

5-H-3  
216

# THE HALL SIGNAL COMPANY

## OFFICES:

NEW YORK

CHICAGO.

## WORKS:

GARWOOD, NEW JERSEY.

*[Faint blue pencil scribbles and a diagonal line across the page]*

CATALOGUE No. 6.

THE HALL ELECTRIC SEMAPHORE  
STYLE "F", ELECTRIC DISC SIG-  
NALS, SWITCH AND TOWER  
INDICATORS, SWITCH  
BOXES, ETC.



CATALOGUE No. 6

A CATALOGUE AND PRICE LIST

*of*

ELECTRIC SIGNALS  
AND INDICATORS

*Manufactured by*

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**THE HALL SIGNAL CO.**

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*of*

**NEW YORK**

Owners of the Normal Danger System of  
Installing Automatic Signals, The Loree  
Patenall System of Operating Sig-  
nals in the Upper Arm of the  
Quadrant. The Electro-  
gas Signal System,  
Etc., Etc., Etc.

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PLANS *and* ESTIMATES *on* APPLICATION

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NEW YORK, CHICAGO,  
BROAD EXCHANGE BLDG, MONADNOCK BLDG.

Works ; GARWOOD, N. J.

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1906.

Return to .....

ENGINEERING DEPARTMENT.

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# ∴ Preface ∴

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IN presenting this addition to our catalogue we call your special attention to our improved Electric Semaphore Signal, operated by the "Style F" mechanism, which we believe to be the best design yet produced, not only in its comparative simplicity, but in economy of operation.

This improved device was first shown at Washington, D. C., in May 1905, and at the present time there are nearly two thousand of them either in service or on order from many of the leading railroads of the United States.

NEW YORK, 1906.

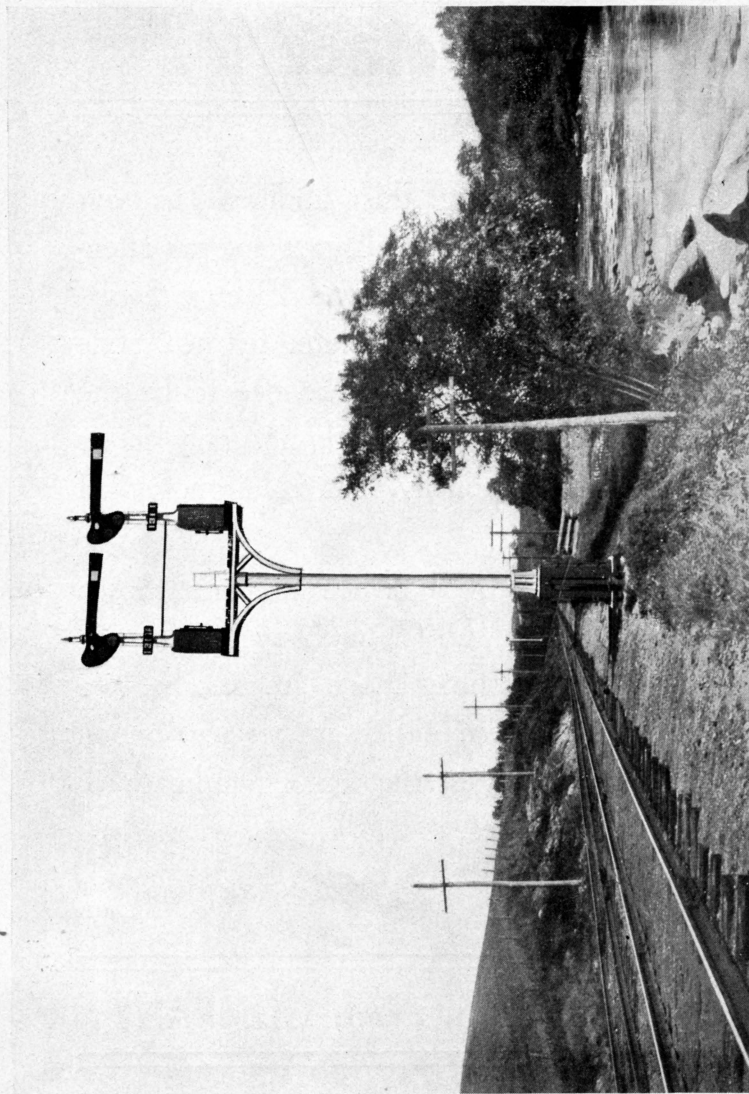
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## THE HALL SIGNAL COMPANY

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“Hall” Automatic Signals on the D. & H. R. R.

## DESCRIPTION OF STYLE "F" MOTOR MECHANISM.

**I**N 1893 THE HALL SIGNAL COMPANY brought out an automatic semaphore signal operated by an electric motor. This was the first signal of this type commercially introduced, and although somewhat crude and faulty in design, showed the possibilities of electric motor signaling. For the past twelve years this company has steadily improved the mechanism used in motor signals. By far the most important step made in this steady progress was the introduction in the year 1905 of the style "F" electric motor semaphore signal.

This improved signal is, in many of its details, a modification of the mechanism of the well-known Hall electro-gas signal with the power furnished by a motor instead of by gas. The same direct vertical action is attained which makes possible the highest degree of efficiency in action and simplicity in design. The parts are comparatively few in number and are made strong and durable. The possibilities of a derangement of any kind seem remote, and the chance of a complication that would give a false clear indication is infinitely small.

An extraordinarily small amount of current—less than 10 milamperes—is required to hold the signal in the clear position. This small battery consumption is attained by the long leverage used in the clutch lever. Nor is this battery saving attended by any increase in the possibilities of a false clear indication since no toggle joints or off-centering of the mechanism is employed. Nothing could be simpler or safer than this dog and latch arrangement here used.

The Hall Company has developed an electric motor of higher efficiency than any before used for signaling. This motor runs without load on .5 of an ampere. The maximum current consumed during the clearing of the signal

is 1.8 amperes. With this slight battery consumption it clears both blades of a double arm signal in 15 seconds. (See pages 406 and 408.)

Roller bearings are used on the shafts of the mechanism and in the stud rollers on the gear wheel 14.41; ball bearings are used on the motor shaft. This reduces the loss of energy by friction to a minimum, which allows the use of heavy counterweights (insuring the gravity return to danger position during any extraordinary condition of ice, frost or other impediments) without any undue waste of energy.

A striking and important point about this apparatus is the adjustment of the angle at which the stud rollers meet the thrust piece 14.100. This angle is such that the maximum load is carried at the point of maximum leverage, and the same proportion is quite nicely carried through the stroke. To demonstrate this (before a number of signal experts at the International Railway Congress at Washington in May, 1905) a battery of  $4\frac{1}{2}$  volts was connected to the signal. This amount of power was just sufficient to start the signal moving, and yet, without a catch, it slowly moved the entire distance to the clear position. With this design a signal at "half-cock" is impossible. The force increases from a ratio of 1 to 250 in the first part of the movement to 1 to 500 when the signal reaches the clear position.

The Hall style "F" electric motor signal is the simplest, most reliable and efficient mechanism of this type ever designed. It is equally well adapted for use on primary or storage battery circuits. It is adapted to either the normal danger or the normal clear system. It is easily adapted to any desired angle of blade movement and to two or three positions. One of the most important features about the mechanism is the convenience of taking any part of the mechanism off or replacing it. By removing two screws the clutch magnets may be taken out, or by removing three screws the thrust rod and dash pot, with the parts attached, can be taken out, and all screws are convenient to get at.

In the detailed description of the design and action of this mechanism which follows, the right hand side of the mechanism will be referred to. The same description would apply to the left hand side by substituting the numbers of that side. The cast iron base 14.08 supports the motor, clutch coils, pistons of the dash pot and the frame 14.05. This frame supports the side frames 14.06 and 14.07, and they contain the roller bearings for gear shafts 14.36 and 14.37, and support the clutch levers 14.11 and 14.12. The steel thrust rod 14.13 is rigidly pinned to the cylinder of the air dash pot 14.29. The base 14.08 has two pedestals rigidly attached, which support the pistons for the dash pots. The piston, in conjunction with the cylinder 14.29, forms the guide for the lower end of thrust rod 14.13; the upper end of this rod runs in a babbitt bearing in the frame 14.05. Secured to the thrust rod 14.13 is the latch support 14.96, which carries the clearing lever 14.22, the thrust piece 14.100, and the latch which engages the lug on the clutch lever 14.11, to hold the signal clear. The thrust piece carries the latch 14.33, which engages the lug on clearing lever 14.22. The large gear wheels are phosphor bronze, and they are driven by the steel pinion 14.193 on the motor, and the pinion and shaft 14.37.

The phosphor bronze knife blade contacts of the circuit controller 37.210 are operated by the circuit controlling rod 14.49 and the escapement crank 14.47. The escapement crank is controlled by the roller 14.52 attached to the latch support. The front armature on the clutch magnets control the multiple contacts for the motor circuit. The back armature is attached to the clutch lever 14.11, which enables the magnets to control the clutch lever. The motor 14.150 is series wound. The fields are laminated iron with but one joint, which is dove-tailed, making them practically continuous, and reducing the magnetic loss on account of joints to a minimum. The armature and commutator are completely enclosed by means of a brass case over the armature and a glass cover over the commutator. The glass cover is held in position by two springs bearing on two lugs on the glass, and all that is necessary to take the cover off



is to turn it enough to move the lugs from under the springs. To replace the cover, hold it in position and turn it far enough to bring the lugs under the springs.

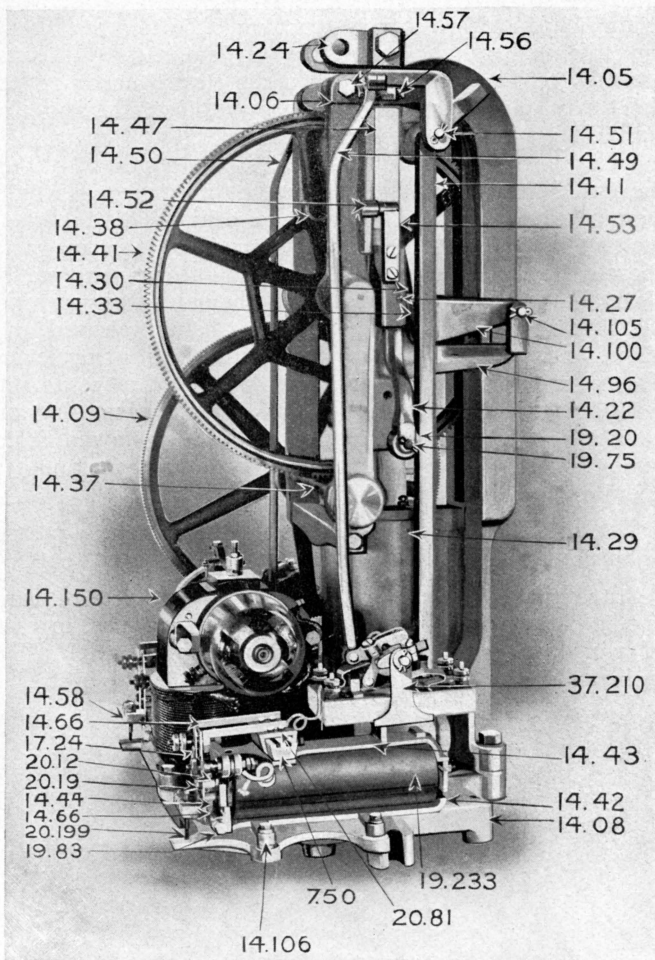
When the home signal is at danger the circuit controller contacts for the motor are closed and the contacts controlling the distant clutch magnets are open, so it is impossible for the distant signal to clear until after the home is clear. When the home signal clutch magnet is energized it closes the motor circuit through the contacts on the front armature, and at the same time holds the back armature, which prevents the clutch lever moving when pressure is applied to clear the signal. The motor circuit being closed, the motor revolves the gears and brings the stud roller 14.38 under the thrust piece 14.100 and pushes it up. Since the clutch lever 14.11 is held by its armature, it prevents the clearing lever 14.22 swinging back and by means of the lug on this lever engaging the latch 14.33 in thrust piece 14.100 carries the thrust rod and all the parts attached to the clear position. In moving to the clear position the roller 19.20, pivoted in the lower end of clearing lever 14.22, rolls along the front edge of clutch lever 14.11. In the last one-eighth inch movement of the signal to the clear position the roller 14.52 strikes the short lever of the escapement crank 14.47 and moves it on to its pivot 14.56, and by means of the rod 14.49 operates the circuit controller, opening the motor circuit and closing a contact in the distant signal circuit. The signal is held in the clear position by the lug on the clutch lever 14.11, engaging under a latch on latch support 14.96; this leaves the gears free to continue their movement as soon as the distant clutch magnet is energized to clear the distant signal. After the signal has been cleared the stud roller 14.38 moves from under the thrust piece 14.100. When the signal circuit is broken the clutch magnet is de-energized. The front armature opens the motor contacts to keep the motor circuit open, and the back armature being released permits the clutch lever 14.11 to swing back far enough so the holding latch in the latch support 14.96 can pass the lug on the clutch lever and allow the signal to go to danger by gravity. The movement of the signal to danger is cush-

ioned by the air dash pot 14.29. The circuit controllers are reversed as soon as the signal starts to danger. If by any chance the motor circuit should be closed without the clutch magnets being energized, the motor would simply revolve the gears, and when the stud roller engaged the thrust piece it would raise it without effecting the signal, on account of the clearing lever 14.22 being free to swing back and permit the latch 14.33 to pass it. When the stud roller passed from under the thrust piece it would drop back in place and be ready to clear the signal when the clutch magnet is energized. Or if the clutch magnets should become de-energized when the signal was partly clear the clearing lever 14.22 would be permitted to swing back on account of clutch armature being released and allow the latch 14.33 to pass the lug on the clearing lever. The signal would go to danger, the thrust piece 14.100 would remain on top of the stud roller by swinging on its pivot 14.104, and when the stud roller moved from under it, it would drop back in its place, ready for another operation.

The signal rod is connected to the thrust rod by means of the clamp 14.24.

Attachments are also furnished so that the blade cannot be cleared from the outside; as, for instance, in case of workman painting blades and clearing signal when train is in block.





Style "F" Mechanism for two blade Signal

## THE HALL ELECTRIC SEMAPHORE MECHANISM.

Order No.	Section 14.	Style F.	List Price
14-A	Mechanism and Motor complete for one arm signal .....		\$230.00
14-B	Mechanism and Motor complete for two arm signal .....		<del>\$230.00</del> <i>320.00</i>
14-C	Mechanism and Motor complete for three-position one arm signal .....		353.00

If mechanism only without motor is wanted, deduct \$68.89 from above list price.

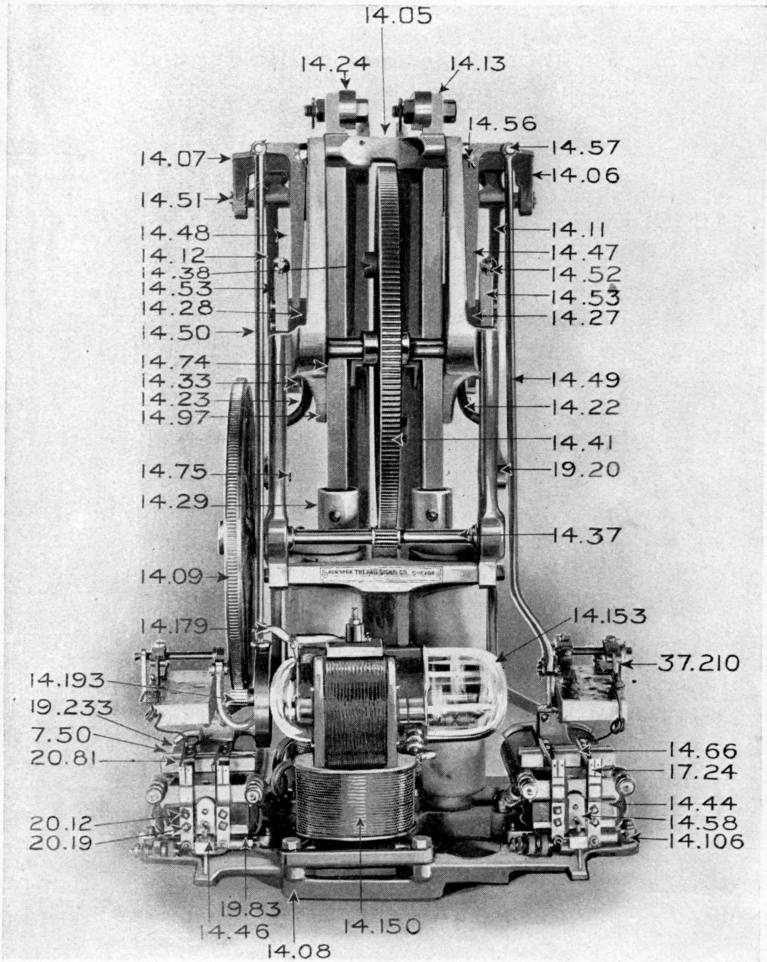
The above includes slot magnets and the necessary circuit closers for the operation of signal, but does not include relays, lightning arresters, nor pole changers.

When ordering, please state resistance of slot magnets, number and kind of circuit controlling springs; also state whether these are for home or distant side of mechanism.

If automatic counters are desired on either blade, it should so state on order, and \$4.00 should be added to the list price for each one ordered.

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Order By Name and Number.



