“
3k	No. 2k " " No. 1 " ".....	“
3l	No. 2l " " No. 1 " ".....	“
3m	No. 2m " " No. 1 " ".....	“
3n	No. 2n " " No. 1 " ".....	“

PRICES FURNISHED UPON APPLICATION



Model No. 1
or
The Union Track Drilling Machine

MODEL NO. 1
or
The Union Track Drilling Machine

This machine is designed for use either in drilling the flange or the web of the rail as illustrated at A and B. The change from one to the other is effected by the interchange of clamping lever plates Nos. 3 and 4, or 18 and 19, which is easily and quickly accomplished.

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
A	Model No. 1.1 Track Drilling Machine, complete, as illustrated (for drilling the flange of rail).....	60 00
B	Model No. 1.2 Track Drilling Machine, complete, as illustrated (for drilling web of rail).....	60 00
1	Frame.....	5 96
1a	Frame with 1 of No. 2.....	6 71
2	Bronze Bushing for Gear Shaft with Headless Set Screws.....	75
3	Right Hand Clamping Plate for A.....	1 25

MODEL NO. 1
OR
The Union Track Drilling Machine

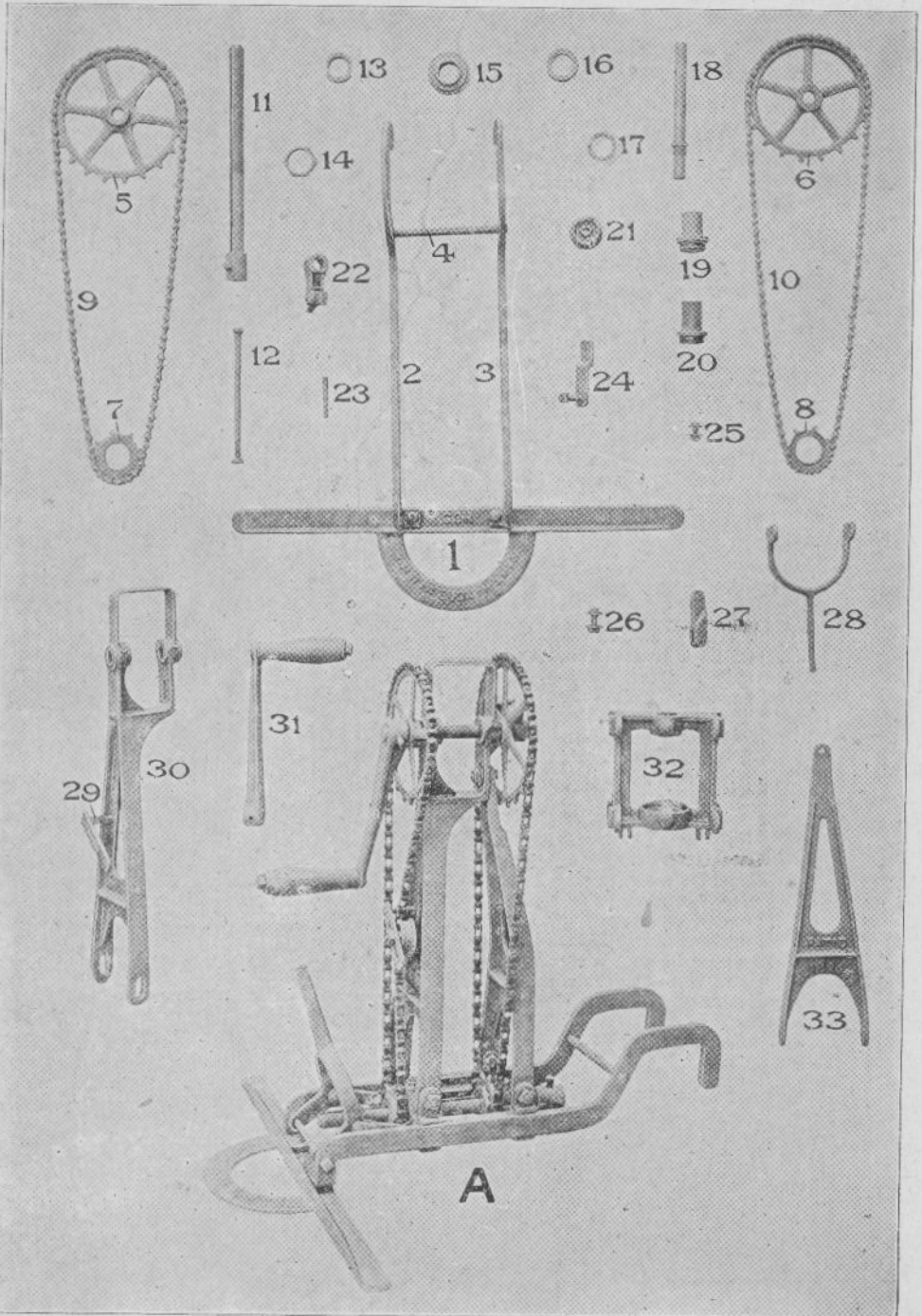
ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
4	Left Hand Clamping Plate for A.....	1 25
5	Spindle.....	3 66
5a	Spindle with Key.....	3 89
6	Key for No. 5.....	18
7	Feed Screw.....	4 02
7a	Feed Screw with (1-8, 1-9, 1-10, 1-11).....	5 70
8	Lock Nut for No. 9.....	61
9	Union Nut for securing No. 5 to No. 7 and enclosing No. 10.....	42
10	Set of Ball Bearings to go between Nos. 5 and 7.....	78
11	Spline Screw for securing No. 7 to No. 1.....	05
12	$\frac{3}{8}$ "x1 $\frac{1}{4}$ " Cap Screw for securing No. 13 to No. 1.....	07
13	Bearing Cap for No. 30.....	1 21
14	Brass Sleeve for operating No. 7.....	2 98
15	Set of Ball Bearings for Upper End of No. 14.....	1 24
16	Cap Nut for No. 1 and containing No. 15.....	87
17	Lock Nut for No. 16.....	47
18	Right Hand Clamping Plate for B.....	1 24
19	Left Hand Clamping Plate for B.....	1 24
20	Square Head Hollow Bolt for securing Nos. 18 and 19 or 3 and 4 to No. 1.....	36
20a	No. 20 with 1 of No. 33.....	40
21	Clamping Lever.....	27
22	Adjusting Pawl.....	4 11
23	Clamping Lever Pawl.....	59
24	$\frac{5}{8}$ "x4" Pin with Cotters for joining Nos. 22 and 23 to No. 1.....	15
25	Pawl Link connecting Nos. 21 and 23.....	09

MODEL NO. 1
or
The Union Track Drilling Machine

ORDER BY PLATE AND LETTER OR NUMBER.

