MAGNETIC WIG WAG CROSSING FLAGMAN

Signal Accessories *and* Supplies

MAGNETIC SIGNAL CO.

GENERAL OFFICES AND FACTORY

1334 East Sixth Street

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BRANCH OFFICES

30 Church Street, New York

Railway Exchange, Chicago

Railway Exchange, St. Louis

FOREIGN OFFICES

Holland Italy Norway Australia Argentina

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"MAGSIG"

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Foreword

A number of years ago the founders of this company manufactured a Wig Wag Flagman operated by means of a motor, and which was then generally conceded to afford the most efficient crossing protection obtainable.

Time works many changes however, and it shortly developed that although the Wig Wag principle was all that could be desired, the operation by motor with the necessary gears, pinions, etc., was far from satisfactory because of the great number of parts employed, many of which were continually being replaced, and the excessive amount of current consumed.

To David Palmer fell the task of improving, and in 1914 he conceived and patented the idea of *operating a Wig Wag Signal by means of magnets and a swinging armature, which is today known as the Magnetic Flagman.*

Over one hundred thousand dollars have been expended in developing and improving Palmer's idea until today the *Magnetic Flagman is a perfected device, standing supreme in the field of crossing protection because of the following features:*

1. *Highest efficiency.*
2. *Lowest battery consumption.*
3. *Extreme simplicity and ruggedness of construction—but three wearing parts.*
4. *Mechanical gong requiring no additional current.*
5. *Widest range of voltage—any current.*
6. *Lowest cost of maintenance.*

Because of the automobile and good roads, together with ever-increasing rail traffic, the subject of crossing protection has become one of real magnitude and one that is today attracting the attention of practically every railroad official both in this and foreign countries.

Effective means of accident prevention must be employed, and it is an acknowledged fact that the *Magnetic Flagman is accomplishing that means on some eighty railroads in the United States, Hawaiian Islands, Panama Canal, Italy, Holland, Norway, Canada and Australia, in a dependable manner at a surprisingly low cost.*

The following pages should be found highly interesting and instructive.

Magnetic Flagman installation on Southern Pacific at Anaheim, California. The above cut illustrates an 8-volt D. C. (Caustic Soda) Battery operation controlled by D. C. track circuits.

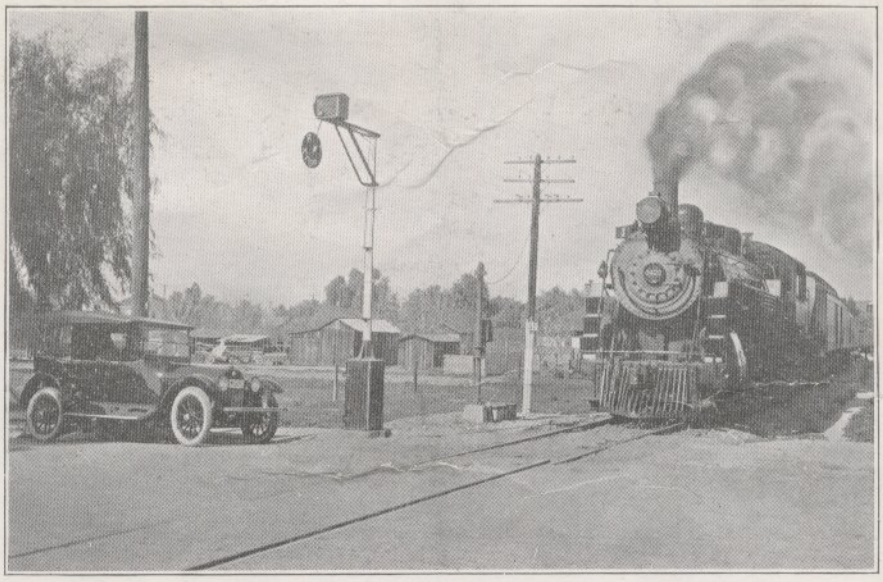
The Southern Pacific Company is protecting its crossings with Magnetic Flagmen as rapidly as possible, and at the present time has several hundred in operation.

Southern Pacific installations are of both the 8-volt D. C. and 110-volt A. C. types, both of which are performing a highly dependable service at an extremely low cost of maintenance and current consumption.