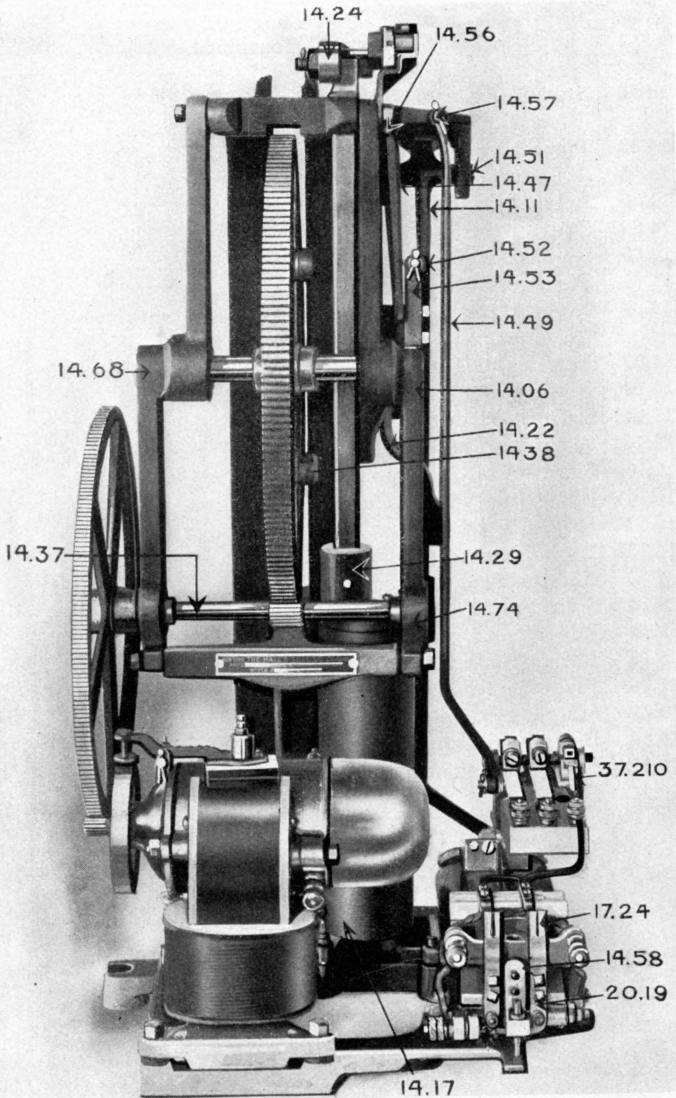
Style "F" Mechanism for two blade Signal

Order No.	<b>DOUBLE MOTOR MECHANISM.</b>	List Price
	<b>Section 14.                                      Style F.</b>	
14-B	Style F Double Motor Mechanism complete...	\$320.00
14.05	Frame with three $1\frac{1}{2}$ 13x2" hexagon head bolts	8.00
14.06	Right Hand Shaft Bearing with three $\frac{3}{8}$ -16x 1 3-16" hexagon head cap screws and two steel shells 14.70.....	4.60
14.07	Left Hand ditto .....	4.60
14.08	Base with four $\frac{1}{2}$ x1 $\frac{3}{4}$ hexagon head cap screw	6.20
14.09	Small Gear with steel key 14.45 and two No. 10 headless set screws .....	10.00
14.11	Right Hand Clutch Lever.....	3.20
14.12	Left Hand ditto .....	3.20
14.17	Pedestal for dash pot .....	1.20
14.22	Right Hand Clearing Lever.....	1.20
14.23	Left Hand ditto.....	1.20
14.24	Signal Rod Clamp with one $\frac{1}{2}$ x1 $\frac{7}{8}$ " hexagon head bolt and nut and $\frac{1}{8}$ x1" cotter pin.....	.88
14.29	Right Hand Dash Pot and thrust rod complete	14.00
14.30	Left Hand ditto .....	14.00
14.31	Latch Pin .....	.32
14.32	Stop Pin .....	.20
14.33	Latch .....	.40
14.35	Steel Latch Spring .....	.05
14.37	Pinion and Shaft .....	3.50
14.38	Roller complete .....	2.50
14.41	Large Gear Wheel, complete with rollers and shaft .....	14.00
14.42	Magnet Stand with pivot screws 19.83, insula- tions 14.106, four $\frac{1}{4}$ -24x $\frac{3}{8}$ " fil. head brass screws and binding posts 14.129.....	3.60
14.43	Magnet Cover with two $\frac{1}{4}$ 24x2" fil. head iron screws and two binding posts 20.09.....	2.80
14.44	Armature with bone studs .....	.60
14.45	Steel Key .....	.30
14.47	Right Hand Escapement Crank .....	.80
14.48	Left Hand ditto .....	.80
14.49	Right Hand Circuit Closer Rod .....	1.30
14.50	Left Hand ditto .....	1.30
14.51	Clutch Shaft with two $\frac{3}{32}$ x $\frac{7}{8}$ " cotter pins....	.20
14.52	Roller .....	.04
14.53	Roller Support complete with two 14-24x $\frac{3}{4}$ " screws, 14.93 .....	.64

Order By Name and Number.

Order No.	Section 14—Continued.	List Price
14.56	Studs for escapement cranks with one 3/32x5/8" cotter pin .....	.48
14.57	Pin with one 3/32x5/8" cotter pin.....	.20
14.58	Armature Lever complete .....	.60
14.59	Latch Spring .....	.04
14.66	Contact Spring .....	.64
14.69	Roller Bearing complete .....	1.60
14.74	Thrust Washer .....	.08
14.96	Right Hand Latch Support complete with two 5/16-18x1 3/16" screws, 14.92.....	3.00
14.97	Left Hand ditto .....	3.00
14.100	Right Hand Thrust Piece complete.....	2.20
14.101	Left Hand ditto .....	2.20
14.104	Shaft for Latch with one 1/16x1/2" cotter pin..	.16
14.105	Shaft for latch support with one 3/32x3/4" cotter	.40
14.106	Fibre Insulation .....	.08
14.127	Hold Clear Latch .....	1.20
14.128	Lava Insulation complete .....	.20
7.50	Bar for Spring Base .....	.05
17.24	Split Finger .....	1.75
19.20	Roller .....	.15
19.75	Roller Shaft with 3/32x7/8" cotter pin.....	.18
19.83	Pivot Screw and 1/4-32 nut .....	.25
19.233	Magnets complete. State resistance.....	16.00
20.12	Bone Armature Insulation .....	.23
20.19	Split Nut for armature Insulation.....	.02
20.81	Spring Base with two 6-32x1/4 R. H. brass screws and one 6-32x5/16 sq. head screws, 3/8" sq. nut and two No. 6 brass washers...	.20
37.210	Circuit Controller complete with two springs..	7.50
	For each additional circuit required, add.....	1.75

Order By Name and Number.



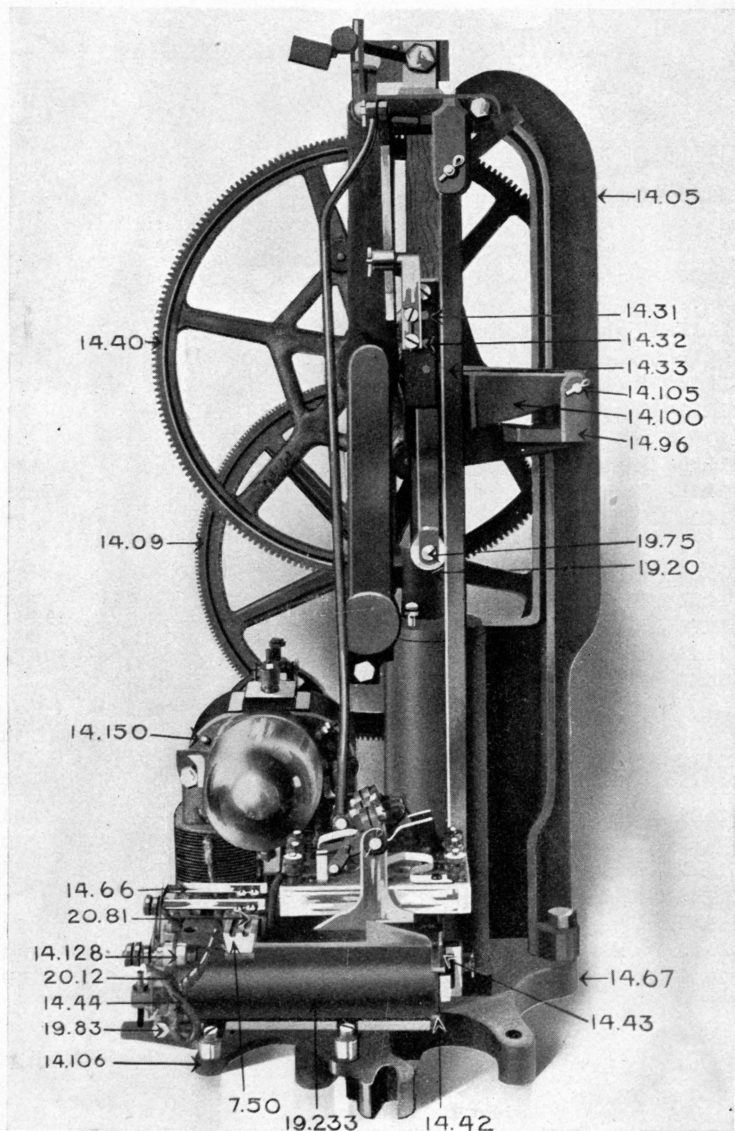
Style "F" Motor Mechanism for one blade



Order  
No.**SINGLE STYLE F MOTOR MECHANISM.**

	Section 14.	Style F.	List Price
14-A	Style F Single Motor Mechanism complete...		\$230.00
14.05	Frame with three ½-13x2" Hex. H. bolts.....		8.00
14.06	Right Hand Shaft Bearing with three ⅜-16x 1 3/16" Hex. H. cap screws and two steel shells, 14.70 .....		4.60
14.09	Small Gear with steel key, 14.45, and two No. 10 headless set screws .....		10.00
14.11	Right Hand Clutch Lever .....		3.20
14.17	Pedestal .....		1.20
14.22	Right Hand Clearing Lever .....		1.20
14.24	Signal Rod Clamp with one ½x1⅞" Hex. H. bolt and nut and ⅛x1" cotter pin.....		.88
14.29	Right Hand Dash Pot and Thrust Rod complete		14.00
14.31	Latch Pin .....		.32
14.32	Stop Pin .....		.20
14.33	Latch .....		.40
14.35	Steel Latch Spring .....		.05
14.37	Pinion and Shaft .....		3.50
14.38	Roller complete .....		2.50
14.40	Gear Wheel complete with shaft and roller....		14.00
14.42	Magnet Stand with pivot screws 19.83, insula- tions 14.106, four ¼-24x⅝" fil. H. brass screws and binding post, 14.129.....		3.60
14.43	Magnet Cover with two ¼-24x2" fil. H. iron screws and two binding posts, 20.09.....		2.80
14.44	Armature with bone studs .....		.60
14.45	Steel Key .....		.30
14.47	Right Hand Escapement Crank .....		.80
14.49	Right Hand Circuit Closer Rod.....		1.30
14.51	Clutch Shaft with two 3/32x⅞" cotter pins....		.20
14.52	Roller .....		.04
14.53	Roller Support complete with screws.....		.64

Order By Name and Number.



Style "F" Motor Mechanism for one blade Signal

Order  
No.

List Price

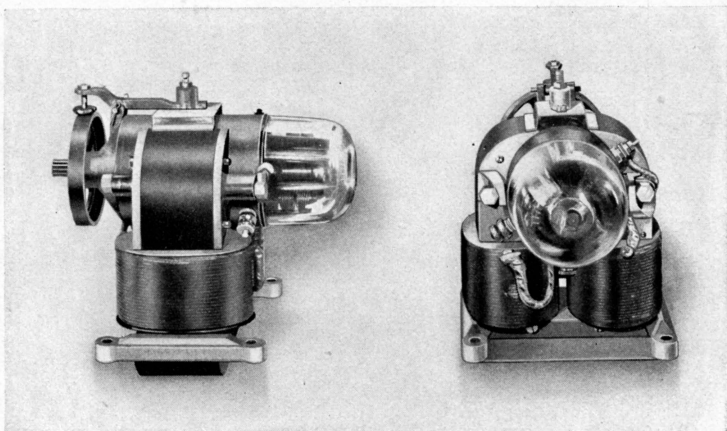
**SINGLE MOTOR MECHANISM.**

**Section 14.**

**Style F.**

14.56	Studs for Escapement Crank with one 3/32x5/8" cotter pin .....	.48
14.57	Pin with one 3/32x5/8" cotter pin .....	.20
14.58	Armature Lever complete .....	.60
14.59	Latch Spring .....	.04
14.66	Contact Spring .....	.64
14.67	Base with three 1/2-13x2" Hex. H. Bolts.....	5.50
14.68	Left Hand Shaft Bearing with two 3/8-16x1 3/16" Hex. H. Cap Screws and two steel shells, 14.70 .....	6.00
14.69	Roller Bearing complete .....	1.60
14.74	Thrust Washer .....	.08
14.96	Right Hand Latch Support complete with two 5/16-18x1 3/16" screws, 14.92.....	3.00
14.100	Right Hand Thrust Piece complete.....	2.20
14.104	Shaft for Latch with one 1/16x1/2" cotter pin..	.16
14.105	Shaft for Latch Support with 3/32x1/4" cotter pin .....	.40
14.106	Fibre Insulation .....	.08
14.127	Hold Clear Latch .....	1.20
14.128	Lava Insulation .....	.20
7.50	Bar for Spring Base .....	.05
17.24	Split Fingers .....	1.75
19.20	Roller .....	.15
19.75	Roller Shaft with 3/32x7/8" cotter pin .....	.18
19.83	Pivot Screw and 1/4-32 nut .....	.25
19.233	Magnets complete, state resistance.....	16.00
20.12	Bone Armature Insulation .....	.23
20.19	Split Nut, for armature insulation.....	.02
20.81	Spring Base with two 6-32x1/4" R. H. Brass Screws and 6-32x5/16" S. H. Screw, 3/8" square nut and two No. 6 brass washers...	.20
37.210	Style D Circuit Controller complete with two 10-32x5/16" Fil. H. Iron Screws, with two circuits .....	7.50
	For each additional circuit required add.....	1.75

Order By Name and Number.



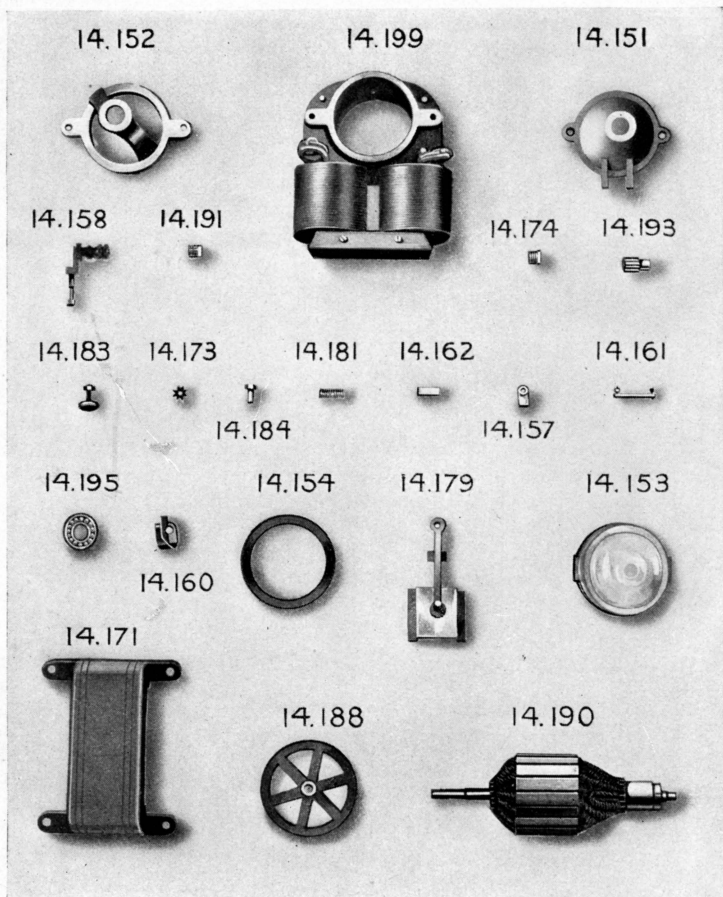
Electric Motor. 14.150

**THE HALL ELECTRIC SEMAPHORE OPERATING  
MOTOR.**

Order No.		List Price
14.150	Electric Motor complete, as shown..... For detail of parts see page 419.	\$68.89

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Order By Name and Number.

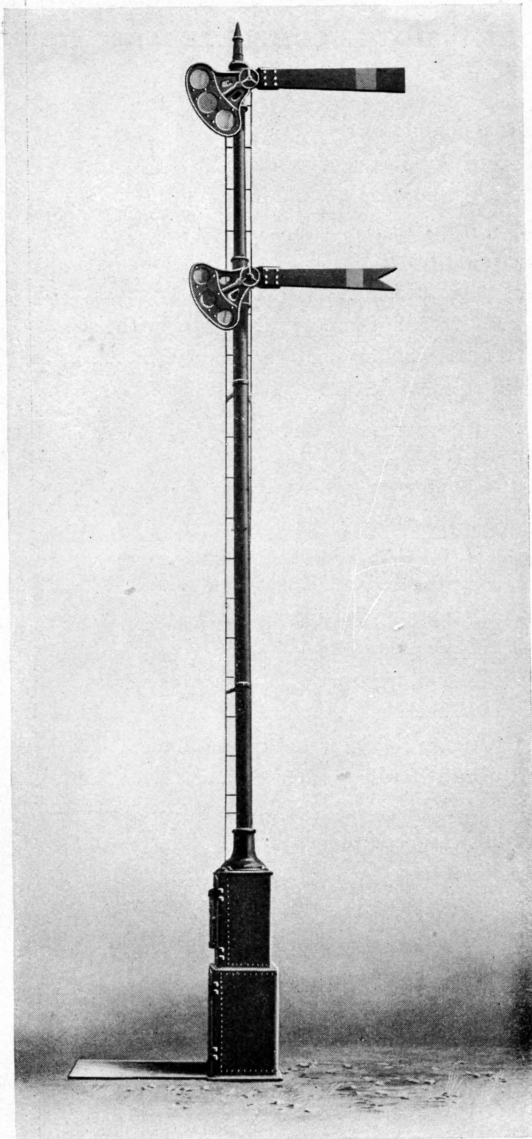


Parts of Electric Motor. 14.150

Order No.	MOTOR COMPLETE 14.150 Section 14	List Price
14.150	Motor complete.....	\$68.89
14.151	Bearing Support, gear end.....	2.34
14.152	Bearing Support, commutator end.....	3.29
14.153	Glass Cover.....	.45
14.154	Packing Ring .....	.20
14.157	Brush Holder.....	.45
14.158	Brush Holder Support complete with screw 14.175, binding post and insulation.....	1.20
14.160	Clamp for cover.....	.15
14.161	Brake Pin.....	.04
14.162	Motor Brush.....	.60
14.171	Motor Base with two wedges 14.177.....	2.60
14.173	Spring Adjuster.....	.05
14.174	Right Hand Brush Holder Spring.....	.18
14.179	Brake Armature and Lever complete.....	1.15
14.181	Brake Armature Spring.....	.12
14.183	Brake Shoe complete.....	.35
14.184	Brake Armature Screw.....	.03
14.188	Brake Wheel.....	.92
14.190	Armature and Commutator complete.....	18.45
14.191	Left Hand Brush Holder Spring.....	.18
14.193	Pinion .....	1.45
14.195	Ball Bearing complete.....	1.00
14.199	Field complete.....	22.00

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Order By Name and Number.