No.		List Price
26	Adjustable Cam.....	43
27	Pin for connecting No. 26 to No. 1.....	26
27a	No. 27 with 1 of No. 28.....	51
28	Wing Nut for No. 27.....	28
29	Large Bevel Driving Gear.....	6 27
30	Small Bevel Driving Gear.....	4 80
31	Knob for Nos. 35 and 38.....	83
32	Fillister Head Bolt with Nut for screwing No. 31 to No. 35 or 38.....	20
33	Nut for No. 20.....	04
34	Driving Crank with Dowel Pin and Wooden Handle for No. 29.....	47
35	Feed Crank for A.....	84
36	Cap Nut for securing Nos. 35 or 38 to No. 14.....	1 00
37	Drill Chuck.....	6 18
38	Feed Wheel for B.....	1 34
39	Pin for joining Nos. 23 and 25.....	05
40	Standard Hex. Wrench for $\frac{3}{8}$ " and $\frac{1}{2}$ " Bolts.....	12
41	Hex. Wrench for Nos. 33 and 12.....	15
42	Hex. and Spanner Wrench for Nos. 16, 17, 8 and 9.....	23



Model No. 2, or The Wilson Track Drilling Machine

MODEL NO. 2
 or
The Wilson Track Drilling Machine

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
A	Model No. 2 Track Drilling Machine, complete (for use in drilling web of rail).....	60 00
1	Foot Plate.....	PRICES FURNISHED UPON APPLICATION
2	Left Hand Rail Hook.....	
3	Right Hand Rail Hook.....	
4	Separator for Nos. 2 and 3.....	
5	Drive Sprocket Wheel (21 teeth).....	
6	Feed Sprocket Wheel (19 teeth).....	
✓ 7	Drive Sleeve Sprocket Wheel (8 teeth).....	
✓ 8	Feed Nut Sprocket Wheel (7 teeth).....	
9	48 Link Drive Chain.....	
10	47 Link Feed Chain.....	
11	Spindle with Set Screw.....	

MODEL NO. 2
or
The Wilson Track Drilling Machine

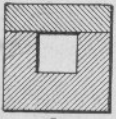
ORDER BY PLATE AND LETTER OR NUMBER

No.	List Price
12 $\frac{3}{8}$ "x6 $\frac{1}{2}$ " Toggle Lever Bolt with Nut and Washers	PRICES FURNISHED UPON APPLICATION
13 Adjusting Nut	
14 Lock Nut for Nos. 7 and 8	
15 Ball Bearing Cone	
16 Collar for Drive Sleeve No. 19	
17 Washer for Adjusting Nut No. 13	
18 Crank Shaft	
19 Drive Sleeve for No. 11	
20 Feed Nut for No. 11	
21 Idler Wheel	
22 Pawl and Arm with 1 of No. 23 for Feed Sprocket Wheel No. 6	
23 Crank Shaft Pin for securing Nos. 22 and 31 to No. 18	

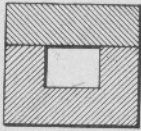
MODEL NO. 2
or
The Wilson Track Drilling Machine

ORDER BY PLATE AND LETTER OR NUMBER

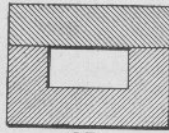
No.		List Price	
24	Idler Wheel Bracket with Pin, Nut and Washer	PRICES FURNISHED UPON APPLICATION	
25	$1\frac{1}{2}$ "x $\frac{3}{4}$ " Bolt with Nut and Washers for securing No. 24 to No. 29		
26	$\frac{3}{8}$ "x1" Bolt with Nut and Washers for securing Nos. 30 and 33 to No. 32 and No. 30 to No. 33		
27	Toggle Link with Rivets		
28	Toggle Lever		
29	Idler Adjusting Plate with Riveted Pin		
30	Upright Frame		
31	Crank with Handle		
32	Sliding Frame with Cups for Ball Bearings and Oilers		
33	Upright Frame Brace		



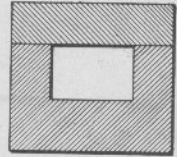
4



20



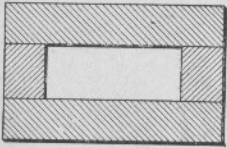
45



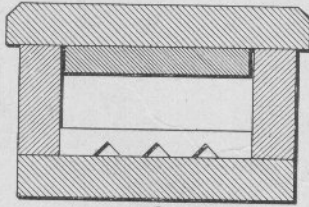
16



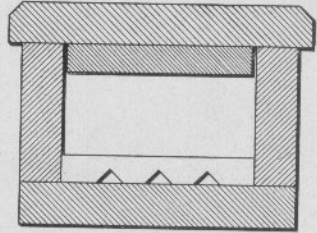
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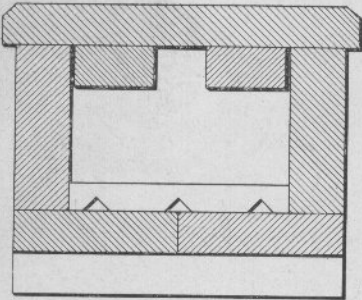
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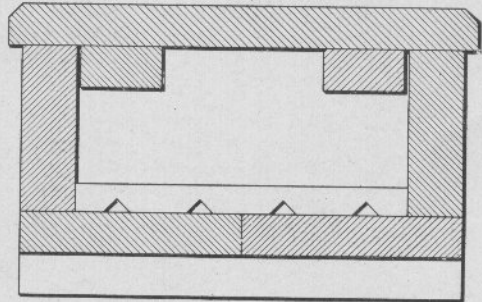
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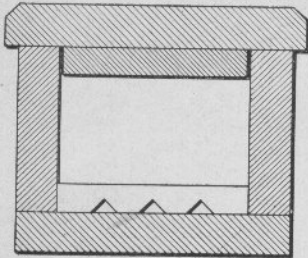
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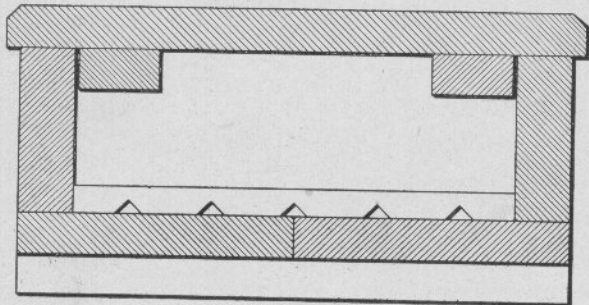
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12



11



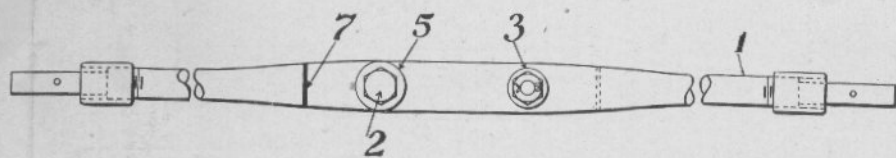
13

Yellow Pine Trunking
(For Wire Leads)

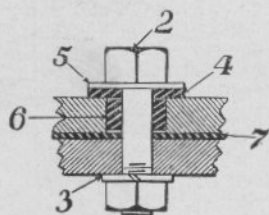
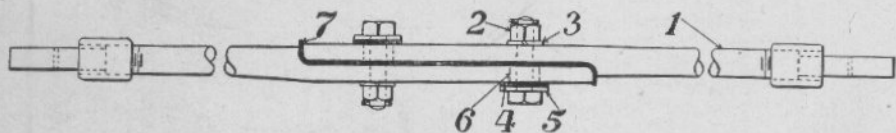
YELLOW PINE TRUNKING
(For Wire Leads)