Practically every climatic condition is encountered on this road from the high and snowy Sierras, to the desert with its sand, adjacent to the Salton Sea. The Magnetic Flagman operates efficiently under all conditions.

The Magnetic Flagman is the prevailing crossing signal on the Union Pacific System, on which road numerous installations of the 8-volt type have been made in the past few years. This road is rapidly protecting all of its important crossings, and in every instance the Magnetic Flagman is being called upon to perform that service.

The Oregon Short Line, the Oregon-Washington Railroad & Navigation Company, and the Los Angeles and Salt Lake R. R., have also taken advantage of dependable crossing protection at low cost, and have installed many Magnetic Flagmen.



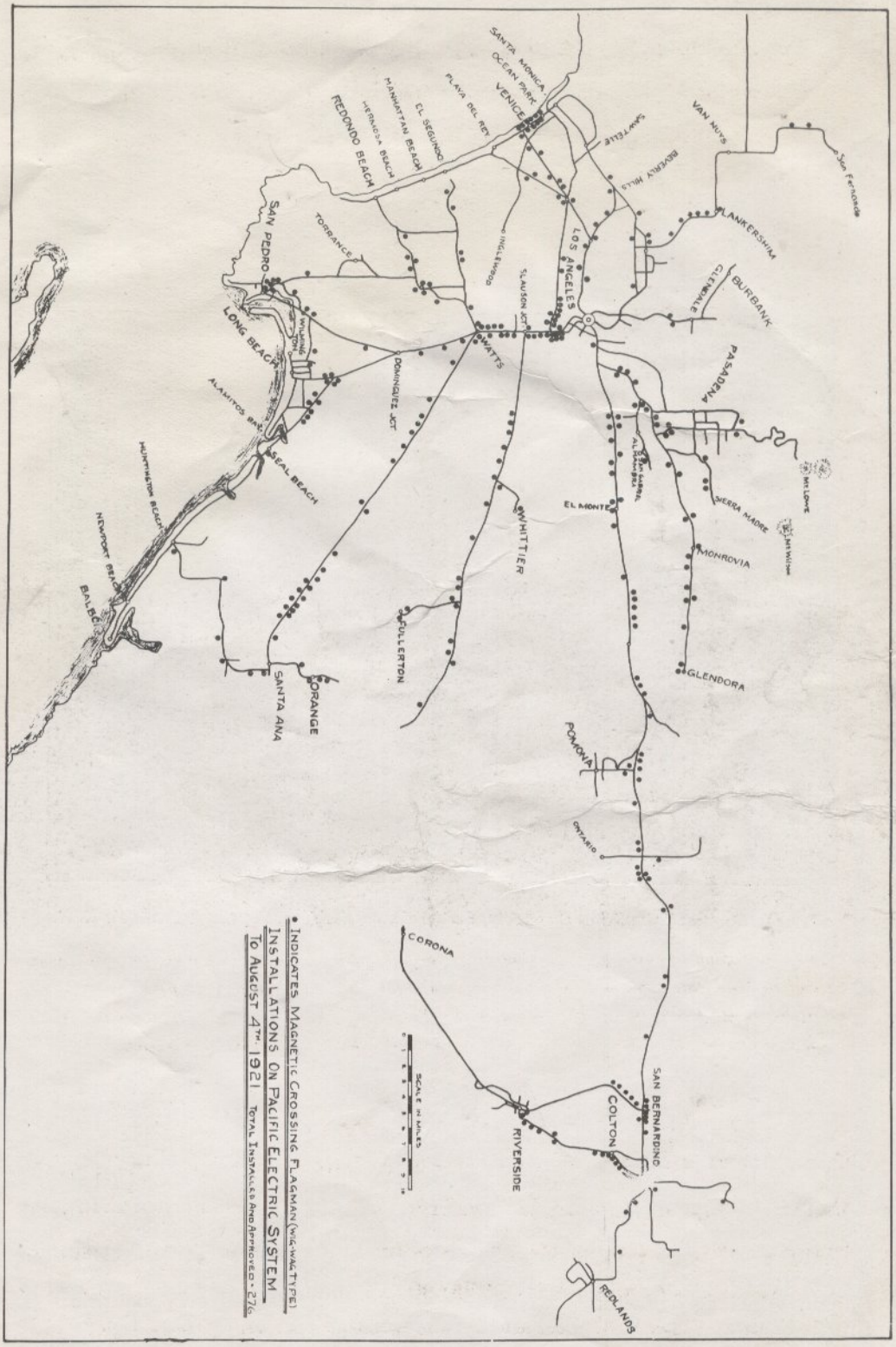
One of the installations at Riverside, California, Union Pacific System (L. A. & S. L.) where old style crossing bell was replaced by Magnetic Flagman without necessitating any change in wiring layout or control apparatus.