**Standard Two-Arm Automatic Signal Mast**



Order No.	SIGNALS AND FITTINGS.	List Price
<b>Electric Semaphore.</b> <b>Section 45. Style F.</b>		
45-N	One Single Home or Distant Signal including mechanism, (no battery case or anchor bolts) .....	\$408.00
45-O	Consists of 45-N with battery case and anchor bolts...	474.00
45-P	Consists of 45-N with anchor bolts, (no battery case).....	415.00
45-Q	A Single Arm Three-Position Signal complete including mechanism, (no battery case or anchor bolts).....	530.00
45-R	Consists of 45-Q with battery case and anchor bolts.....	595.00
45-S	A Double Arm Signal including mechanism. (no battery case or anchor bolts).....	557.00
45-T	Consists of 45-S with battery case and anchor bolts..	623.00
45-U	Consists of 45-S with anchor bolts, (no battery case) .....	564.00

The above references are for each signal complete including mechanism, with blades, ladders and fittings, but do not include lamps, glasses, pole changes, relays, lightening arresters, back lights or number plates, which should be ordered separately if required. The order should state the character of each signal desired, specify whether home or distant, on one-arm types; or whether two home or two distant, or one home and one distant on two-arm types. Should also state any changes desired from the standard design. Dimensions of posts and blades, colors and numbers of glass discs, are traversed by arm, design of spectacle, type of lamp, etc., must be clearly stated when differing from standard design.

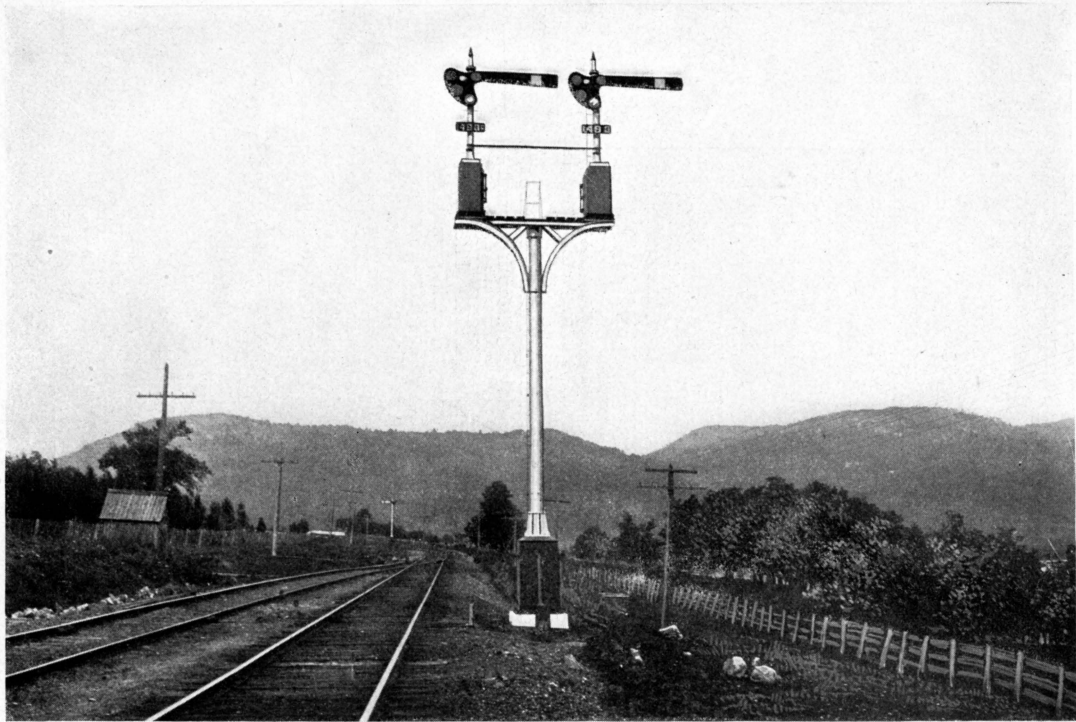
For list of Rondells see page 458.

For styles of Blade Grips see page 438.

For standard dimensions see page 423.

If automatic counters are wanted add \$4.00 to list price for each blade.

Order By Name and Number.



Single Track Automatic Signaling on The Delaware & Hudson R. R.

Order  
No.

**Section 45—Continued.**

List Price

Unless otherwise specified, signals will be furnished as follows:

Base of mechanism case to center of lower signal shaft.....23' 0"

Center of lower to center of upper shaft..6' 0"

Inside diameter of lower section of pipe mast .....0' 5"

Inside diameter of upper section of pipe mast.....0' 4"

**Semaphore Blades**

Grip.....7' x 7"

Length.....4' 0"

Diameter of glass.....8-3/8"

**Colors of glass**

Home.. .....red

Distance.....green

Glasses with each spectacle.....2

**Arc of Signal Arms**

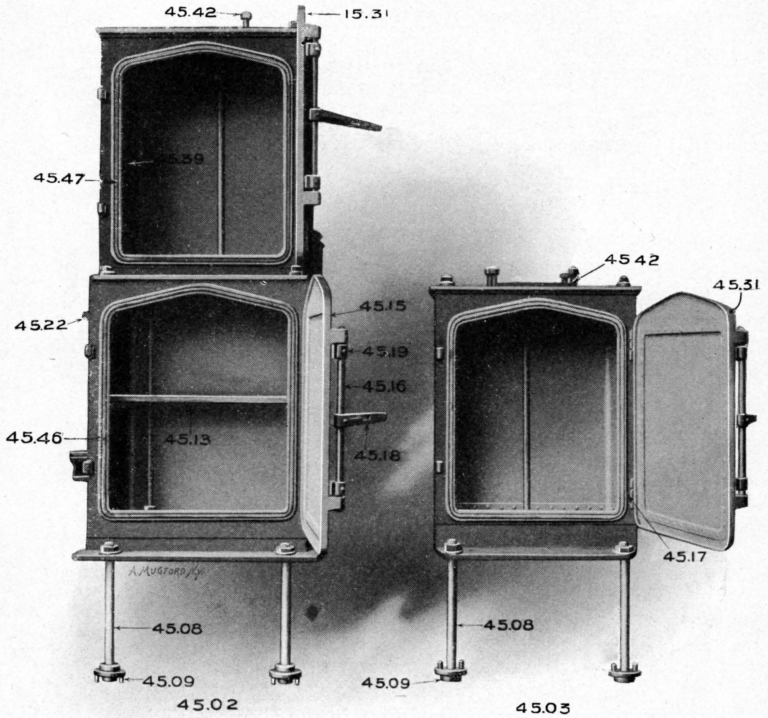
45-N .....60°

45-Q-45° between stop  
and caution and 45° between caution and  
clear, total.....90°

No foundations are included in the above.

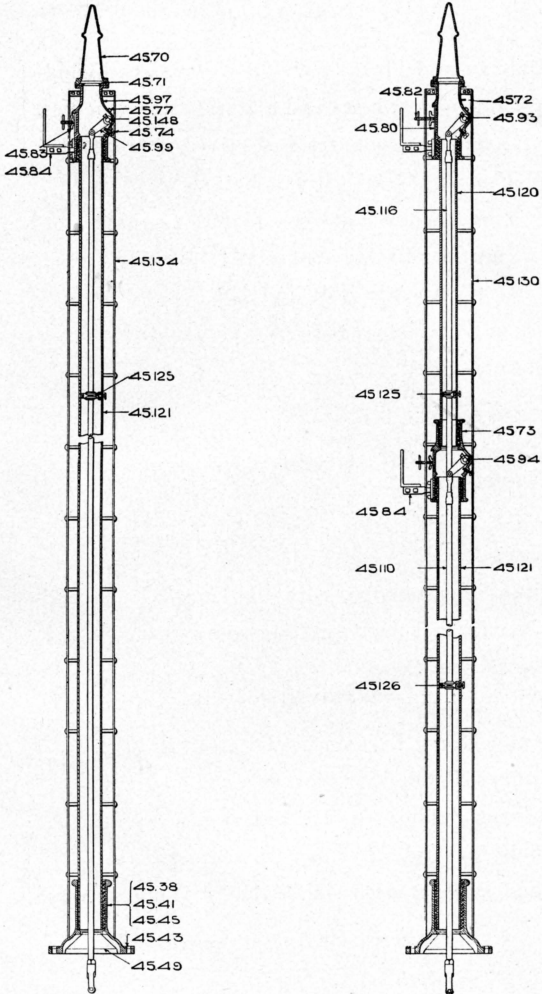
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Order By Name and Number.



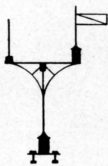
Mechanism and Battery Cases

Order No.	<b>BATTERY AND MECHANISM CASES.</b>	List Price
	<b>Section 45.</b>	
45.02	Battery and Mechanism Case complete including anchor bolts and plates, battery shelves, trunking supports and relay supports.....	\$147.00
45.03	Mechanism Case, without battery case, including anchor bolts and plates, trunking supports and relay supports.....	104.00
45.08	1"x3' 0" Anchor Bolt and Nut.....	.88
45.09	.....	
45.13	Battery Shelf.....	.75
45.15	Battery Case Door.....	10.53
45.16	Latch Handle Rod.....	.35
45.17	Hinge Pin.....	.09
45.18	Latch Handle.....	.58
45.19	Latch .....	.23
45.22	Trunking Supports with two $\frac{3}{8}$ x1" Bolts and nuts and two $\frac{1}{4}$ x1" lag screws.....	.90
45.31	Mechanism Case Door.....	9.40
45.39	Relay Support.....	.54
45.42	$\frac{7}{8}$ x3 $\frac{1}{2}$ " Stud Bolt and Nut.....	.35
45.46	Rubber Tubing for battery case.....	1.36
45.47	Rubber Tubing for mechanism case.....	1.31
45.25	Shelf for style B relay.....	.58
45.26	Shelf Bracket with six $\frac{5}{8}$ "-No. 8 Wood screws	.20
Order By Name and Number.		

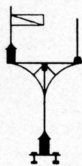


Upper Section of Standard Signal Masts.

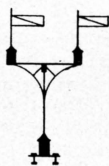
Order No.	UPPER SECTIONS OF IRON MASTS	List Price
Section 45		
45.38	Mast Support for 6" pipe.....	12.00
45.41	Mast Support for 5" pipe.....	11.00
45.43	Washer for mast support.....	.13
45.45	Mast Support for 4" pipe.....	10.51
45.70	Pinnacle complete with four $\frac{3}{8}$ x2 bolts and nuts	4.00
45.71	Gasket for pinnacle.....	.20
45.72	Upper Shaft Bearing.....	10.00
45.73	Lower Shaft Bearing.....	12.00
45.49	Zinc Shield.....	.72
45.74	Stop Bolt and nut.....	.60
45.76	Thumb Nut Gasket.....	.07
45.77	$\frac{3}{4}$ Pipe Plug for shaft bearings.....	.09
45.78	Weather Plate with four $\frac{3}{4}$ "x14-24 flat head brass screws.....	.20
45.79	Weather Plate Gasket.....	.13
45.80	Hand Hole Plate.....	.30
45.81	Hand Hole Plate Gasket.....	.30
45.82	Clamp Screw for hand hole plate.....	.51
45.83	Thumb Nut for clamp screw.....	.30
45.84	Lamp Bracket complete.....	1.30
45.93	Shaft for upper bearing complete with nut and cotter .....	5.00
45.94	Shaft for lower bearing complete with nut and cotter .....	5.51
45.97	Shaft Bearing for one-arm mast.....	16.20
45.99	Shaft Crank complete with one $1\frac{3}{4}$ " No. 7 taper pin.....	1.00
45.110	Signal Rod complete for lower arm.....	12.00
45.116	Signal Rod complete for upper arm.....	13.50
45.120	Section 4" Steel Pipe for two-arm signal (state length) per foot.....	.85
45.121	Section 5" Steel Pipe, single and double masts (state length) per foot.....	1.20
45.125	One-way Pipe Guide with three $\frac{1}{2}$ x $\frac{7}{8}$ cap screws .....	.72
45.126	Two-way Pipe Guide with three $\frac{1}{2}$ x $\frac{7}{8}$ cap screws .....	.88
45.130	Ladder complete for 30-ft. mast.....	18.00
45.131	Ladder complete for 32-ft. mast.....	19.50
45.132	Ladder complete for 28-ft. mast.....	16.00
45.133	Ladder complete for 26-ft. mast.....	14.00
45.134	Ladder complete for one-arm mast (per foot)	.72
45.148	Shaft complete for one-arm mast.....	5.00



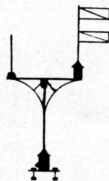
47-A



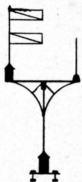
47-B



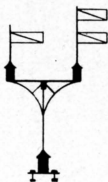
47-C



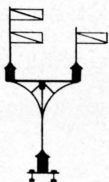
47-D



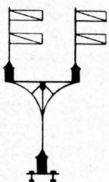
47-E



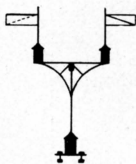
47-F



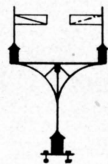
47-G



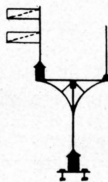
47-H



47-I



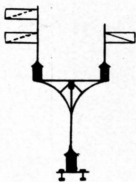
47-J



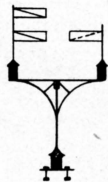
47-K



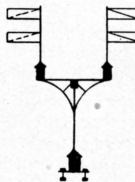
47-L



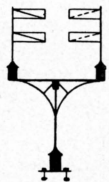
47-M



47-N



47-O

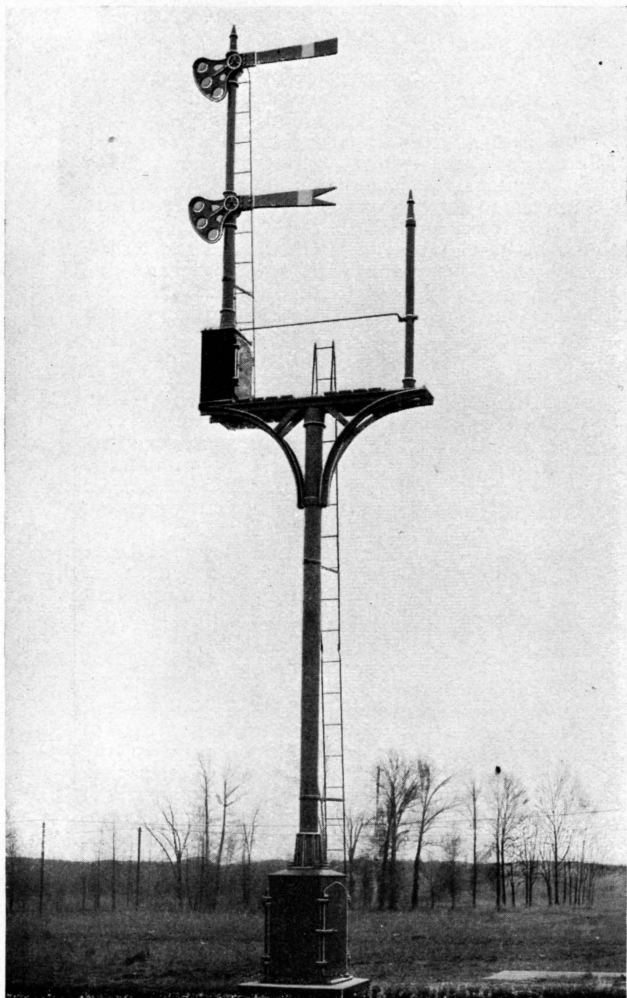


47-P

### Bracket Masts for Automatic Signals



Order No.	SIGNALS AND FITTINGS. Automatic Bracket Signal.	List Price
<b>Section 47.</b>		
47-A	*Steel Pipe and Structural Work Bracket Mast, with one single arm signal, including mechanism, and one blind doll.....	\$ 635.00
47-B	Same as 47-A, with signal arrangement reversed.	635.00
47-C	Same as 47-A, except with two single blade signals .....	907.00
47-D	Same as 47-A, with one double blade signal and one blind doll .....	756.00
47-E	Same as 47-D, with signal arrangement reversed.	756.00
47-F	Same as 47-A, except with one single and one double blade signal .....	1,028.00
47-G	Same as 47-F, with signal arrangement reversed .....	1,028.00
47-H	Same as 47-A, except with two double blade signals .....	1,150.00
47-I	Steel Pipe and Structural Work Bracket Mast, with two single blade signals .....	907.00
47-J	Same as 47-I, with signal arrangement reversed.	922.00
47-K	Same as 47-I, with one double blade signal and one blind doll .....	756.00
47-L	Same as 47-K, with signal arrangement reversed. ....	756.00
47-M	Same as 47-L, except with one single and one double blade signal .....	1,028.00
47-N	Same as 47-M, with signal arrangement reversed .....	1,044.00
47-O	Same as 47-I, except with two double blade signals .....	1,150.00
47-P	Same as 47-O, with signal arrangement reversed .....	1,166.00
<p>47-A to 47-H represent arrangement of bracket signals for controlling traffic in the same direction on parallel and adjacent tracks.</p>		
<p>47-I to 47-P represent arrangement of bracket signals for controlling traffic in opposite directions on parallel and adjacent tracks.</p>		
<p>47-I, 47-K, 47-M, and 47-O represent arrangement for righthand running; 47-J, 47-N and 47-P for left-hand running.</p>		
<p>All the above references are for each signal complete, including bracket mast and ladder, anchor bolts, mechanism case, glasses, blades and mechanism, but do not include any relays, lightning arresters, back light spectacles, number plates or lamps, which should be ordered separately if required.</p>		



**Bracket Mast with Battery Case**

Order  
No.