ORDER BY PLATE NUMBER

No.	Drawing Reference	List Price
1	Grooved Trunking with opening 1"x1", complete, as illustrated, per 100 lin. ft.	B-3568 6 34
1a	Capping for No. 1, per 100 lin. ft.	" 2 32
✓ 4	Grooved Lumber with opening 1½"x1½" complete, as illustrated, per 100 lin. ft.	" 11 08
4a	Capping for No. 4, per 100 lin. ft.	" 2 80
9	Cable Conduit with opening 5"x2", complete, as illustrated, per 100 lin. ft.	" 20 82
9a	Capping for No. 9, per 100 lin. ft.	" 8 12
10	Cable Conduit with opening 7"x2", complete, as illustrated, per 100 lin. ft.	" 44 20
10a	Capping for No. 10, per 100 lin. ft.	" 19 90
11	Cable Conduit with opening 7"x4", complete, as illustrated, per 100 lin. ft.	" 48 20
11a	Capping for No. 11, per 100 lin. ft.	" 19 90
12	Cable Conduit with opening 12"x3½", complete, as illustrated, per 100 lin. ft.	" 71 70
12a	Capping for No. 12, per 100 lin. ft.	" 27 46
13	Cable Conduit with opening 16"x3½", complete, as illustrated, per 100 lin. ft.	" 82 60
13a	Capping for No. 13, per 100 lin. ft.	" 33 06
✓ 16	Grooved Trunking with opening 2"x2", complete, as illustrated, per 100 lin. ft.	" 16 50
16a	Capping for No. 16, per 100 lin. ft.	" 3 00
20	Grooved Trunking with opening 2"x1½", complete, as illustrated, per 100 lin. ft.	" 16 00
20a	Capping for No. 20, per 100 lin. ft.	" 5 50
45	Grooved Trunking with opening 3"x1½", complete, as illustrated, per 100 lin. ft.	" 16 90
45a	Capping for No. 45, per 100 lin. ft.	" 6 00
46	Cable Conduit with opening 7"x3", complete, as illustrated, per 100 lin. ft.	" 46 20
46a	Capping for No. 46, per 100 lin. ft.	" 19 90
47	Cable Conduit with opening 8"x3½", complete, as illustrated, per 100 lin. ft.	" 63 20
47a	Capping for No. 47, per 100 lin. ft.	" 24 00



A



Detail for A or B

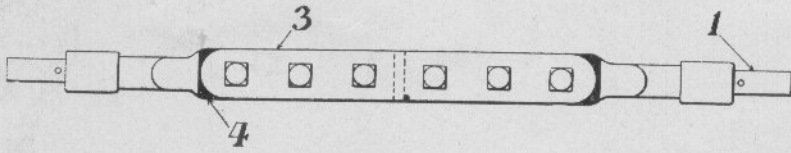
Insulated Connections for Pipe Lines
Model No. 1

INSULATED CONNECTIONS FOR PIPE LINES

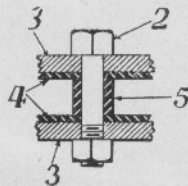
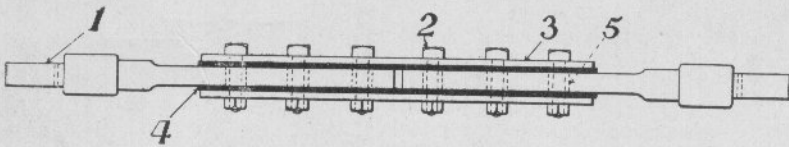
Model No. 1

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
A	Model No. 1.1 Insulated Connection with Tang Ends and Sleeves, complete as shown.....	4 60
B	Model No. 1.2 Insulated Connection with Stub End, complete	3 90
1	Threaded Piece with Tang End and Sleeve.....	1 75
1a	Stub End Piece.....	1 35
2	$\frac{3}{4}$ "x3" Bolt with Nut, per 100.....	12 00
3	Nut Lock for No. 2, per 100.....	2 00
4	Fiber Washer for No. 2.....	04
5	Wrought Washer for No. 2, per 100.....	1 00
6	Fiber Bushing for No. 2.....	04
7	$\frac{1}{8}$ "x2"x1 $\frac{3}{4}$ " Bent Fiber Plate.....	16



C



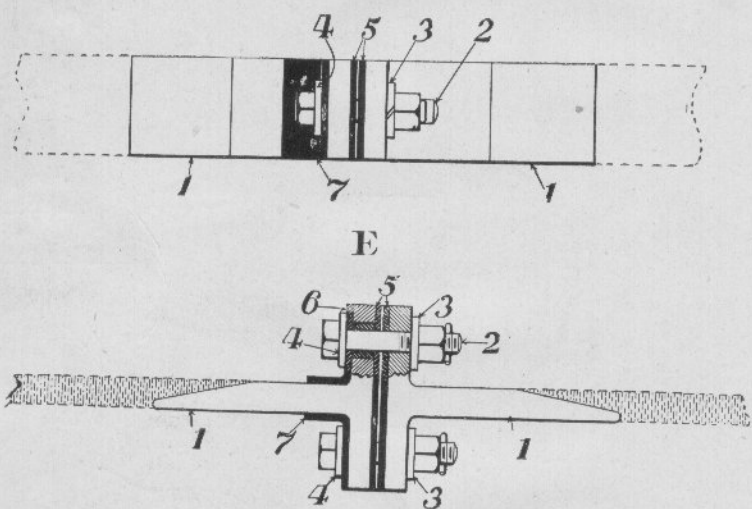
Detail for C or D
Insulated Connections for Pipe Lines
Model No. 2

6
6
36

INSULATED CONNECTIONS FOR PIPE LINES

Model No. 2

No.		List Price
C	Model No. 2.1 Insulated Connection with Tang Ends and Sleeves, complete as shown.....	3 30
D	Model No. 2.2 Insulated Connection with Stub Ends complete	2 65
1	Threaded Piece with Tang End and Sleeve.....	80
1a	Stub end Piece.....	44
2	1/2" x 2 1/4" Bolt with Nut, per 100.....	6 00
3	3/8" x 2" x 13" Iron Splice Plate.....	20
4	1/8" x 2" x 13 3/4" Fiber Plate.....	14
5	Fiber Bushing for No. 2.....	03



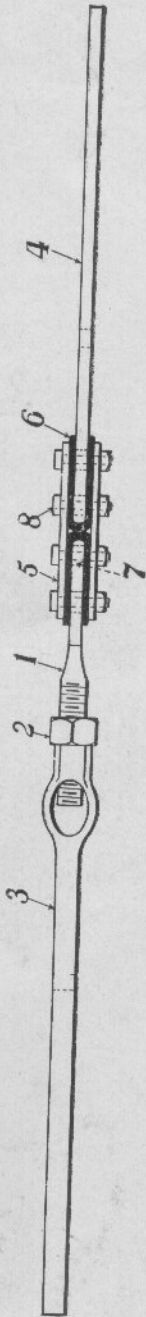
Insulated Joint for Welding to Switch Tie Rods or Derail Head Rods
Model No. 1