List Price

**Section 47—Continued.**

The order should state the character of each signal desired; specify whether home or distant on one-arm types; whether two home, two distant, or one home and one distant on two-arm types; should state any changes desired from the standard design. Dimensions of masts and blades, colors, numbers and sizes of glass discs, arc traversed by arm, design of blade grip, type of lamp, etc., must be clearly stated when differing from standard design.

\*Unless otherwise specified, signals will be furnished as follows:

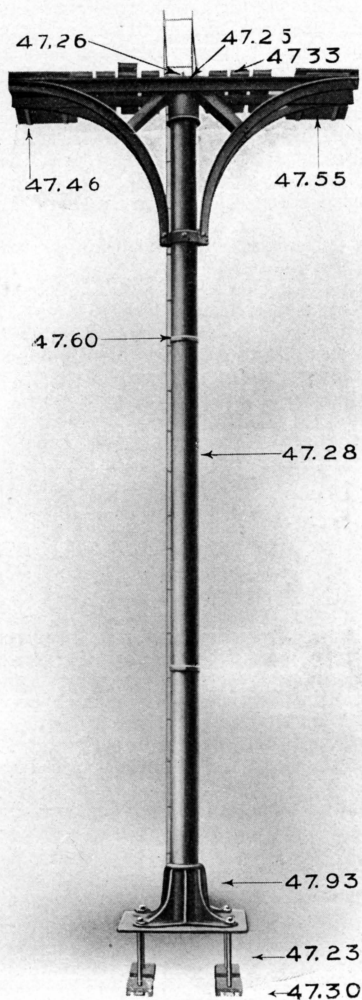
Base to top of bracket.....	22" 0"
Top of bracket to center of lower signal shaft .....	8' 3"
Center of lower to center of upper shaft.	6' 0"
Inside diameter of bracket mast.....	0' 8"
Inside diameter of lower section of pipe mast .....	0' 5"
Inside diameter of upper section of pipe mast .....	0' 4"
Semaphore Blades: { Grip .....	7" x 7"
{ Length .....	4' 0"
Diameter of Glass .....	8 3/4"
Colors of Glass { Home .....	Red
{ Distant .....	Green
Glasses with each spectacle.....	2
Arc traversed by signal arms .....	60°

Should three-position signals be required in place of single mechanism in any of the above one-arm combinations, the fact must be specifically stated in the order. For each three-position mechanism that is substituted for a single mechanism, add \$115.00. If substituted for a double mechanism, add \$40.00 to the above prices.

All the above arrangements of bracket signals may be furnished with a battery and relay case, built of cast iron and steel, at the base of the main mast, and if this case is wanted, the fact must be specifically stated on the order. The sum of \$145.00 must be added to the price of each arrangement of bracket signal when the battery case is desired. Either electric-motor or electro-gas mechanism furnished as desired.

No foundations are included in the above.

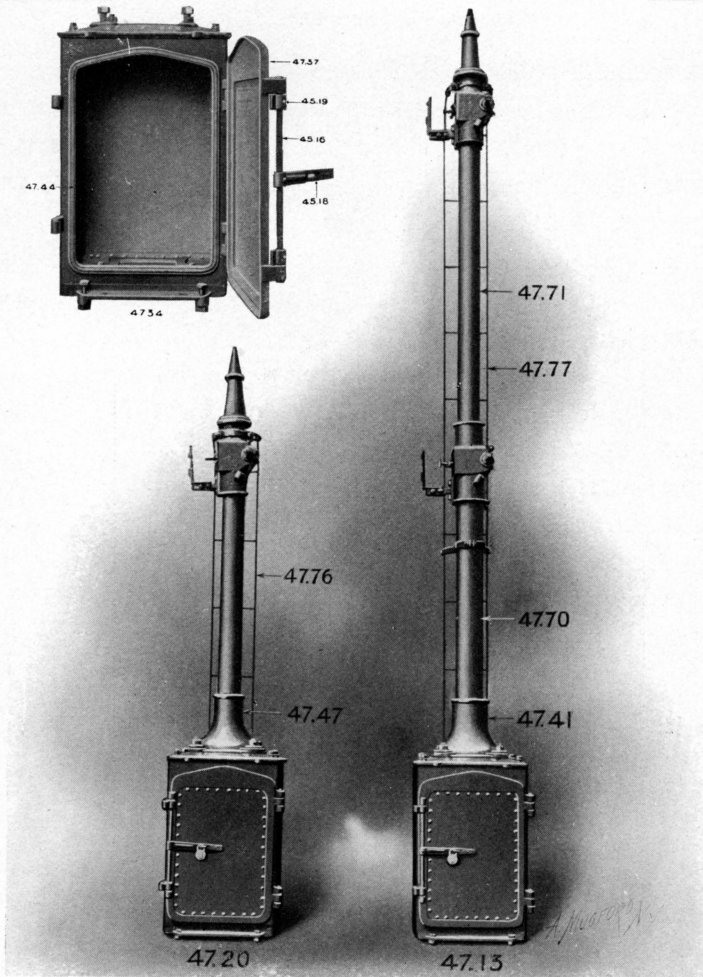
\*If height of mast is over 22' and not exceeding 25', add \$30.00 to list price.



Bracket Mast Only 47.14

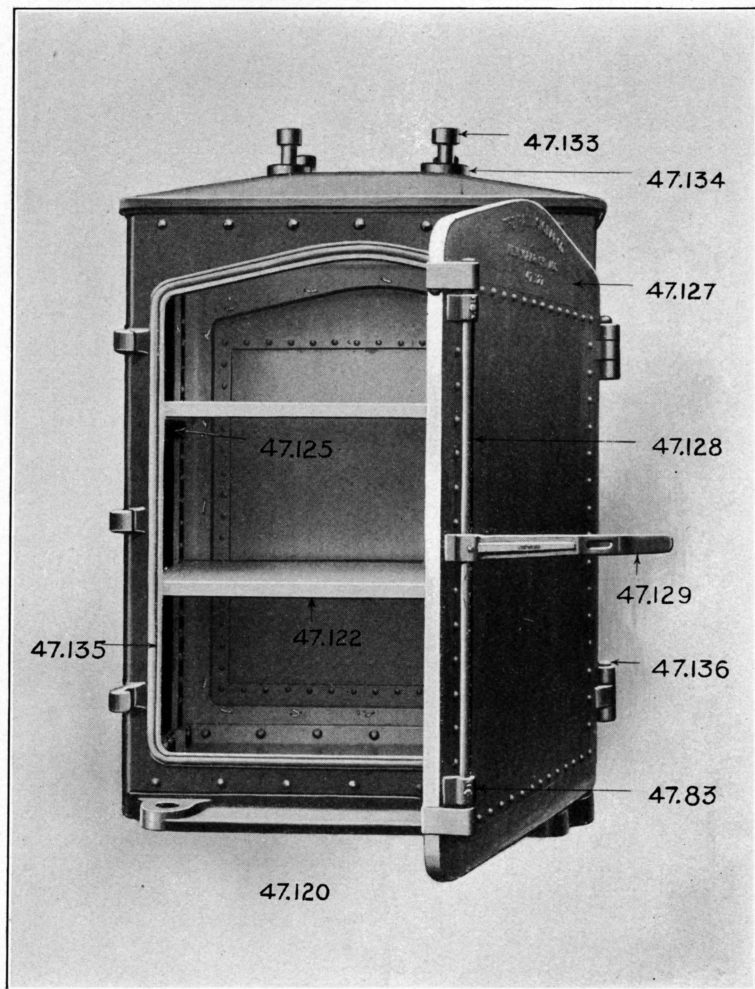
Order No.	<b>BRACKET MASTS.</b>	List Price
	<b>Section 47.</b>	
<b>47.14</b>	Bracket Mast, including anchor bolts and ladders, cross-trees and braces, not including dolls .....	\$245.00
<b>47.23</b>	Anchor Bolt and Nut for bracket mast, each..	1.67
<b>47.25</b>	Hand-hole Plate .....	.78
<b>47.26</b>	Clamp Screw, each .....	.40
<b>47.28</b>	Section 8" Pipe for main mast, 22' long.....	56.00
<b>47.32</b>	Trunking Support .....	.34
<b>47.33</b>	1½x6x18" Platform Plank, each .....	.34
<b>47.46</b>	Ladder Plank Support .....	2.23
<b>47.55</b>	1½x6"x2' 6" Platform Plank, each .....	.45
<b>47.60</b>	Ladder complete for standard bracket mast...	33.34
<b>47.93</b>	Bracket Mast Base .....	44.45

Order by Name and Number.



Dolls for Bridges and Bracket Masts

Order No.	<b>BRACKET MAST DOLLS.</b>	List Price
<b>Section 47—Continued.</b>		
47.13	Bracket Mast Doll complete, with mechanism case and fittings for two-arm automatic signal—no mechanism .....	\$179.00
47.20	Bracket Mast Doll complete, with mechanism case and fittings for one-arm automatic signal—no mechanism .....	130.00
47.34	Mechanism Case complete for bracket mast signals .....	73.50
47.37	Mechanism Case Door .....	15.20
47.41	Mast Support for 5" pipe mast .....	11.00
47.44	Rubber Tubing, 10 feet long .....	2.00
47.47	Mast Support for 4" pipe .....	10.00
47.70	Section 5" Steel Pipe for two-arm automatic semaphore, per foot .....	2.00
47.71	Section 4" Steel Pipe for two-arm automatic semaphore, per foot .....	1.54
47.72	Signal Rod complete for one-arm bracket mast doll .....	11.50
47.73	Signal Rod complete for two-arm bracket mast doll .....	12.50
47.76	Ladder complete for one-arm bracket mast doll .....	13.34
47.77	Ladder complete for two-arm bracket mast doll .....	17.77
For blade grips see page 438.		
For glasses see page 458.		
No lamps included in above.		
Order by Name and Number.		



Battery Case for Bracket Mast. 47.120



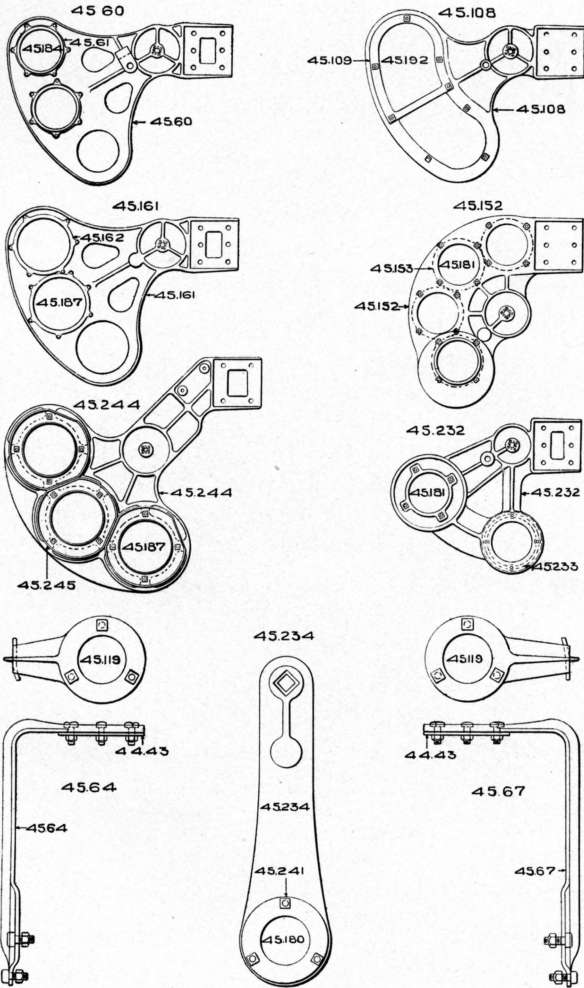
Order  
No.

**BATTERY CASE FOR BRACKET MAST.** List Price

**Section 47.**

<b>47.120</b>	Battery case complete, as shown.....	<b>\$160.00</b>
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Order by Name and Number.



Various Types of Blade Grips

**BLADE GRIPS AND BACK LIGHT SPECTACLE.**

Order No.	No glass included in this list. See page 458.	List Price
45.60	60° Continuous light spectacle only.....	\$ 5.15
45.60A	As above, with rims, bolts, etc.....	7.70
45.64	Back light spectacle only for 45.60.....	1.25
45.64A	As above, complete with rims, bolts, etc....	1.60
45.108	Blade grip only, New York Central pattern	10.00
45.108A	As above, with rims complete .....	11.50
45.161	Blade grip only 60° for 8¾ glass.....	5.15
45.161A	As above, complete with rims, etc.....	7.70
45.152	90° Universal blade grip only .....	10.50
45.152A	As above, complete with rims, etc.....	12.00
45.232	60° blade grip only, C. & N. W., style (takes 6¾ glass) .....	6.00
45.232A	As above, complete with rims, etc.....	8.00
45.234	Back light spectacle complete for 45.232....	2.00
45.244	90° Blade grip only B. & O., style.....	12.00
45.244A	As above, with rims, bolts, etc.....	13.50

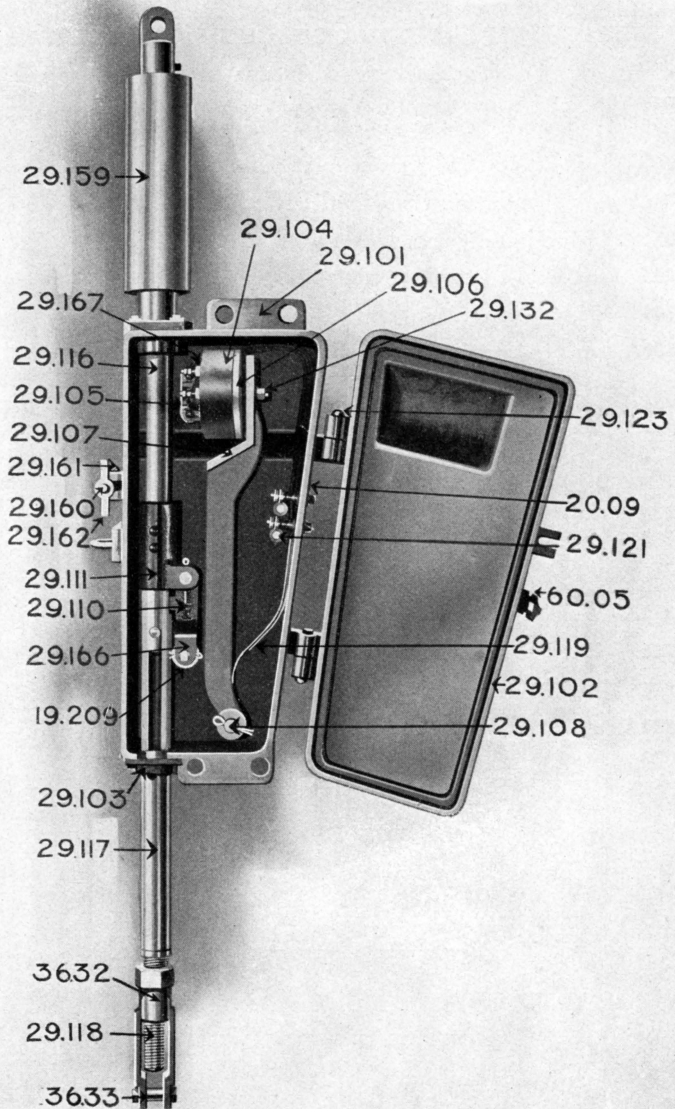
Other styles furnished if desired.

**SIGNAL BLADES.**

Standard Signal blades .....	2.55
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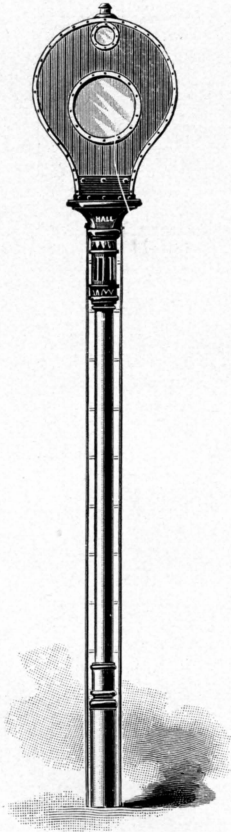
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Order by Name and Number.