**INSULATED JOINT FOR WELDING TO SWITCH TIE
RODS OR DERAIL HEAD RODS**

Model No. 1

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price	
E	Insulated Joint, complete as shown.....	3 50	
1	"T" Piece drilled for No. 2.....	1 20	
1a	"T" Piece drilled for No. 6.....	1 20	
2	5/8" x 3/4" Bolt with Nut and Cotter, per 100.....	9 00	
3	Nut Lock for No. 2, per 100.....	2 00	
4	Pressed Washer for No. 2, per 100.....	1 00	
5	Fiber Plate.....	08	
6	Fiber Bushing for No. 2.....	06	
7	Bent Fiber Plate.....	08	



F

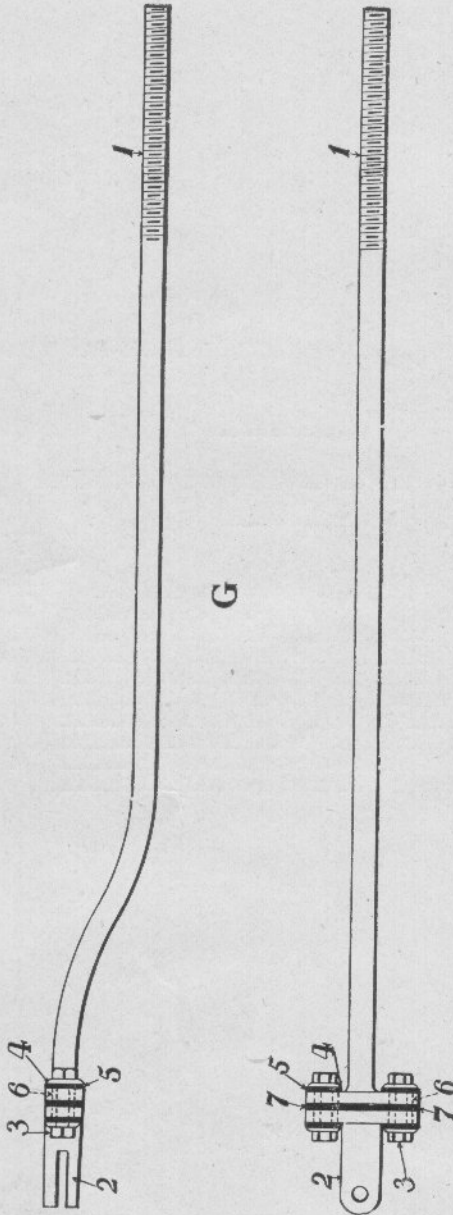


Insulated Adjustable Switch Tie Rod
Model No. 1

INSULATED ADJUSTABLE SWITCH TIE ROD
Model No. 1

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
F	Insulated Adjustable Tie Rod for Switch, complete as shown.....	15 10
1	Threaded Piece.....	2 28
2	Nut for No. 1.....	20
3	Female End of Rod.....	9 70
4	3/4"x2 1/2" Flat Rod.....	85
5	Splice Plate.....	30
6	Bent Fiber Plate.....	20
7	Fiber Bushing for No. 8.....	04
8	3/4"x2 7/8" Flat Head Bolt with Nut, special.....	08



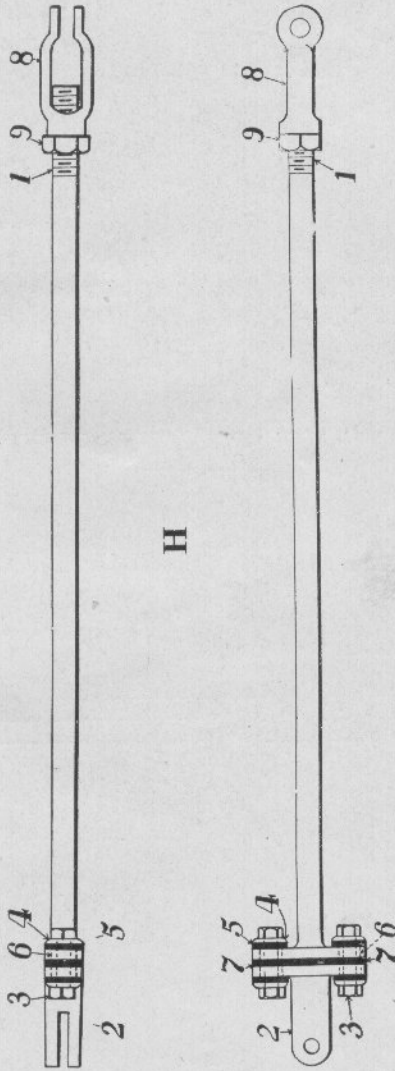
Insulated Threaded Rod With Special Jaw for Switch Adjustment
Model No. 1

**INSULATED THREADED ROD WITH SPECIAL JAW
FOR SWITCH ADJUSTMENT**

Model No. 1

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
G	Insulated Threaded Rod with Jaw for Switch Adjustment, complete as shown.....	12 00
Ga	Above with Pin and Cotter.....	12 10
1	1 1/4" Rod with "T" Head and Threaded End.....	6 08
2	Special Jaw.....	4 30
3	3/4"x3/4" Bolt with Nut, per 100.....	12 00
4	Steel Washer for No. 3, per 100.....	1 00
5	Fiber Washer for No. 3.....	04
6	Fiber Bushing for No. 3.....	04
7	1/4"x2"x6" Fiber Plate.....	20



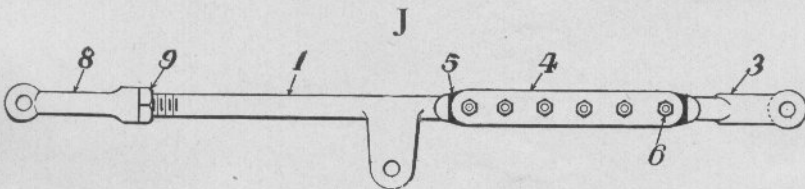
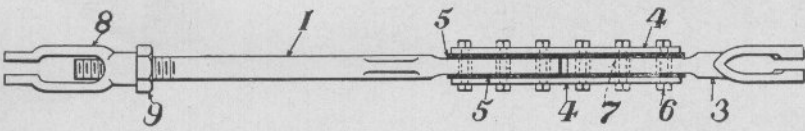
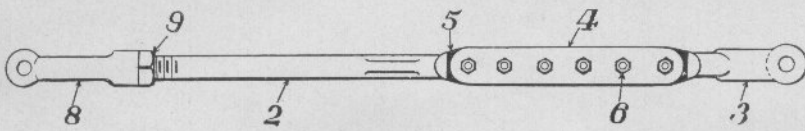
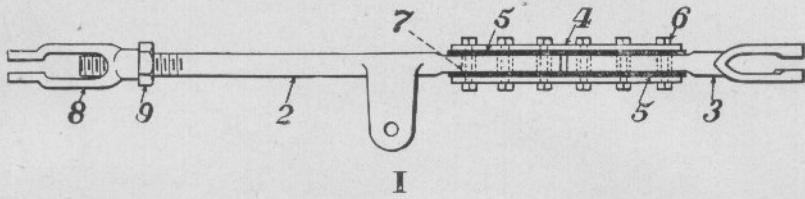
Insulated Rod with Special Jaw for Rocking Shaft Connection
Model No. 1

**INSULATED THREADED ROD WITH SPECIAL JAW
FOR ROCKING SHAFT CONNECTION**

Model No. 1

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price	
H	Insulated Rod for Rocker Shaft Connection, complete as shown.....	10 96	
Ha	Above with Pins and Cotter.....	11 15	
1	1/4" Rod with "T" Head and Threaded End.....	4 74	
2	Special "T" Jaw.....	4 30	
3	3/4" x 3/4" Bolt with Nut, per 100.....	12 00	
4	Steel Washer for No. 3, per 100.....	1 00	
5	Fiber Washer for No. 3.....	04	
6	Fiber Bushing for No. 3.....	04	
7	1/4" x 2" x 6" Fiber Plate.....	20	
8	1/4" Screw Jaw.....	44	
9	1/4" Hexagonal Nut for No. 8.....	10	



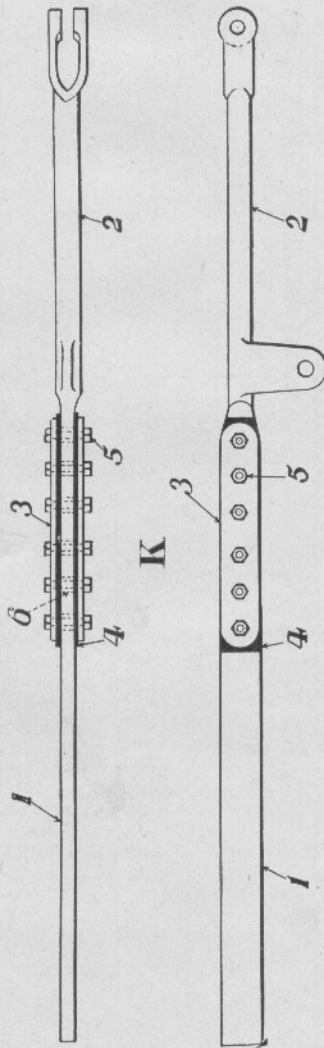
Insulated Front Rods for Switches
Models No. 1

INSULATED FRONT RODS FOR SWITCHES

Model No. 1

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
I	Model No. 1.1 Insulated Front Rod for Switch with Vertical Pipe Lug; complete as shown.....	7 66
Ia	I with Pins and Cotters.....	7 84
J	Model No. 1.2 Insulated Front Rod for Switch with Lateral Pipe Lug, complete as shown.....	7 66
Ja	J with Pins and Cotters.....	7 84
1	1 $\frac{1}{4}$ " Threaded Rod with Lateral Lug for J.....	3 24
2	1 $\frac{1}{4}$ " Threaded Rod with Vertical Lug, for I.....	3 24
3	1 $\frac{1}{4}$ " Solid Jaw with Flattened Shank, for I or J...	2 05
4	Splice Plate, for I or J.....	20
5	Fiber Plate, for I or J.....	14
6	$\frac{1}{2}$ "x2 $\frac{1}{4}$ " Bolt with Nut for I or J, per 100.....	6 00
7	Fiber Bushing for No. 6.....	03
8	1 $\frac{1}{4}$ " Screw Jaw for I or J.....	44
9	1 $\frac{1}{4}$ " Thin Hexagonal Nut for No. 8.....	10

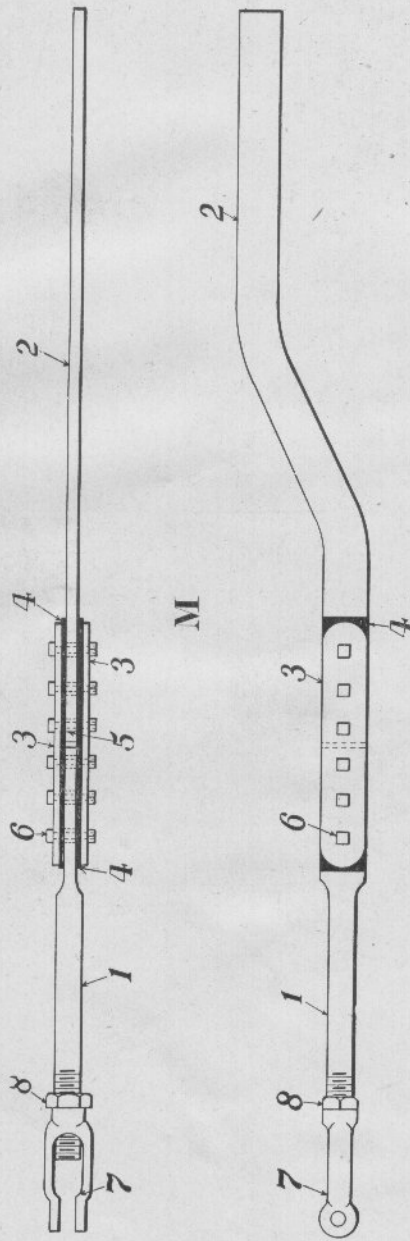


Insulated Front Rod for Derail
Model No. 2

INSULATED FRONT ROD FOR DERAIL
Model No. 2

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
K	Model No. 2.1 Insulated Front Rod for Derail with Lateral Pipe Lug complete as shown.....	5 56
Ka	K with Pin and Cotter.....	5 65
L	Model No. 2.2 Insulated Front Rod for Derail with Vertical Pipe Lug, complete.....	5 56
La	L with Pin and Cotter.....	5 65
1	3/4"x2" Flat Rod for K or L.....	62
2	1 1/4" Solid Jaw with Lateral Pipe Lug and Flattened End for K.....	3 16
2a	1 1/4" Solid Jaw with Vertical Pipe Lug and Flattened End for L.....	3 16
3	Splice Plate for K or L.....	20
4	Fiber Plate for K or L.....	14
5	1/2"x2 1/4" Bolt with Nut for K or L.....	6 00
6	Fiber Bushing for No. 5.....	03