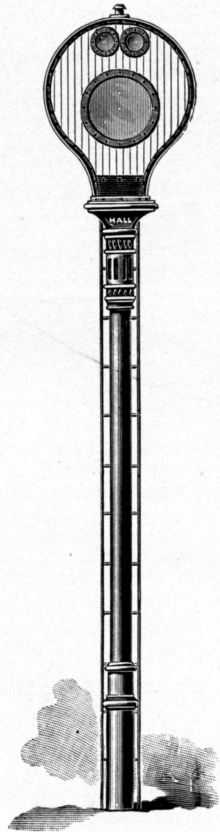


Electric Slot. 29.100

Order No.	ELECTRO-MECHANICAL SLOTS.	List Price
<b>Section 29.</b>		
29.100	Single electro-mechanical slot complete for one blade .....	\$88.00
29.124	Double electro-mechanical slot complete for two blades .....	150.00
29.101	Case with binding posts 20.09, bushings 29.123 and washers 29.173 .....	16.00
29.102	Cover with gasket 29.120.....	4.00
29.103	Weather plate with three 14x24- $\frac{5}{8}$ " fillister head brass screws .....	.60
29.104	Magnet with two $\frac{1}{4}$ -24x1 $\frac{1}{8}$ fillister head brass screws and two $\frac{1}{4}$ " brass washers.....	15.75
29.105	Magnet stand with two 14x24- $\frac{7}{8}$ " fillister head brass screws, two bushings, fibre strip....	1.30
29.106	Armature .....	1.55
29.107	Armature lever .....	3.00
29.108	Stud for armature lever with washer and $\frac{3}{16}$ x1 $\frac{1}{8}$ " cotter pin .....	.75
29.110	Latch .....	1.76
29.111	Latch support with two $\frac{1}{4}$ x $\frac{1}{4}$ brass pins.....	1.60
29.112	Guide bar with one 5/16-18x1 1/16 flat head brass screw and one 5/16-18x $\frac{3}{4}$ " flat head brass screw .....	.80
29.116	Cylinder rod with one No. 5 2" taper pin.....	2.00
29.117	One-and-one-quarter inch (1 $\frac{1}{4}$ " ) brass tubing with two $\frac{1}{4}$ "x1 11/32" rivets.....	3.50
29.118	Rod .....	2.00
29.119	Spring with two 8/32x7/16 fillister head brass screws .....	1.00
29.121	Insulation bushings .....	.10
29.122	Insulation bushings .....	.10
29.123	Hinge pin .....	.10
29.132	Special screw with nut, washer and cotter pin .....	.25
29.133	Insulation bushing .....	.10
29.134	Insulation washer .....	.05
29.159	Dash pot complete .....	19.00
29.160	Eye bolt .....	.30
29.161	Pin for eye bolt .....	.03
29.162	Thumb nut .....	.28
29.166	Roller pin with cotters.....	.28
29.167	Insulation bushing.....	.08
29.168	Insulation strip.....	.12
29.173	Micanite washers.....	.03
19.209	Roller.....	.12
20.09	Binding post complete.....	.45
36.32	Screw jaw.....	1.20
36.33	$\frac{5}{8}$ " Turned pin for screw jaw.....	.20
60.05	Hasp with three 3/16 x $\frac{7}{8}$ stove bolts and nuts .....	.15



Standard Disc Signal.  
42.20



C. & N. W. Distant Signal  
42.21

Order  
No.

**THE "HALL" DISC SIGNAL.**

List Price

**Section 42.**

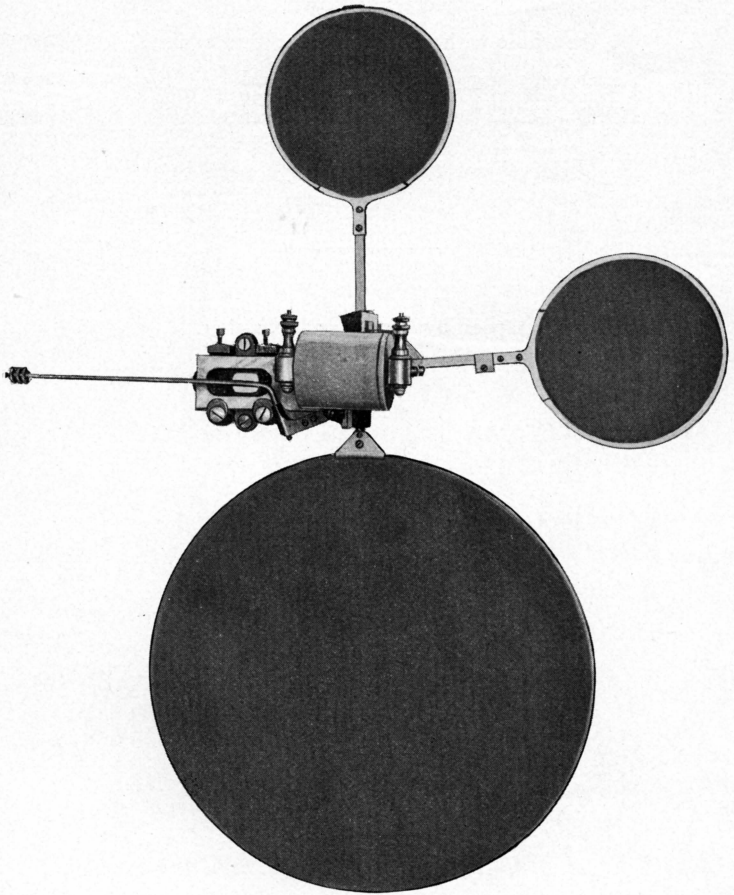
<b>42.20</b>	Disc signal complete as shown, with 20 foot iron post with white as "clear" indication..	\$312.00
<b>42.21</b>	As above, using a color for clear..... If "Hold-clear" attachments are wanted, add..	325.00 30.00

For signal instruments, see page 447.

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Order by Name and Number.

Disc Signal Instrument, C. & N. W. Style



**6.50**



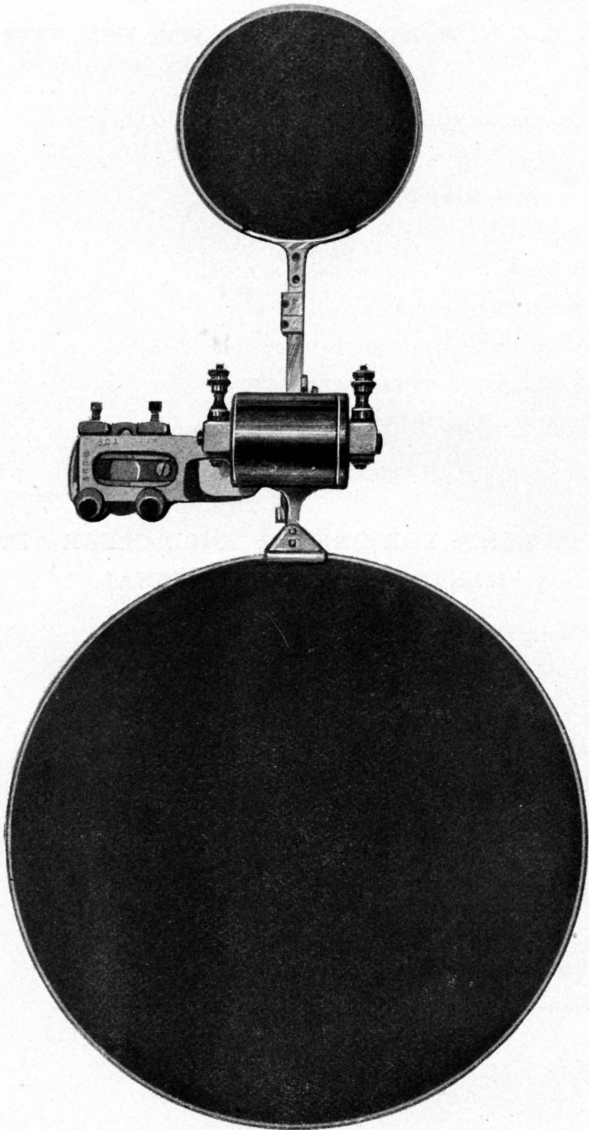
**SET C. & N. W. ATTACHMENTS FOR NEW STYLE**

Order No.	SIGNAL INSTRUMENT.	List Price
6.06	Aluminum Arm, with screws and nuts for glass disc . . . . .	\$ 1.77
6.08	Counterweight . . . . .	.26
6.09	Green Glass Disc . . . . .	3.00
6.12	Balance Rod, with three nuts . . . . .	1.34
6.13	Brass Plate, complete, with screws and nuts . . . . .	1.67
6.14	Aluminum Clamp for balance rod . . . . .	.77
6.21	Aluminum Counterweight Arm . . . . .	.34
6.36	Set of Attachments, complete . . . . .	9.15
6.50	C. & N. W. Signal Instrument, complete . . . . .	140.00

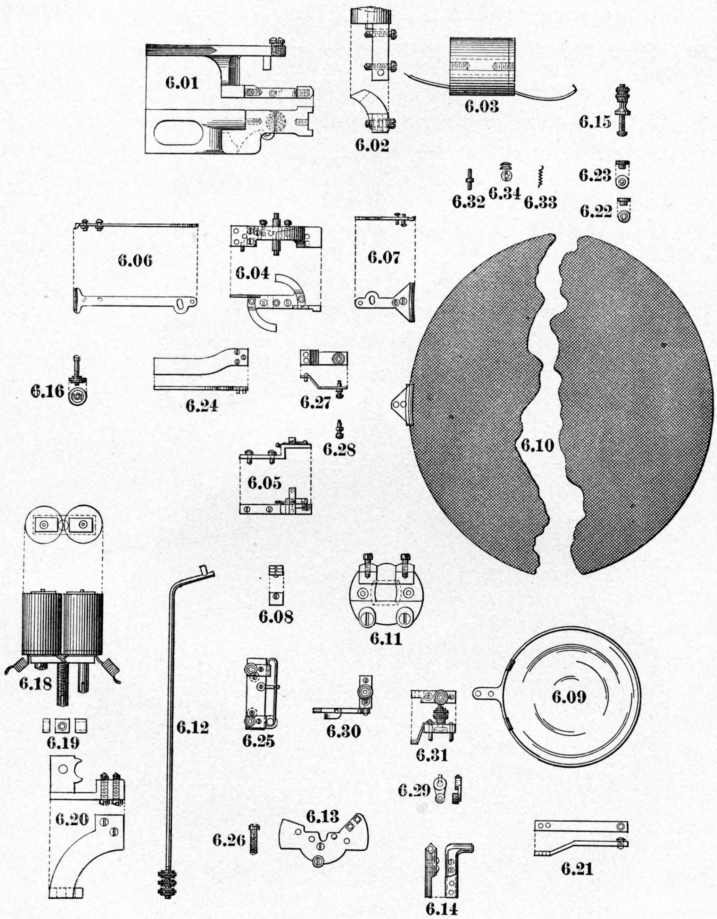
**LISTS OF PARTS FOR ONE SET HOLD CLEAR ATTACHMENTS FOR STYLE B SIGNAL.**

6.08	Counterweight . . . . .	.26
6.18	Hold Clear Magnet, complete . . . . .	15.00
6.19	Large Nut for adjusting Hold Clear magnets . . . . .	.23
6.20	Hold Clear Magnet Bracket, with screws . . . . .	3.34
6.21	Disc Counterweight Arm . . . . .	.34
6.24	Hold Clear Armature, with screws . . . . .	.67
6.26	Special Screws, with tapped heads . . . . .	.23
6.27	Brass Arm, complete with bearing screw and nut and screws . . . . .	1.12
6.35	End Circuit Close, complete . . . . .	6.77
6.70	Complete Set Hold Clear Attachment . . . . .	30.00

Order by Name and Number.

**Disc Signal Instrument, Style B****6.00**

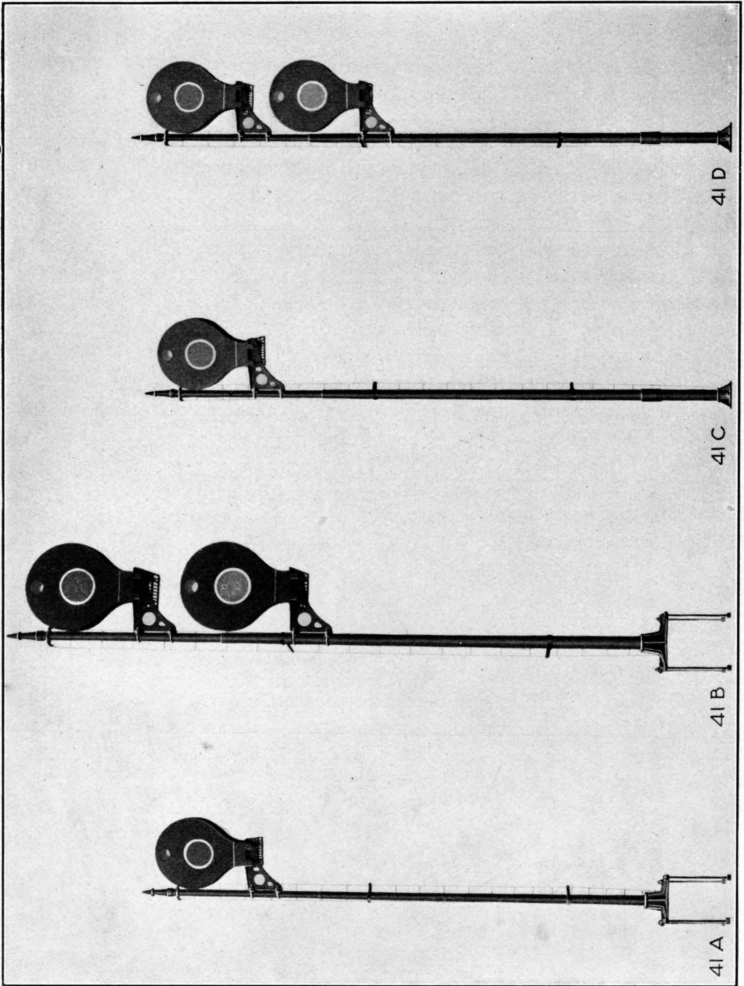
Order No.	<b>THE HALL DISC SIGNAL INSTRUMENT.</b>		List Price
6.00	Style "B" signal instrument complete, as shown on page 446.....		\$120.00
6.50	Style "B" signal instrument complete with C. & N. W., attachment, as shown on page 444...		140.00
	If "Hold-clear" attachment No. 6.70 is wanted on either of the above, add.....		30.00
<hr style="width: 20%; margin: 0 auto;"/> <p>Order by Name and Number.</p>			



Disc Signal Instrument, Style B

Order No.	<b>DISC SIGNALS.</b>		List Price
	Section 6.	Style B	
6.00	Style B signal instrument as shown on page 446.		\$120.00
6.50	Style B signal instrument with C. & N. W. attachment; page 444.....		140.00
6.60	Style B signal instrument with hold clear coils		140.00
6.75	Style B, C. & N. W. style with hold clear coils		160.00
6.01	Frame with pivot screws .....		26.66
6.02	Pole piece with screws .....		5.55
6.03	Magnets complete (state resistance) .....		17.77
6.04	Armature with shaft .....		17.77
6.05	Latch complete with screws .....		2.23
6.06	Aluminum arm with screws.. .....		1.77
6.07	Composition clamps with screws.....		.67
6.08	Counterweight, assorted sizes, each .....		.26
6.09	Glass disc complete with rims, red, \$3.34 green and yellow .....		3.00
6.10	Cloth disc complete, state color.....		2.23
6.11	Case clamp .....		1.12
6.15	Binding post with screws, each.....		.45
6.16	Clamp screws with nut.....		.23
6.22	Small bushing .....		.12
6.23	Large bushing .....		.12
6.25	End circuit closer .....		6.50
6.28	Brass bearing screw with bone point.....		.34
6.29	Cam for shaft circuit closer .....		1.12
6.30	Spring with block and post for circuit closer...		3.34
6.31	Anvil with block and post for circuit closer...		1.66
6.32	Plunger .....		.34
6.33	Plunger spring .....		.05
6.34	Plunger screw .....		.07

Order by Name and Number.



Disc Signals Complete with Iron Masts

**DISC SIGNALS COMPLETE WITH IRON MASTS.**

Order No.	Section 41.	List Price
41-A	Style A Single Disc Signal complete with iron mast, and including signal instrument, signal case, bracket and platform, anchor bolts and ladders.....	\$309.00
41-B	Style A Double Disc Signal complete with iron mast, and including signal instruments, signal cases, brackets and platforms, anchor bolts and ladders .....	..
41-C	Style B Single Disc Signal complete with iron mast, and including signal instrument, signal case, bracket and platform, ladders, etc.	534.00
41-D	Style B Double Disc Signal complete with iron mast, and including signal instruments, signal cases, brackets and platforms, ladders, etc.....	309.00
	If lamps are desired add \$6.66 to list price for each lamp .....	534.00

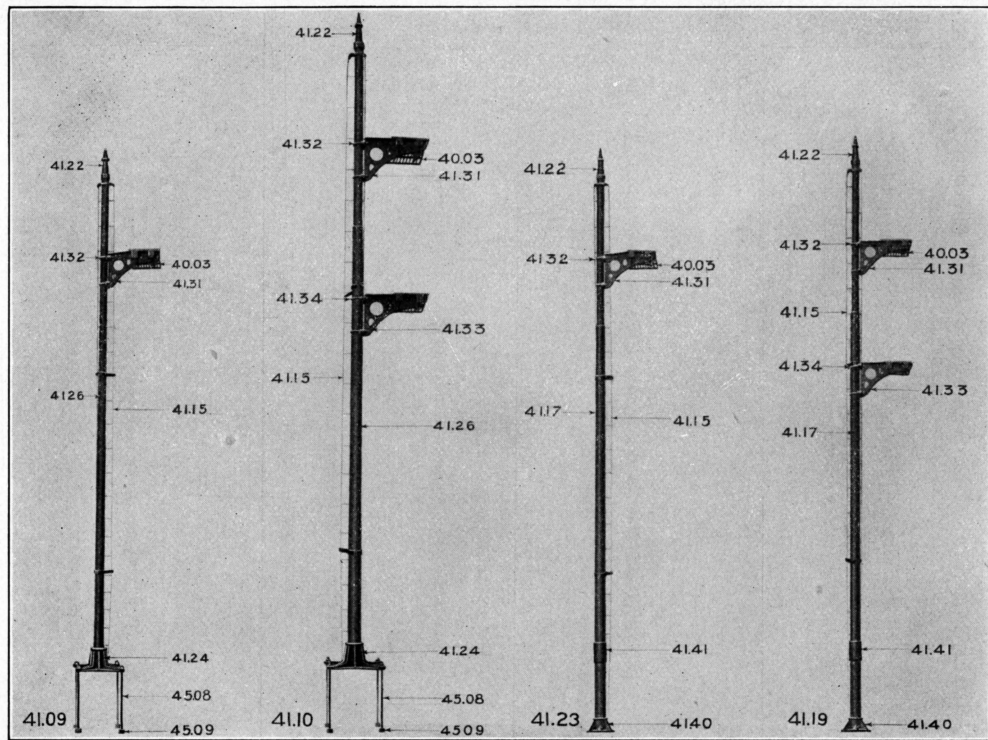
If lamps are desired add \$6.66 to list price for each lamp .....

41-A and 41-B represent arrangements of iron masts to be supported by anchor bolts, embedded in concrete. 41-C and 41-D represent arrangements of iron masts with pipe extending 6 feet in ground, and which do not require concrete foundations.