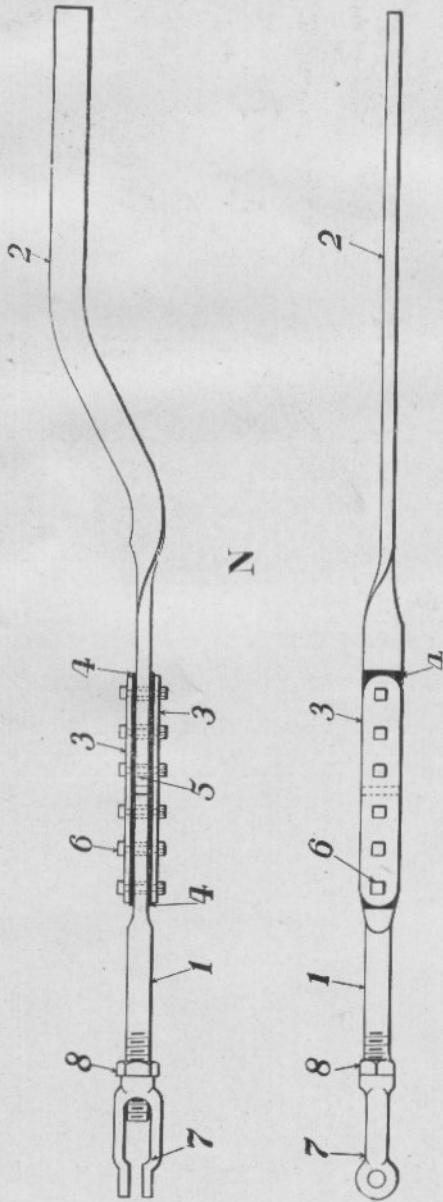
Insulated Lock Rod
Model No. 1

INSULATED LOCK RODS

Model No. 1

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
M	Model No. 1.1 Insulated Lock Rod with Vertical Set, complete, as shown.....	5 16
Ma	M with Pin and Cotter.....	5 25
1	1 1/4" Threaded Rod.....	1 46
2	3/4" x 2" Flat Rod with Vertical Set.....	1 30
3	Splice Plate.....	20
4	Fiber Plate.....	16
5	Fiber Bushing for No. 6.....	03
6	1/2" x 2 1/4" Bolt with Nut, per 100.....	6 00
7	1 1/4" Screw Jaw.....	44
8	1 1/4" Thin Hexagonal Nut for No. 7.....	10



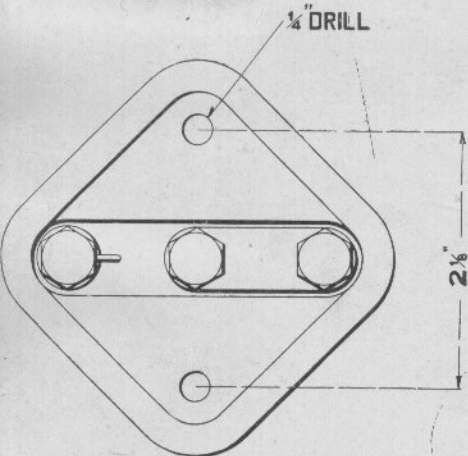
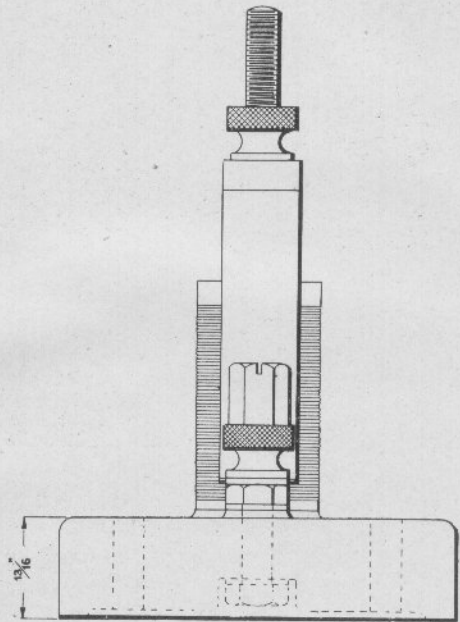
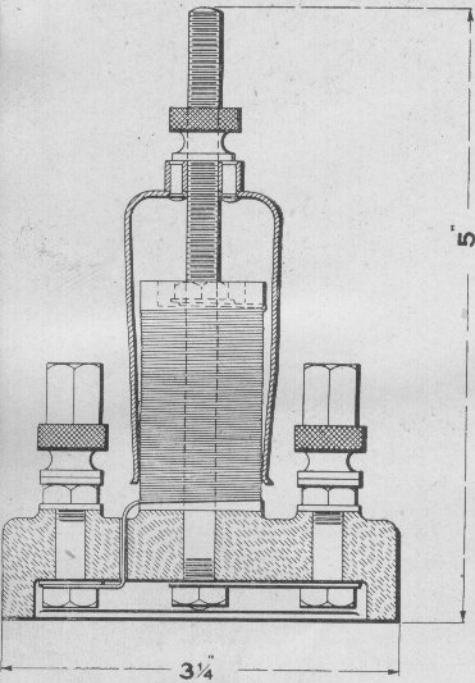
Insulated Lock Rod
Model No. I

INSULATED LOCK RODS

Model No. 1

ORDER BY PLATE AND LETTER OR NUMBER

No.		List Price
N	Model No. 1.2 Insulated Lock Rod with Vertical Set, complete as shown.....	5 30
Na	N with Pin and Cotter.....	5 39
1	1 1/4" Threaded Rod.....	1 35
2	3/4"x2" Flat Rod with Twist and Vertical Set.....	1 54
3	Splice Plate.....	20
4	Fiber Plate.....	14
5	Fiber Bushing for No. 6.....	93
6	1/2"x2 1/4" Bolt with Nut, per 100.....	6 00
7	1 1/4" Screw Jaw.....	44
8	1 1/4" Thin Hexagonal Nut for No. 7.....	10



INVERTED PLAN VIEW

Variable Resistance Coil, Single Spool Type

VARIABLE RESISTANCE COIL

Single Spool Type

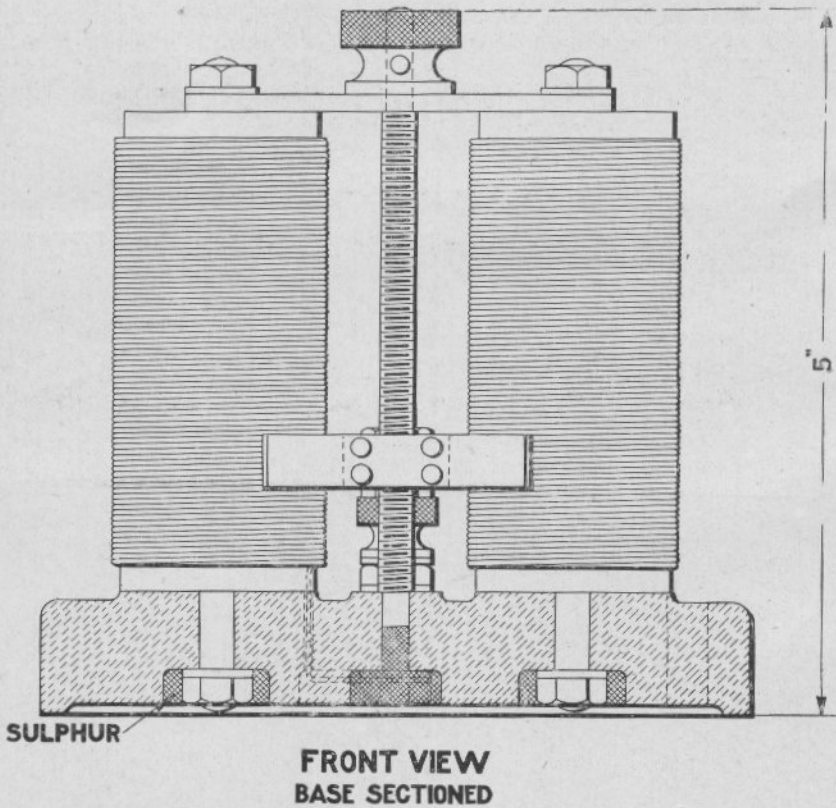
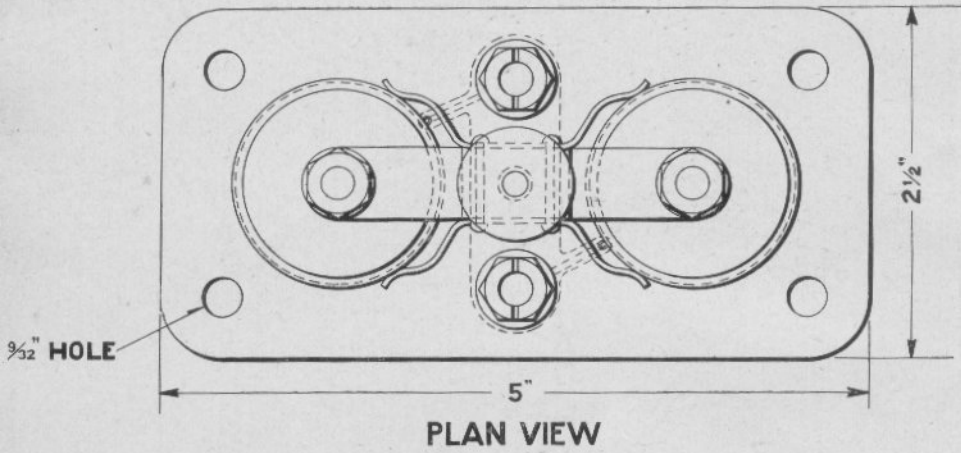
Designed primarily for use between storage batteries and track circuits, this instrument is readily adapted to similar purposes which will suggest themselves.

By loosening the jam nut and turning the U shaped spring up or down the resistance of the coil can be varied at will from zero up to its maximum number of ohms. It is suitable for use in circuits up to 8 volts.

ORDER BY PLATE AND FIGURE

Fig.

	Drawing Reference	List Price
1 Variable Resistance Coil, complete, as shown. Maximum resistance 5 ohms. Suitable for circuits up to 8 volts.....	1-C-6792	3 00
2 as above, Maximum resistance 6 ohms.....	1-C-6792	3 00
3 as above, Maximum resistance 8 ohms.....	1-C-6792	3 00
4 as above, Maximum resistance 10 ohms.....	1-C-6792	3 00
5 as above, Maximum resistance 12 ohms.....	1-C-6792	3 00
6 as above, Maximum resistance 15½ ohms.....	1-C-6792	3 00
7 as above, Maximum resistance 20 ohms.....	1-C-6792	3 00
8 as above, Maximum resistance 25 ohms.....	1-C-6792	3 00



Variable Resistance Coil, Double Spool Type

VARIABLE RESISTANCE COIL

Double Spool Type

On the opposite plate is shown a resistance coil designed to give greater resistance than the coil on Plate 1790.

The contact springs between the two spools on which is wound resistance wire are raised or lowered by turning the thumb nut at the top. This adjusts the resistance from zero to 150 ohms as desired. This coil is suitable for circuits up to 16 volts.

ORDER BY PLATE AND FIGURE

Fig.

1 Variable Resistance Coil, complete, as shown.
 Maximum resistance 150 ohms. Suitable for
 circuits up to 16 volts.

Drawing Reference	List Price
9-C-6792	5 60

SUPPLEMENT NO. 3
TO
1902 CATALOGUE SECTIONS 16-17

PLATES 1631, 1632 AND 1633

SWITCH INDICATOR AND RELAY BOX POSTS
SEMAPHORE TYPE OF INDICATOR



The Union Switch & Signal Co.

Swissvale, Pa.

MARCH, 1909.

INDICATOR AND RELAY BOX POSTS

THE Indicator and Relay Box Posts illustrated on the following pages are designed to admit of dropping line wires direct from pole line to the post, thus eliminating the objectionable features of running rubber covered wire in trunking from pole line to instrument. Figs. A and B illustrate a double and single indicator location.

A cable is carried on a messenger wire direct from the pole line to the holding clamp near the top of the post, thence under the drip cap to the interior of the post and to the instrument terminals.

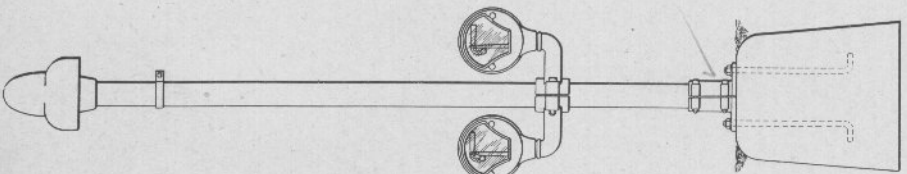
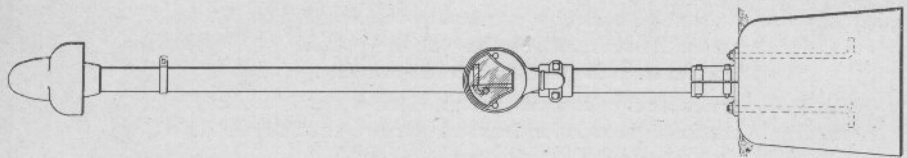
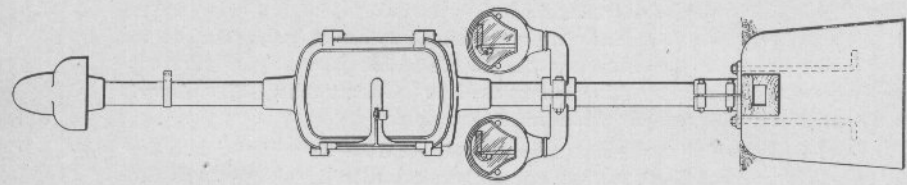
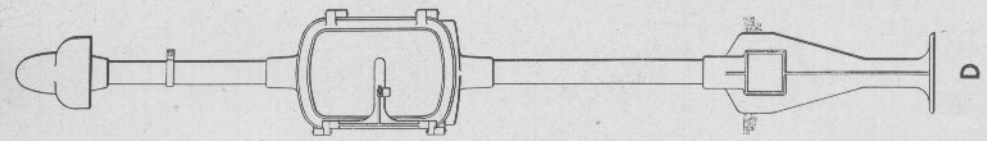
This arrangement is particularly desirable in prairie country where it is the practice to burn over the right of way, subjecting the trunking to damage by fire. Necessarily the post must be located on the pole line side and clear of all tracks. When locations must be on the opposite side of tracks from pole line, the line wire or cable may be carried to a pole on the opposite side and then dropped to the instrument post.

Fig. C illustrates a relay box, in addition to the indicators. Aerial wires are carried from pole line as previously described. The $5\frac{3}{8}$ " x $5\frac{7}{8}$ " opening just beneath the socket at the base of the post is for the conduit which carries the wires from the tracks to the instrument.

Fig. D illustrates a relay box post mounted on a cast iron foundation. The opening in the foundation is for the same purpose as stated in Fig. C.

Figs. E to L inclusive need no explanation, as their uses are apparent.

These applications may be varied or additional apparatus may be added to meet many special layouts.



4

A
B
C
D
SWITCH INDICATOR AND RELAY BOX POSTS
SEMAPHORE TYPE OF INDICATOR

**SWITCH INDICATOR AND RELAY BOX POSTS
SEMAPHORE TYPE OF INDICATOR**

The indicator mechanism illustrated on the opposite page is the same as that illustrated on Plate 1625.