The order should state the character of each signal desired; specify resistance of magnets on signal instrument; whether red or green disc on signal disc masts, and two red, two green, or one red and one green disc on double disc masts. Should also state any changes desired from the standard design. Unless otherwise specified, signals will be furnished as follows:

- Base to center of lower disc, 41-A and 41-B; 17' 4" .....
- Center of lower to center of upper disc, 41-B and 41-D 6' 0".....
- Base of mast to center of lower disc, 41-C and 41-D 23' 4".....
- Inside diameter of lower section of pipe mast 0' 5".....
- Inside diameter of upper section of pipe mast 0' 4".....
- If battery case 41.42 is wanted add to list price, \$65.00.....
- No Foundations included in any of the above.

Order by Name and Number.

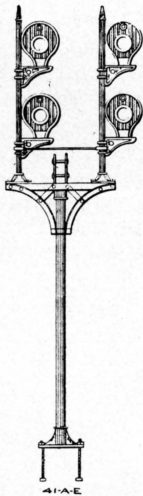
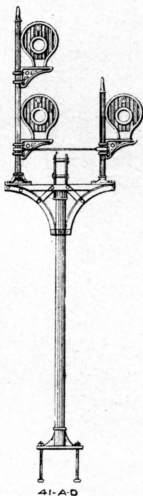
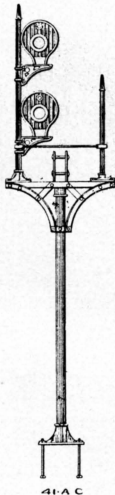
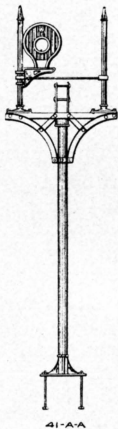


Iron Masts for Disc Signals



Order No.	IRON MAST FOR DISC SIGNAL.	List Price
<b>Section 41.</b>		
41.09	Style A Iron Mast for one disc signal including bracket and platform, anchor bolts and ladder but not including signal instrument or signal case.....	\$131.00
41.10	Style A Iron Mast for two disc signals including brackets and platforms, anchor bolts and ladders but not including signal instruments or signal cases .....	155.00
41.15	Ladder for disc signal mast (State length) per foot .....	.51
41.17	Swedged Pipe for style B mast .....	58.00
41.19	Style B Iron Mast for two disc signals complete, including brackets platforms, and ladders but not including signal instruments or signal cases .....	155.00
41.22	Pinnacle with ½x6" Bolt and nut.....	4.00
41.23	Style B Iron Mast complete for one disc signal including bracket and platform, but not signal instruments or signal case....	131.00
41.24	Base Casting for style A signal mast.....	30.00
41.26	Section 4" and 5" Swedged pipe for style A mast .....	51.00
41.31	Disc Signal Bracket for 4" pipe mast.....	14.00
41.32	U-Bolt Fastener complete for 4" pipe mast..	1.00
41.33	Disc Signal Bracket for 5" pipe mast.....	14.23
41.34	U-Bolt Fastener complete for 5" pipe mast..	.45
40.03	Bracket Platform with four ½x2½" bolts and nuts .....	10.00
41.40	Base for style B mast .....	14.00
41.41	Collar for style B mast .....	4.00
41.42	Battery case for disc Signal Mast.....	81.00
45.08	Anchor bolts each .....	3.00

Order by Name and Number.



Bracket Masts with Fittings for Disc Signals

**BRACKET MASTS WITH FITTINGS FOR DISC SIGNALS.**

Order No.	Section 41.	List Price
41-AA	Steel Pipe and Structural Work Bracket Mast with fittings for one single disc doll and one blind doll .....	\$538.00
41-AB	Steel Pipe and Structural Work Bracket Mast with fittings for two single disc dolls....	799.00
41.AC	Steel Pipe and Structural Work Bracket Mast with fittings for one double disc doll and one blind doll .....	799.00
41-AD	Steel Pipe and Structural Work Bracket Mast with fittings for one double and one single disc doll .....	1,000.00
41-AE	Steel Pipe and Structural Fork Bracket Mast with fittings for two double disc dolls....	1,250.00

If lamps are desired add 6.66 for each one wanted.

The above arrangements include masts and fittings complete including signal instruments, signal cases, brackets and platforms, anchor bolts and ladders, no lamps.

The order should state the character of each signal desired: specify whether home or distant on single disc type; whether two home, two distant, or one home and one distant on double disc types; should state any changes from standard design.

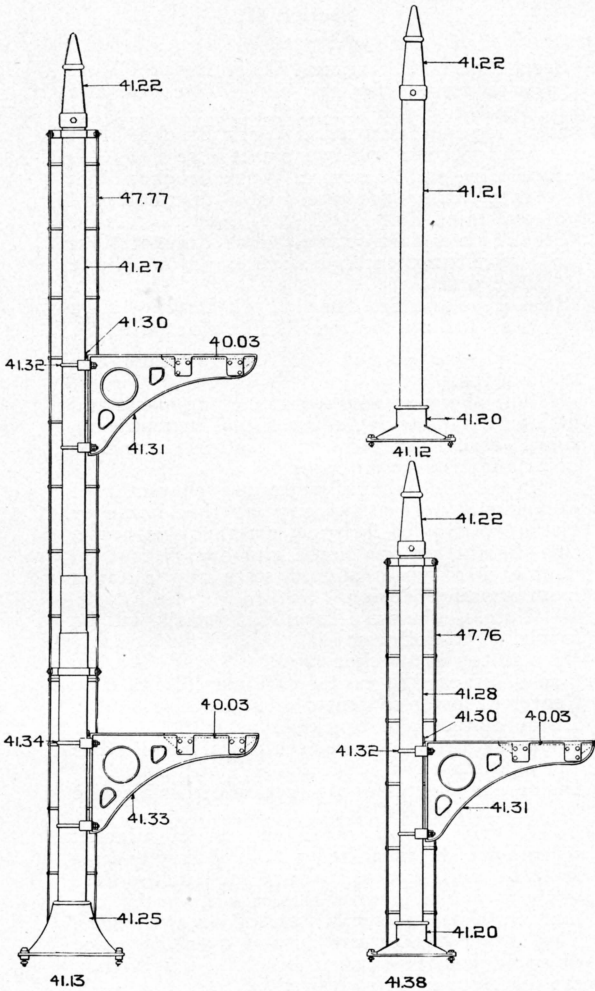
Unless otherwise specified, signals will be furnished as follows:

- Base to top of bracket 22' 0" .....
- Top of bracket to center of lower disc 6' 0" ..
- Center of lower to center of upper disc 6' 0" ..
- Inside diameter of bracket mast 0' 8" .....
- Inside diameter of lower section of double disc pipe mast 0' 5" .....
- Inside diameter of upper section of double disc pipe mast 0' 4" .....

All the above arrangements of bracket signals may be furnished with a battery and relay case, built of cast iron and steel at the base of the main mast, and if this case is wanted, the fact must be specifically stated on the order. The sum \$145.00 must be added to the price of each arrangement of bracket signal when the battery case is desired.....

No foundations included in the above.

Order by Name and Number.



Bracket Mast Dolls for Disc Signals

**BRACKET MAST DOLLS FOR DISC SIGNALS.**

Order No.	Section 41.	List Price
41.12	Blind Doll complete .....	\$16.10
41.20	Base for single doll with four $\frac{3}{4}$ x2" Bolts and nuts .....	6.00
41.21	Section 4" Steel Pipe for blind doll 7' long.....	6.00
41.22	Pinnacle with $\frac{1}{2}$ x6" Bolt and nut,.....	4.00
41.25	Base for double disc doll with four $\frac{3}{4}$ x2" bolts and nuts .....	8.12
41.27	Section 4" and 5" Swedged Pipe for double disc doll 12' 9 $\frac{1}{2}$ " long .....	22.00
41.28	Section 4" Pipe for single disc doll 7' 8" long.	9.00
41.30	Wire Plug.....	.16
41.31	Disc Signal Bracket for 4" pipe mast.....	14.00
41.32	U-Bolt Fastener complete for 4" pipe mast...	1.00
41.33	Disc Signal Bracket for 5" pipe mast.....	14.23
41.34	U-Bolt Fastener for 5" pipe mast.....	.45
47.76	Ladder complete for single disc doll.....	9.00
47.77	Ladder complete for double disc doll.....	10.00
40.03	Bracket Platform with four $\frac{1}{2}$ x2" bolts and nuts .....	10.00
41.13	Bracket Mast Doll complete for two disc signals including brackets and platforms but not signal instruments, signal cases or lamps .....	100.00
41.38	Bracket Mast Doll complete for one disc signal including bracket and platform, but not signal instrument signal case or lamp.	70.00

Order by Name and Number.

### MOULDED SEMAPHORE RONDELLS.

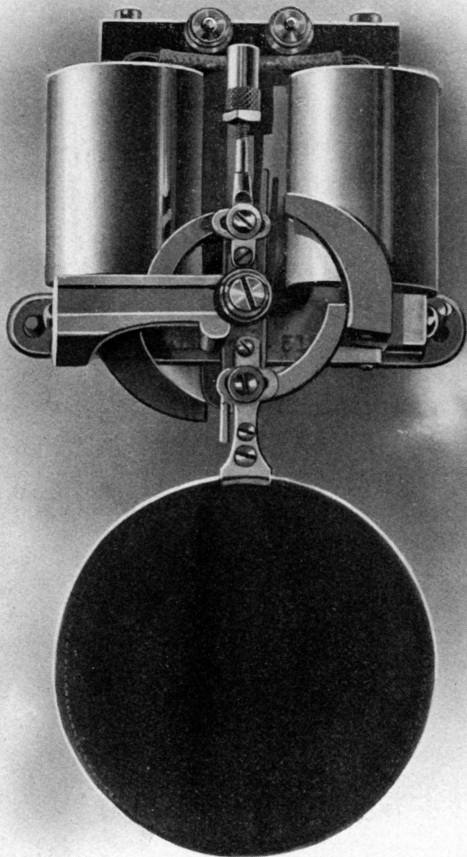
When sent out these glasses have lamp wick-  
ing fastened around the edges, making it unneces-  
sary to use putty or other substance when  
putting them in rims.

Size	Red	Green	Yellow	Blue
3"	.54	.27	.27	.27
3 $\frac{3}{8}$ "	.65	.31	.31	.31
3 $\frac{1}{2}$ "	.65	.31	.31	.31
4"	.65	.35	.35	.35
4 $\frac{1}{4}$ "	.72	.38	.38	.38
4 $\frac{1}{2}$ "	.76	.40	.40	.40
5"	.80	.50	.50	.50
5 $\frac{1}{2}$ "	.80	.50	.50	.50
6"	1.34	.50	.50	.50
6 $\frac{3}{8}$ "	1.34	.72	.72	.72
6 $\frac{1}{2}$ "	1.34	.72	.72	.72
6 $\frac{3}{4}$ "	1.60	.88	.88	.88
7"	1.60	.88	.88	.88
7 $\frac{1}{2}$ "	1.83	1.15	1.15	1.15
8 $\frac{3}{8}$ "	2.00	1.50	1.50	1.50
8 $\frac{3}{4}$ "	2.40	1.70	1.70	1.70

Order by Color and Size.

**Switch and Tower Indicators**

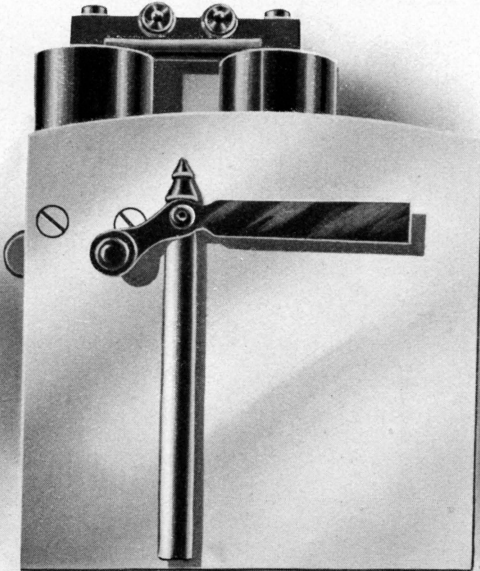
## Disc Indicator, assembled

**7.00**



Order No.	INDICATOR COMPLETE, DISC STYLE.	List Price
7.00	Disc indicator complete as shown, (State resistance required) ..... For details of instruments, see page 465..... For Parts of Indicator Box, see page 479.....	\$27.00
<hr style="width: 20%; margin: 0 auto;"/> Order by Name and Number.		

Semaphore Indicator, assembled



**7.40**

Order  
No.

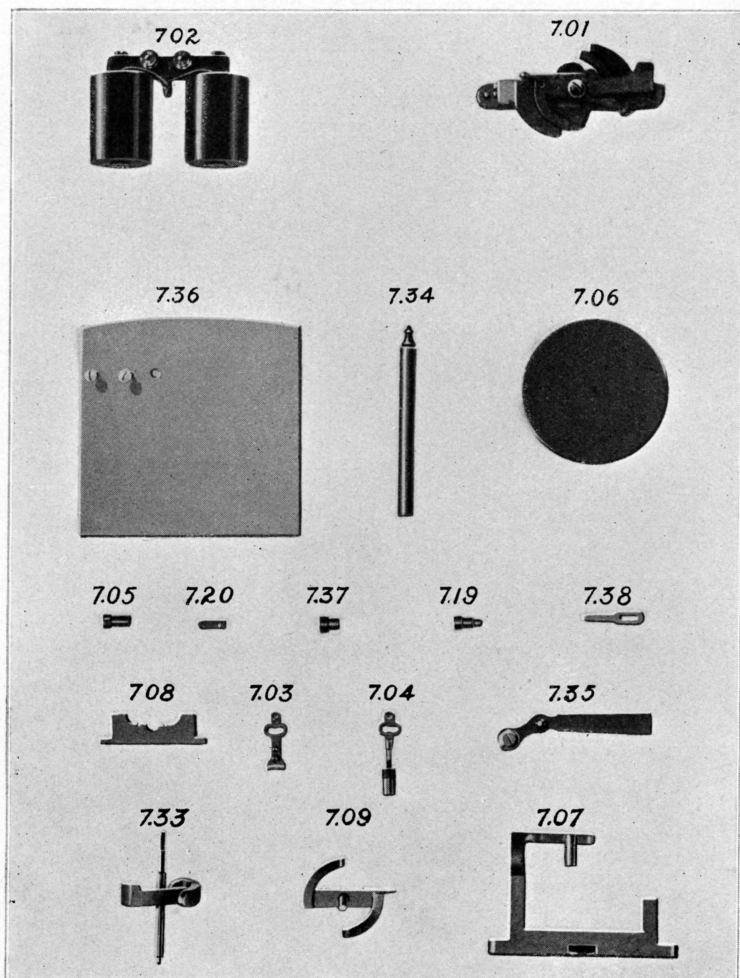
List Price

**INDICATOR COMPLETE, SEMAPHORE  
STYLE.**

7.40	Semaphore indicator complete as shown, (State resistance required) ..... For details see page 465 .....	\$27.00
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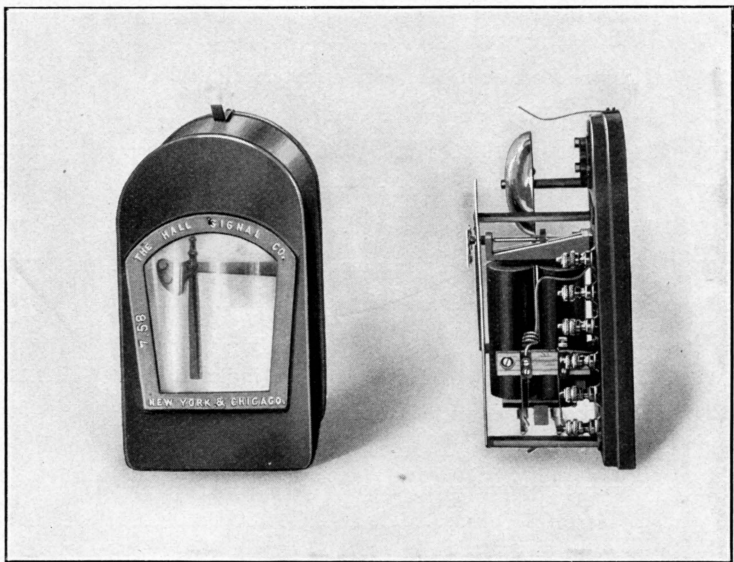
Order by Name and Number.



Parts of Indicator

Order No.	<b>PARTS OF INDICATOR INSTRUMENTS.</b>	List Price
<b>Section 7.</b>		
7.01	Frame, assembled (state whether for disc or semaphore) .....	\$12.00
7.02	Magnets, complete (state resistance) up to 100 ohms .....	10.00
7.03	Disc clamp, complete .....	.20
7.04	Balance Rod, complete with counterweight....	.60
7.05	Balance Weight only .....	.20
7.06	Cloth Disc .....	1.05
7.07	Frame only, for disc or semaphore indicator..	2.60
7.08	Indicator Brace .....	.73
7.09	Armature complete, for disc indicator.....	6.00
7.19	Pivot Screw for disc indicator .....	.20
7.20	Armature Spring .....	.10
7.33	Armature complete, for semaphore indicator..	4.51
7.34	Mast complete, with escutcheon pins.....	.69
7.35	Blade .....	.60
7.36	Cover complete, with two $\frac{1}{4}$ "x8/32 flat head screws .....	.92
7.37	Shaft Bearing for semaphore indicator.....	.60
7.38	Adjustable Stop for semaphore indicator.....	.60

Order by Name and Number.



Tower Indicator and Bell. 741

Order  
No.

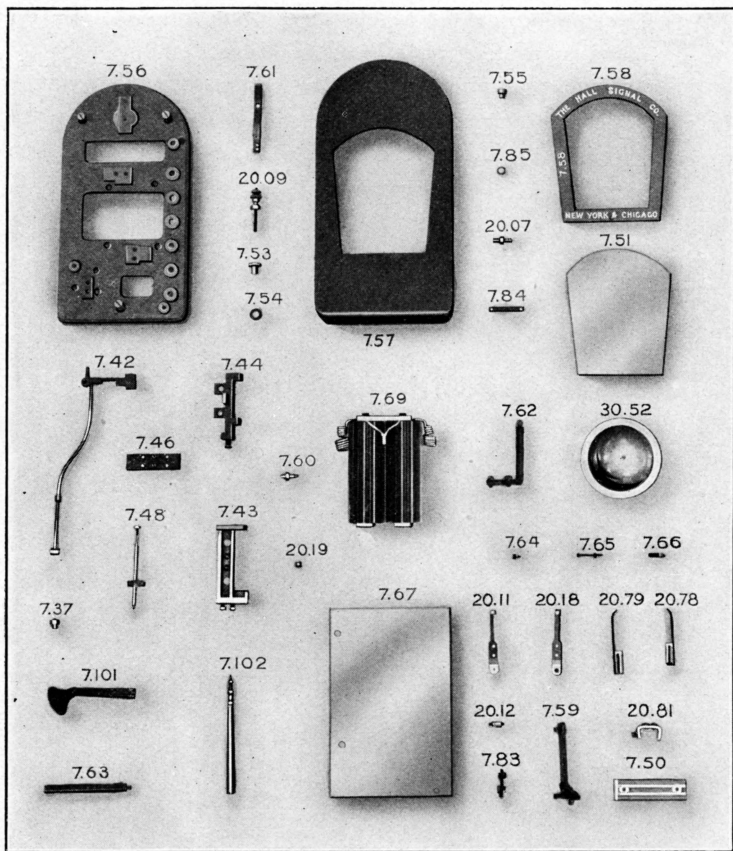
List Price

**INDICATOR COMPLETE WITH CASE  
FOR SIGNAL TOWERS.**

<b>7.41</b>	Tower indicator and bell as shown, with one circuit (state resistance of magnets and number of circuits wanted).....	\$36.00
	For each additional circuit over and above one add .....	2.00
	For details see page 469.	
	If Bell is omitted deduct \$3.00.	

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Order by Name and Number.

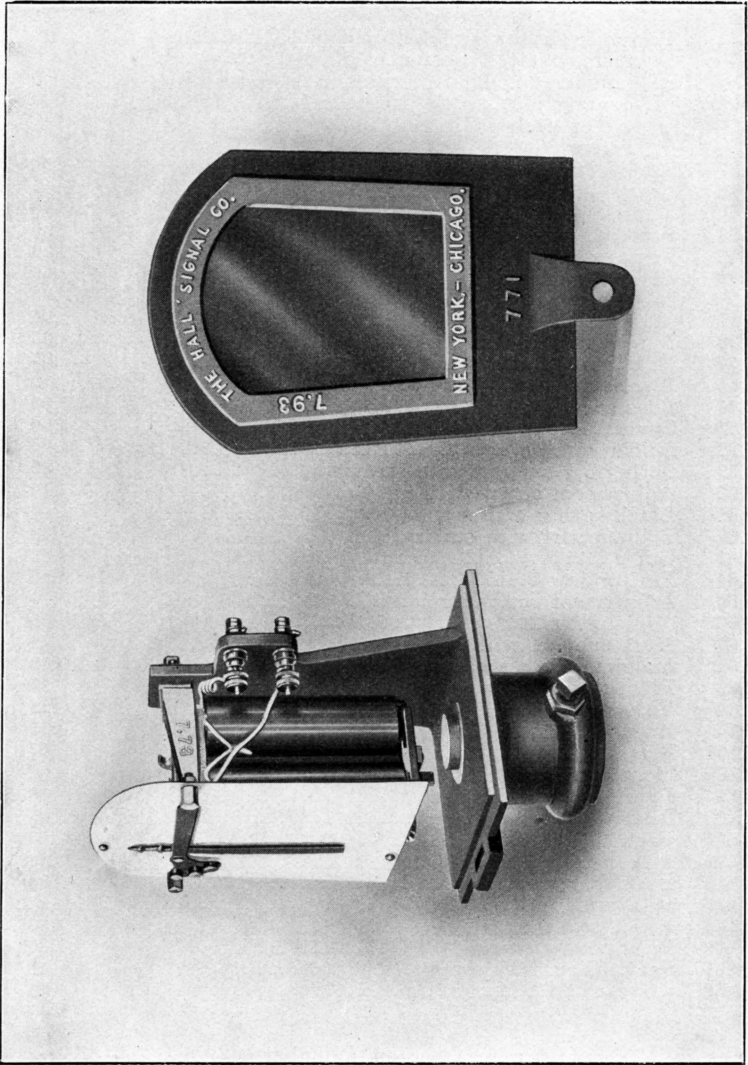


Parts of Tower Indicator. 7.41



Order No.	TOWER INDICATOR AND BELL NO. 7.41	List Price
7.41	Tower indicator and bell complete, no contacts, (state resistance of magnets, and number and kind of contacts). With one contact .....	36.00
	For each additional circuit add \$2.00 to list price .....	
7.37	Shaft bearing .....	.60
7.42	Armature level and clapper complete.....	1.15
7.43	Magnet stand with screws.....	2.00
7.44	Pivot stand with screws .....	1.00
7.46	Armature with screws .....	1.00
7.48	Blade shaft with nut and jaw.....	.80
7.50	Bar for spring base .....	.05
7.51	Glass .....	.35
7.53	Binding post insulation .....	.05
7.54	Insulation washer for binding post.....	.05
7.55	Insulation bushing for wires .....	.10
7.56	Base with wood screws .....	2.00
7.57	Cover .....	5.00
7.58	Shield with screws .....	1.20
7.59	Spring bar support with screws.....	.80
7.60	Adjustment screw with nut .....	.10
7.61	Latch spring with screws .....	.48
7.62	Bell support with screws.....	.40
7.63	Guide .....	.12
7.64	Pin for jaw .....	.20
7.65	Adjustment screw for jaw .....	.10
7.66	Adjustment .....	.10
7.67	Mast support with screws .....	.75
7.69	Magnets complete, state resistance.....	10.00
7.83	Pivot stand screw with nuts, washers and screw .....	.10
7.84	Finger connecting strip .....	.05
7.85	Insulation washer for pivot stand.....	.05
7.101	Blade .....	.67
7.102	Mast complete .....	.69
20.07	Pivot screw with nuts .....	.18
20.09	Binding post complete.....	.45
20.11	Front finger complete .....	1.80
20.12	Armature insulation .....	.23
20.18	Back finger complete .....	1.80
20.19	Split nut .....	.02
20.78	Front contact spring .....	1.80
20.79	Back contact spring .....	1.80
20.81	Spring base with screws.....	.18
30.52	Gong 4" .....	.25

Order by Name and Number.



Switch Indicator Complete. 7.70

Order  
No.

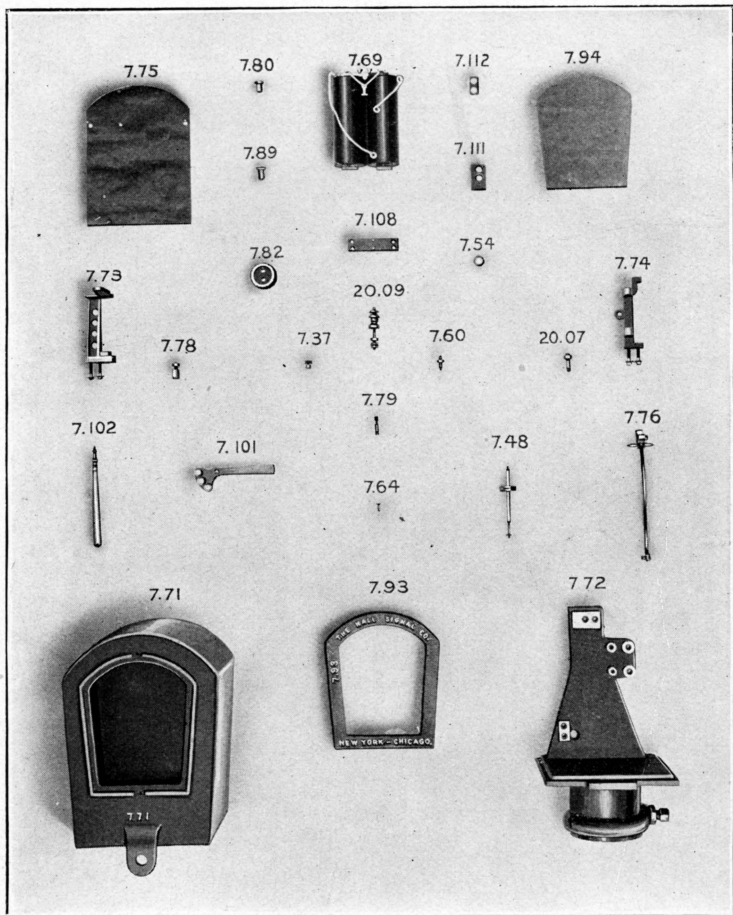
List Price

**SWITCH INDICATOR COMPLETE WITH  
IRON BOX FOR IRON POST.****7.70**Switch indicator complete with iron box (state  
resistance of magnets) .....**\$40.00**

For detail of parts see Page 473.

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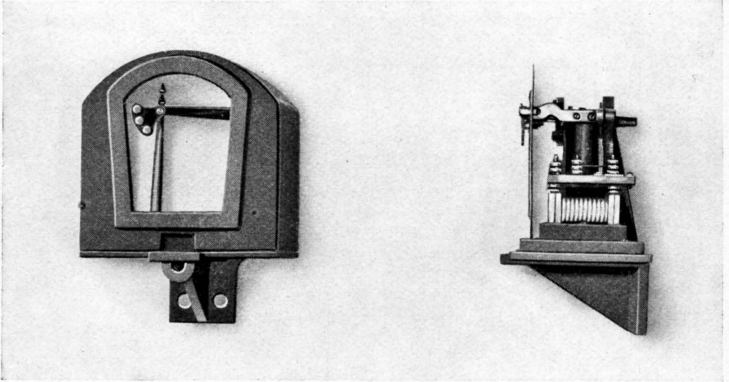
Order by Name and Number.



Parts of Switch Indicator. 7.70

Order No.	<b>SWITCH INDICATOR WITH IRON BOX NO. 7.70. Section 7.</b>	List Price
7.37	Shaft bearing .....	.60
7.48	Blade shaft complete with nut and jaw.....	.80
7.54	Insulation washer for binding post.....	.05
7.60	Adjustment screw with nuts.....	.10
7.64	Split pin .....	.20
7.69	Magnets complete (state resistance), up to 100 ohm. ....	10.00
7.71	Cover .....	4.96
7.72	Base .....	5.50
7.73	Magnet stand with screws.....	2.60
7.74	Pivot stand with screws.....	1.50
7.75	Mast support with screws.....	1.65
7.76	Armature lever and connecting rod complete..	1.00
7.78	Guide pin with nut and washer.....	.16
7.79	Jaw connection .....	.25
7.80	Insulation for binding post.....	.05
7.82	Wood plug .....	.30
7.89	Insulation bushing .....	.10
7.93	Shield with screws .....	1.20
7.94	Glass .....	.35
7.101	Blade .....	.67
7.102	Mast complete .....	.69
7.108	Armature .....	1.00
7.111	Magnet stand insulation .....	.15
7.112	Pivot stand insulation .....	.15
20.07	Pivot screw with lock nut.....	.18
20.09	Binding post complete.....	.45

Order by Name and Number.



Switch Indicator. 7.90

Order  
No.

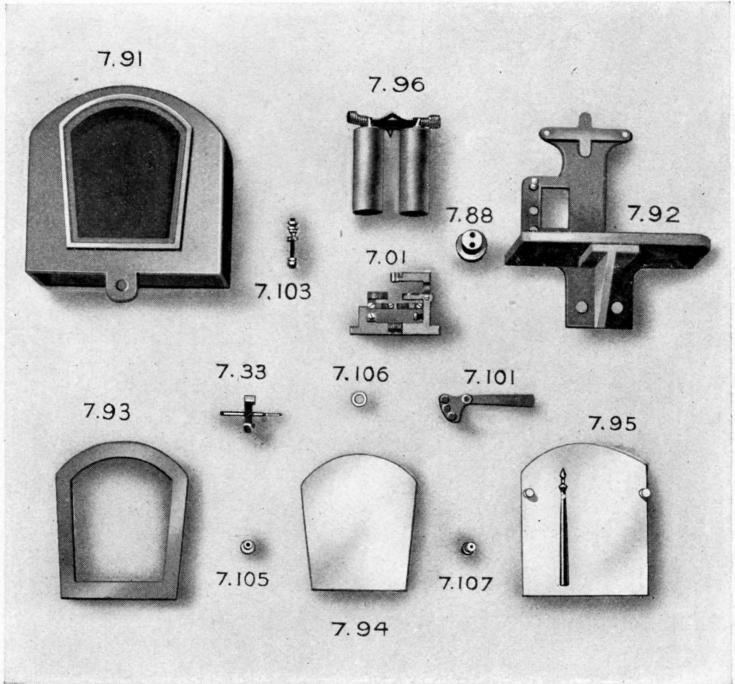
List Price

**SWITCH INDICATOR COMPLETE WITH  
IRON BOX FOR WOOD POST.****7.90**Switch instrument complete with box (please  
state resistance of magnets).....**\$38.00**

For detail of parts, see Page 477.

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Order by Name and Number.



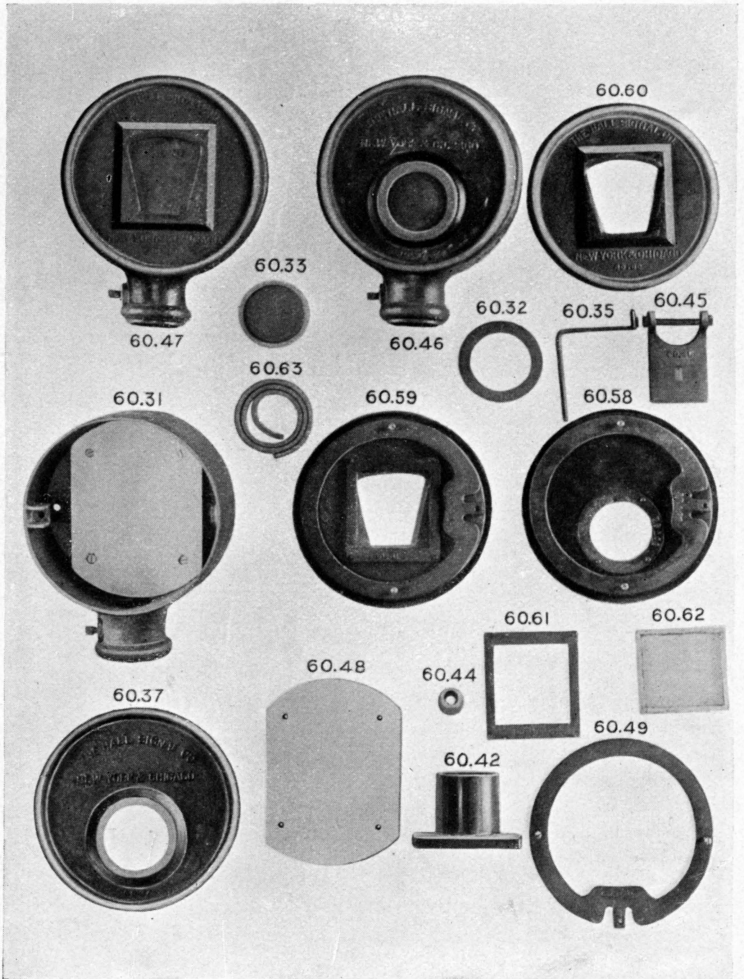
Parts of Switch Indicators. 7.90



Order No.	PARTS OF SWITCH INDICATOR 7.90.	List Price
<b>Section 7.</b>		
7.01	Frame complete with screws.....	\$12.00
7.33	Armature complete .....	4.51
7.88	Wire plug .....	.30
7.91	Cover.....	5.00
7.92	Base .....	8.50
7.93	Shield with screws .....	1.20
7.94	Glass .....	.35
7.95	Mast support with screws.....	2.00
7.96	Magnets complete (state resistance up to 100 ohm.) .....	10.00
7.101	Blade .....	.67
7.102	Mast complete with escutcheon pins.....	.69
7.103	Binding post complete .....	.40
7.105	Binding post bushing.....	.15
7.106	Binding post insulation washer.....	.06
7.107	Connecting wire bushing .....	.10
7.109	Guide with nut and washer.....	.40
70.25	Two-point style "EG" lightning arrester, per point .....	2.78

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Order by Name and Number.



Parts of Indicator Box and Post

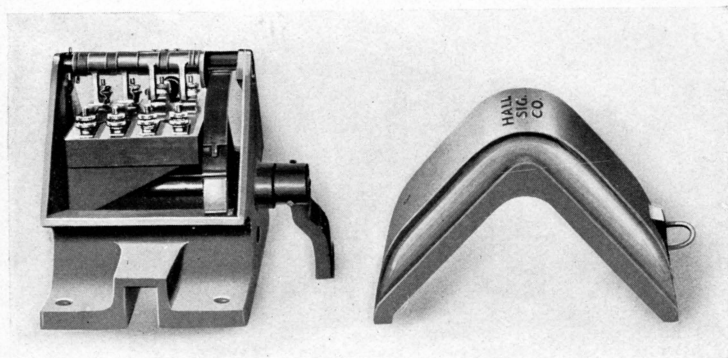
Order No.	DISC INDICATOR BOX. Section 60.	List Price
60.31	Indicator Box with shelf and ½x1" iron set screw .....	\$11.25
60.32	Rim for disc indicator with four ⅜x8/32", round head brass screws.....	.35
60.33	Glass for disc indicator.....	.45
60.35	Locking Crank .....	.80
60.37	Cover only for disc indicator box.....	2.25
60.42	Post Base with ½x¾" iron set screw.....	1.12
60.44	Wire Plug only .....	.15
60.45	Trunking Support, complete, with one ⅜x4" iron bolt and nut and two ⅞" No. 16 wood screws .....	.44
60.46	Indicator Box, complete, with cover for disc indicator .....	13.75
60.47	Indicator Box, complete, with cover for semaphore indicator .....	14.50
60.48	Indicator Shelf only .....	.25
60.49	Latch Rim, complete, with two ⅞ 14x24 fillister head iron screws .....	1.00
60.58	Cover, complete for disc indicator box.....	3.50
60.59	Cover, complete, for semaphore indicator box .....	4.25
60.60	Cover, only, for semaphore indicator box.....	2.25
60.61	Rim for semaphore indicator with four ⅜x8/32 inch round head brass screws.....	.66
60.62	Glass for semaphore indicator.....	.45
60.63	Gasket for cover .....	.70

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Order by Name and Number.