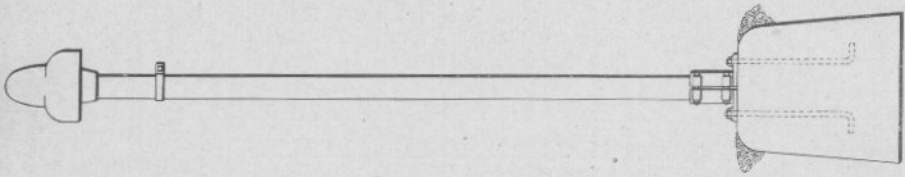
When ordering, specify the resistance of the magnets required.

Order by Plate, Figure and Instructions given above

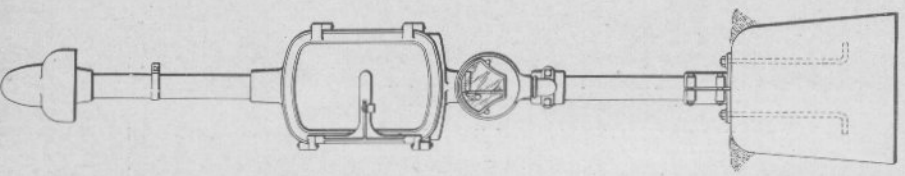
The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

Fig.		Drawing Reference	List Price
A	Double Location Switch Indicator Post, with lower quadrant semaphore indicators and foundation bolts, as shown	1-C-7425	82.00
Aa	as above, with upper quadrant semaphore indicators	"	82.00
B	Single Location Switch Indicator Post, with lower quadrant semaphore indicator and foundation bolts, as shown	3-C-7425	50.60
Ba	as above, with upper quadrant semaphore indicator	"	50.60
C	Combined Double Location Switch Indicator and Relay Box Post (for two relays), with lower quadrant semaphore indicators, clamp base and foundation bolts, as shown	2-C-7425	109.00
Ca	as above, with upper quadrant semaphore indicators	"	109.00
Cb	Combined Double Location Switch Indicator and Relay Box Post (for three relays), with lower quadrant semaphore indicators, clamp base and foundation bolts	C-7425	115.00
Cc	as above, with upper quadrant semaphore indicators	"	115.00
Cd	Combined Double Location Switch Indicator and Relay Box Post (for four relays), with lower quadrant semaphore indicators, clamp base and foundation bolts	"	123.00
Ce	as above, with upper quadrant semaphore indicators	"	123.00
D	Relay Box and Post (for two relays), with cast iron foundation, as shown	"	50.00

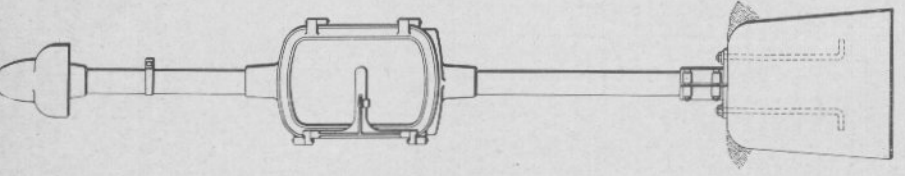
G



F



E



SWITCH INDICATOR AND RELAY BOX POSTS
SEMAPHORE TYPE OF INDICATOR

**SWITCH INDICATOR AND RELAY BOX POSTS
SEMAPHORE TYPE OF INDICATOR**

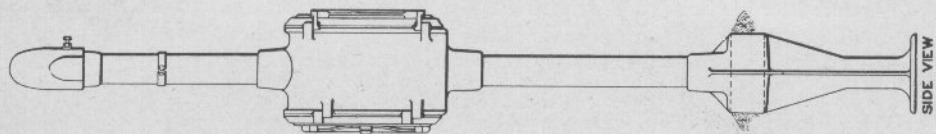
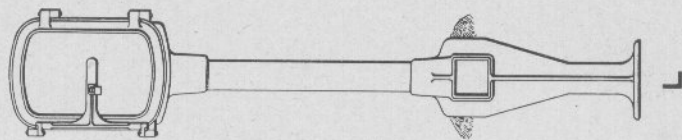
The indicator mechanism illustrated on the opposite page is the same as that illustrated on Plate 1625.

When ordering, specify the resistance of the magnets required.

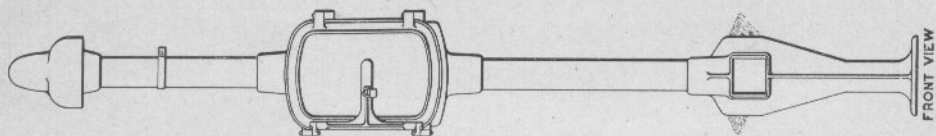
Order by Plate, Figure and Instructions given above

The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

Fig.		Drawing Reference	List Price
E	Relay Box and Post (for two relays), with clamp base and foundation bolts, as shown.....	C-7425	45.00
F	Combined Single Location Switch Indicator and Relay Box Post (for two relays), with lower quadrant semaphore indicator, clamp base and foundation bolts, as shown.....	"	77.60
Fa	as above, with upper quadrant semaphore indicator.....	"	77.60
Fb	Combined Single Location Switch Indicator and Relay Box Post (for three relays), with lower quadrant semaphore indicator, clamp base and foundation bolts.....	"	83.60
Fc	as above, with upper quadrant semaphore indicator.....	"	83.60
Fd	Combined Single Location Switch Indicator and Relay Box Post (for four relays), with lower quadrant semaphore indicator, clamp base and foundation bolts.....	"	91.60
Fe	as above, with upper quadrant semaphore indicator.....	"	91.60
G	Post, with clamp base and foundation bolts, as shown, for mounting semaphore switch indicators.....	"	18.00

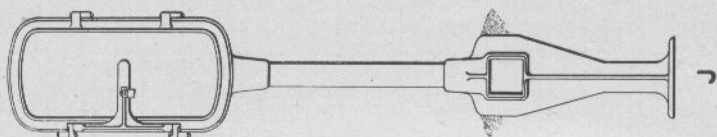


K

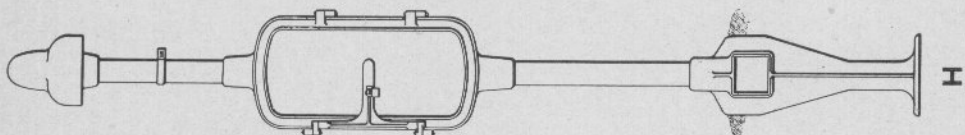


FRONT VIEW

RELAY BOXES



J



H

RELAY BOXES

Order by Plate and Figure

The drawing references are shown merely for convenience in checking material with shipping lists and invoices.

Fig.		Drawing Reference	List Price
H	Relay Box and Post (for three relays), with cast iron foundation, as shown.....	5-C-7425	56.00
J	Relay Box and Post (for three relays), with cast iron foundation (no top post or drip cap), as shown....	C-7425	50.00
Ja	as above, for two relays.....	"	44.00
K	Relay Box and Post (for four relays), with cast iron foundation, as shown..	7-C-7425	64.00
L	Relay Box and Post (for four relays), with cast iron foundation (no top post or drip cap), as shown....	6-C-7425	58.00

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