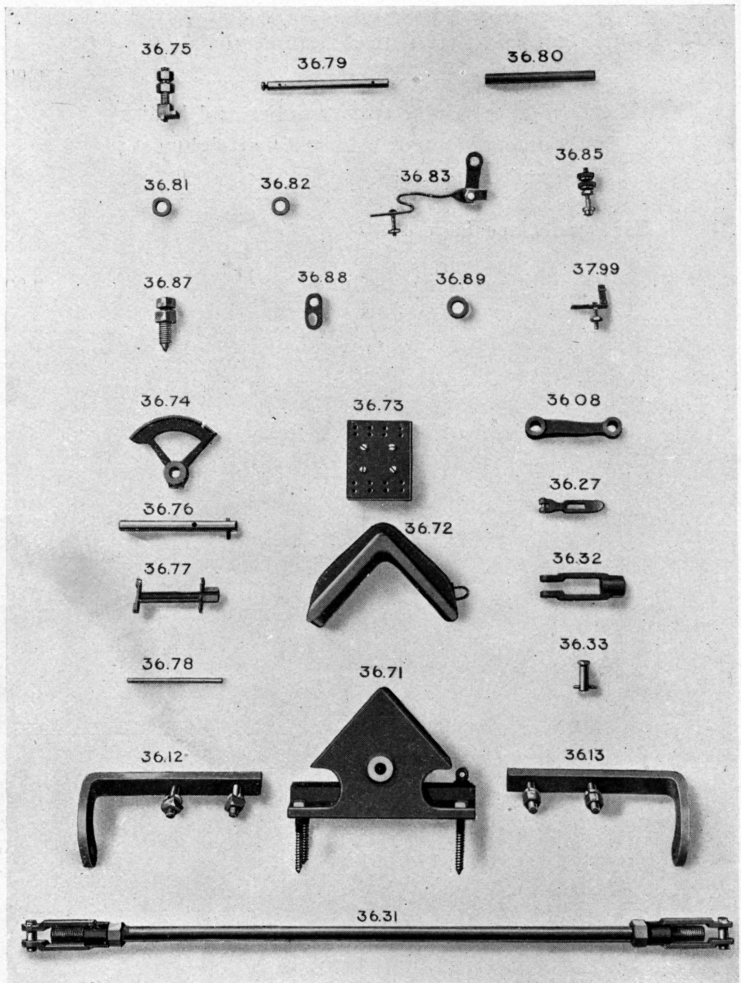


**Switch Boxes, Circuit Closers  
and Pole Changers**



Style E Switch Box. 36.70

Order No.	SWITCH BOX, STYLE "E."	List Price
<b>36.70</b>	Switch box complete with rail connections and two springs .....	<b>\$30.00</b>
	When ordering, please state number and kind of contacts wanted; also whether right or left hand switch lugs.	
	For details, see Page 485.	
	For each additional circuit add.....	<b>2.00</b>
	<hr style="width: 15%; margin: 0 auto;"/> <p>Order by Name and Number.</p>	



Parts of Switch Box. 36.70

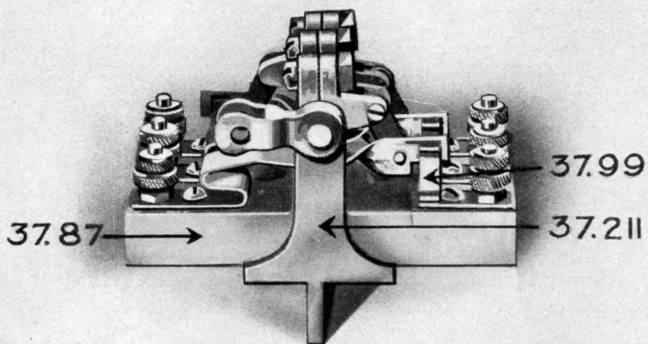
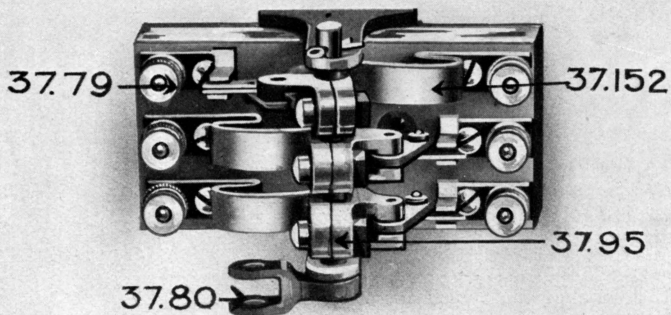


## STYLE "E" SWITCH INSTRUMENT NO. 36.70.

Order No.	Section 36.	List Price
36.70	Style "E" switch box complete (state number and kind of contacts and whether right or left hand lug) with two circuits.....	\$30.00
	For each additional circuit, add.....	2.00
36.71	Case complete with lag screws.....	4.30
36.72	Cover .....	1.20
36.73	Porcelain base with screws and washers.....	.45
36.74	Segment .....	2.10
36.75	Segment tooth with hexagon nuts.....	.60
36.76	Main shaft with taper pin.....	.35
36.77	Rocker .....	3.00
36.78	Rocker shaft with cotter pins.....	.10
36.79	Link shaft with cotter.....	.08
36.80	Fibre tube .....	.08
36.81	Fibre washer .....	.07
36.82	Fibre washer .....	.07
36.83	Contact spring and link complete with screw and nut.....	1.15
36.85	Binding post complete .....	.25
36.87	Set screw with nut.....	.10
36.88	Guide pin .....	.80
36.89	Fibre washer .....	.04
36.08	Outside arm .....	1.81
36.12	Left hand lug complete with bolts, nuts and washers .....	2.00
36.13	Right hand ditto.....	2.00
36.27	Hasp with rivet.....	.30
36.31	Switch instrument rod complete.....	3.00
36.32	Screw jaw .....	1.20
36.33	Turned pin and cotter.....	.20
37.99	Contact jaw with screw and nut.....	.50

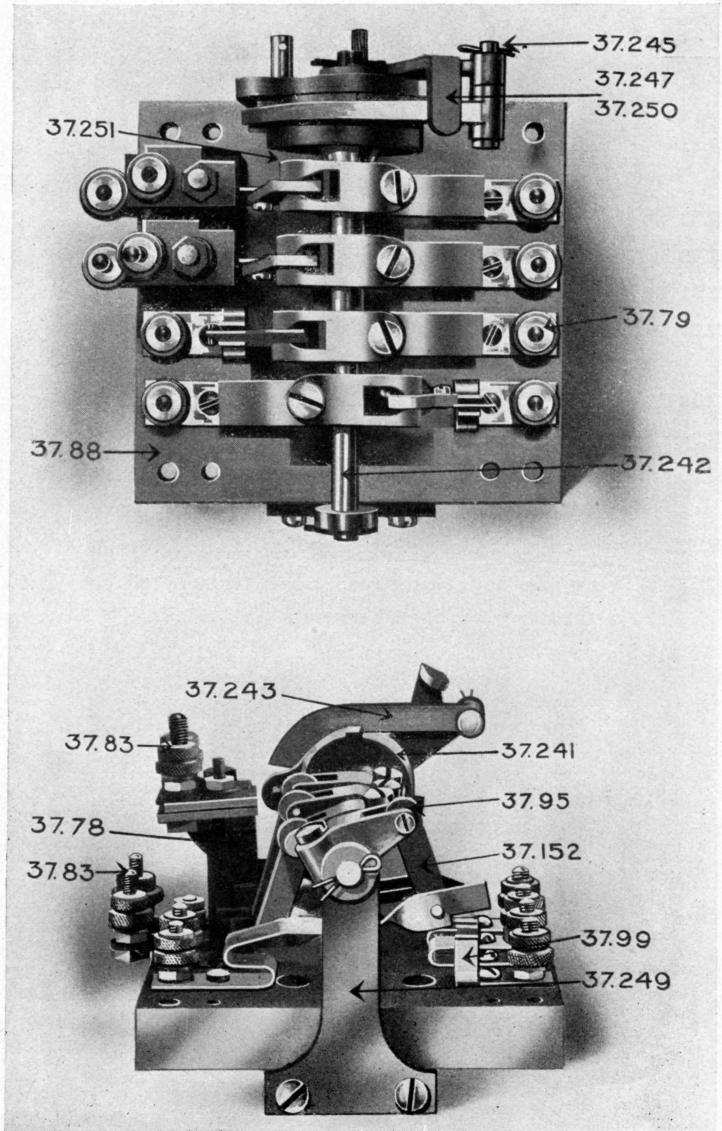
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Order by Name and Number.



Circuit Closer. 37.210

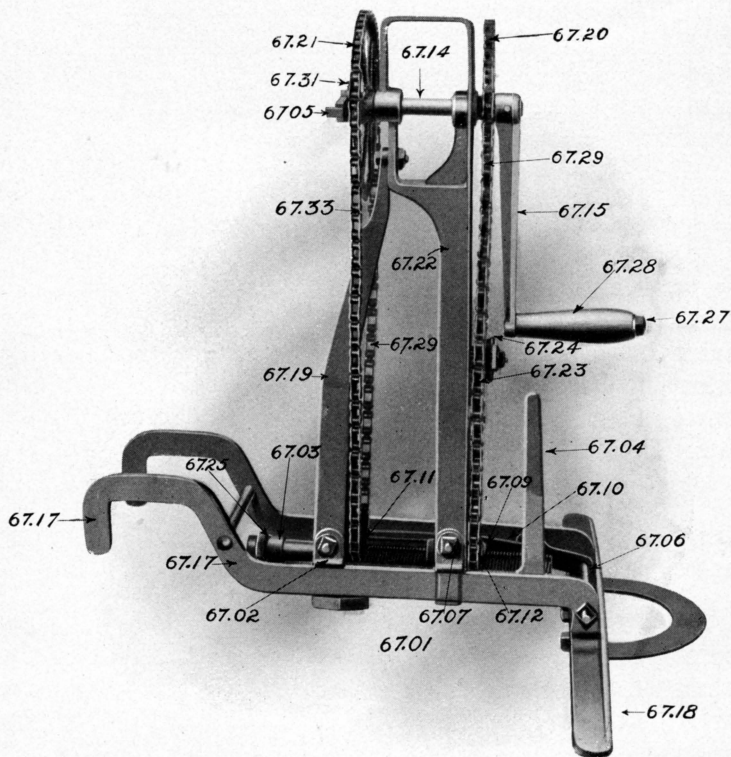
Order No.	<b>CIRCUIT CONTROLLERS.</b>	List Price
	<b>Section 37.</b>	
<b>37.210</b>	Circuit controller complete, up to 3 springs...	\$7.50
	For each additional circuit required add.....	1.75
<b>37.79</b>	Binding post complete .....	.20
<b>37.80</b>	Three-way shaft and crank complete.....	.50
<b>37.81</b>	Six-way ditto .....	.60
<b>37.87</b>	Three-way base with two 8x32 $\frac{3}{4}$ " round head brass screws .....	.40
<b>37.88</b>	Six-way ditto .....	.50
<b>37.95</b>	Connecting bar crank complete.....	.40
<b>37.99</b>	Contact jaw complete with one 8x32 $\frac{3}{4}$ " round head brass screw .....	.50
<b>37.152</b>	Spring and link complete.....	.40
<b>37.211</b>	Three-way shaft bearing with two 10x32 $\frac{5}{16}$ " fillister head brass screws .....	1.20
<b>37.214</b>	Six-way ditto .....	1.30
<hr style="width: 20%; margin: 0 auto;"/> <p style="text-align: center;">Order by Name and Number.</p>		



Pole Changer. 37.240

Order No.	<b>POLE CHANGER.</b> <b>Section 37.</b>	List Price
<b>37.240</b>	Pole changer complete with two pole changing springs .....	\$12.00
	For each additional circuit required add.....	1.75
<b>37.78</b>	Bracket with jaws complete.....	.60
<b>37.79</b>	Binding post complete .....	.20
<b>37.83</b>	Binding post complete .....	.20
<b>37.88</b>	Six-way base with two 8x32 $\frac{3}{4}$ " round head brass screws .....	.50
<b>37.95</b>	Connecting bar crank complete.....	.40
<b>37.99</b>	Contact jaw complete with one 8x32 $\frac{3}{4}$ " round head brass screw .....	.50
<b>37.152</b>	Spring and link complete .....	.40
<b>37.241</b>	Spring case .....	1.00
<b>37.242</b>	Shaft and crank complete.....	1.20
<b>37.243</b>	Pawl .....	.30
<b>37.245</b>	Pin with cotter .....	.12
<b>37.247</b>	Six-way shaft bearing, right hand, with two 10x32 $\frac{5}{16}$ " fillister head brass screws and two 10x32 $\frac{7}{16}$ " fillister head brass screws	1.20
<b>37.249</b>	End bearing .....	.32
<b>37.250</b>	Six-way shaft bearing, left hand, with two 10x32 $\frac{5}{16}$ " fillister head brass screws and two 10x32 $\frac{7}{16}$ " fillister head brass screws	1.20
<b>37.251</b>	Connecting bar crank complete.....	.40
<b>37.252</b>	Left hand spring with washer 37.254.....	.20
<b>37.253</b>	Right hand ditto .....	.20

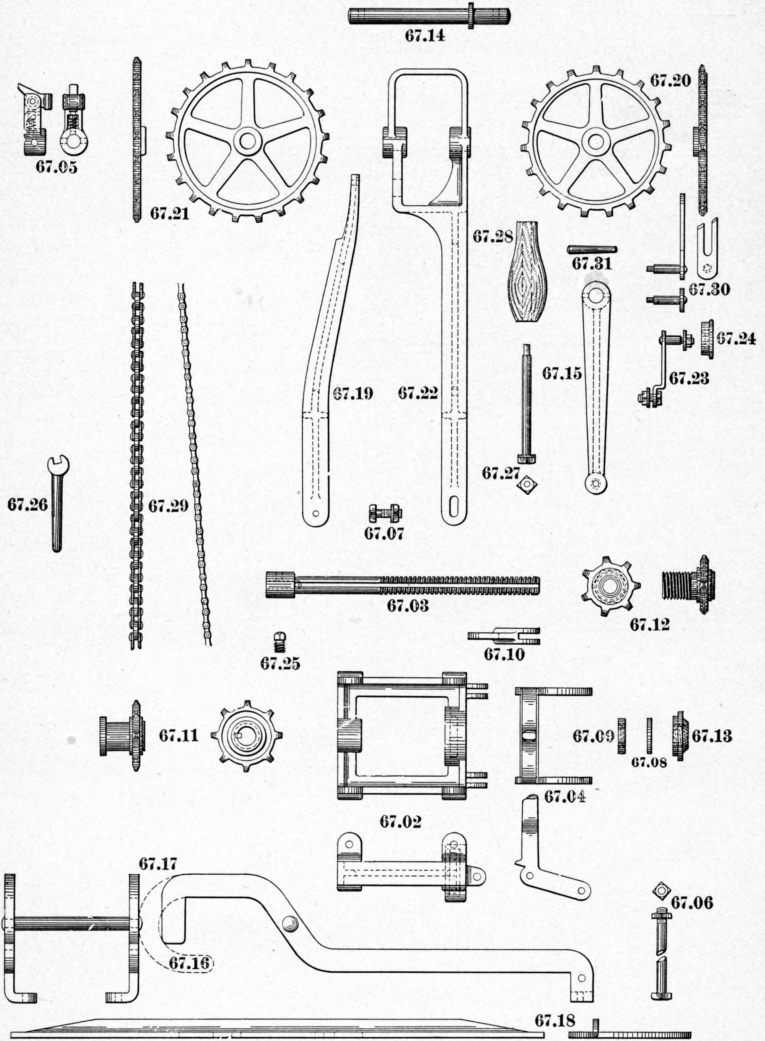
Order by Name and Number.



Style B Drilling Machine. 67.01

Order No.	THE HALL DRILLING MACHINE. Style B.	List Price
67.01	Style B Drilling Machine as shown.....  For detail of parts, see Page 493.	\$55.56

Order by Name and Number.



Drilling Machine, Style B



Order No.	DRILLING MACHINE.		List Price
	Section 67.	Style B.	
67.01	Drilling Machine for web of rail.....		\$55.56
67.02	Sliding Frame .....		4.11
67.03	Spindle .....		3.00
67.04	Toggle Lever .....		1.45
67.05	Pawl and Arm .....		2.23
67.06	Toggle Lever Bolt .....		.14
67.07	Machine Bolt .....		.14
67.08	Washer for adjusting bolt.....		.20
67.09	Adjusting nut for ball bearing.....		1.12
67.10	Toggle .....		.78
67.11	Drive Sleeve, eight teeth.....		4.44
67.12	Feed Nut Sprocket, seven teeth.....		3.00
67.13	Cone for ball bearing .....		1.89
67.14	Crank Shaft .....		1.56
67.15	Crank .....		1.23
67.16	Rail Hook .....		2.56
67.17	Rail Hook .....		2.56
67.18	Foot Plate .....		1.89
67.19	Upright Frame Brace .....		1.89
67.20	Feed Sprocket, 19 teeth .....		3.00
67.21	Drive Sprocket, 21 teeth.....		3.67
67.22	Upright Frame .....		3.67
67.23	Idler Bracket .....		.56
67.24	Idler Wheel .....		.29
67.25	Set Screw .....		.15
67.26	Small Wrench .....		.56
67.27	Shaft for wood handle.....		.29
67.28	Wood Handle .....		.29
67.29	Feed Chain, 47 links .....		2.00
67.30	Idler Adjusting Plate.....		.56
67.31	Taper Pin .....		.20
67.32	¼" Balls, each .....		.03
67.33	Feed Chain, 48 links .....		2.12

Order by Name and Number.

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ENGINEERING DEPARTMENT.