The Pacific Electric Railway was first to employ a Wig-Wag Signal for the protection of its crossings, and after several years use of the motor-driven type, the Magnetic Flagman was placed in service, and shortly thereafter adopted as standard.

Double installation of 600-volt D. C. Magnetic Flagman, using power from trolley line, on Pacific Electric Railway four-track system at Huntington Boulevard, Los Angeles. Operation controlled by Trolley Brush Contacts, and Simplex Relays. There are over 1200 interurban train movements at this crossing per day. This railway has installed over 300 of our Magnetic Flagmen.

In 1920, after several years of efficient and economical operation, the Magnetic Flagman replaced 117 motor-driven wig-wags which were ordered scrapped, and Pacific Electric officials estimate a resulting saving in maintenance alone of approximately $6000.00 per annum.

A map of Pacific Electric Magnetic Flagman installations appears on opposite page.



Pacific Electric Magnetic Flagman Installations.
Approximately one hundred installations since map was prepared.

The accompanying photograph illustrates an installation on the Atchison, Topeka & Santa Fe R. R. at Claremont, California. This 110-volt alternating current Magnetic Flagman was placed in service approximately six years ago, and to our knowledge has never had a failure. *Exhaustive competitive crossing signal tests, conducted by the Santa Fe, proved conclusively the efficiency and low operating cost of the Magnetic Flagman, therefore its adoption as "standard" by this system.*

Magnetic Flagman installed at Claremont, California, on Atchison, Topeka & Santa Fe R. R.

Two thousand Magnetic Flagmen on seventy railroads—following, a few satisfied customers:

Atchison, Topeka & Santa Fe
Akron, Canton & Youngstown
Canadian National
Chicago, Aurora & Elgin
Chicago, Burlington & Quincy
Chicago, Milwaukee & St. Paul
Copper River & Northwestern
Duluth, Winnipeg & Pacific
Illinois Central
Kansas City Southern
Los Angeles & Salt Lake
Louisville & Nashville
Louisville Railway
Missouri Pacific
Norfolk & Western
Northern Pacific
Northwestern Pacific
Oregon Short Line
Oregon-Washington Railway & Nav. Co.
El Paso & Southwestern
Pacific Electric
Sacramento Northern
San Francisco & Sacramento
Southern Pacific Lines
Southern Railway
St. Joe & Grand Island
St. Louis & San Francisco
Texas & Pacific
Union Pacific System
Western Pacific
Wheeling & Lake Erie
Etc., Etc.

MAGNETIC FLAGMAN CROSSING PROTECTION
EFFICIENT—ECONOMICAL

Installation at Bassett, California, on Southern Pacific Railroad. This company has over 400 Magnetic Flagmen in service.

Standard Installation as shown above without crossing sign consists of the following:

1 Type KC-8 Magnetic Wigwag Flagman Mechanism (for 8-volt D.C. operation, with brake and bell).

1 No. 101-4 Battery and Instrument Case.

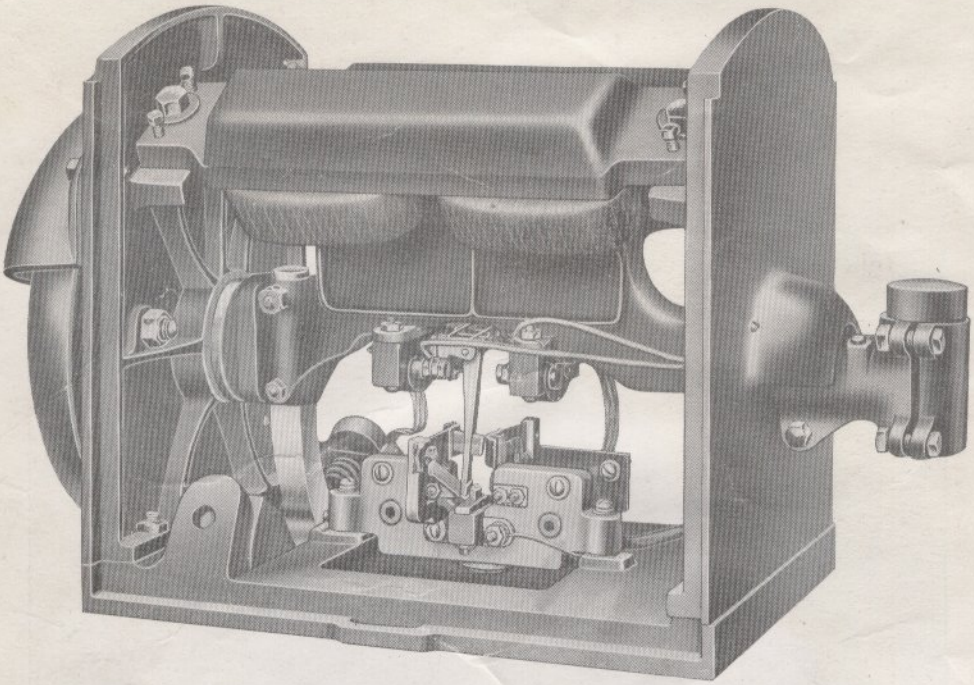
1 No. 144-11 Steel Pole 4½″ O.D. 11′ long.

1 No. 174 Offset Bracket.

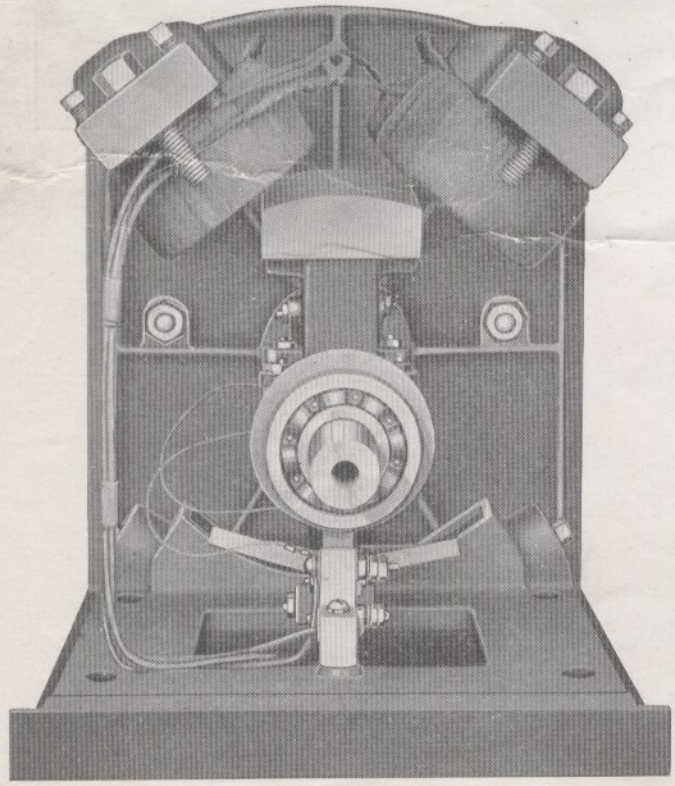
3 No. 180-4 C.I. Pole Steps, double pattern.

1 No. 155 Assembly ½″ Iron Conduit with fittings for bringing wires from signal mast to mechanism.

1 No. 150 Special Cable Entrance.



Side view of Magnetic Flagman Mechanism, with top, doors and flag removed, illustrating contact circuit breaker used on all types of flagmen.



End view showing operating mechanism with end plate, top, doors and flag removed.

Note the simple and rugged construction of the Magnetic Flagman. The swinging armature shaft is carried in annular ball bearings, thus practically eliminating friction, and permitting great ease of movement to the oppositely arranged magnets. The mechanism is entirely foolproof.

Above cuts illustrate the accessibility of signal for inspection and maintenance purposes, allowing quick and easy adjustment and renewal of parts without removing machine from service.

Standard 8-Volt Magnetic Flagman

The construction of the Magnetic Flagman is of such simplicity and ruggedness as to make it practically immune from trouble and the resulting expense. The mechanism is well housed in a weather-proof cast iron case with felted metal doors, thus eliminating complications caused by snow, ice, or sand.

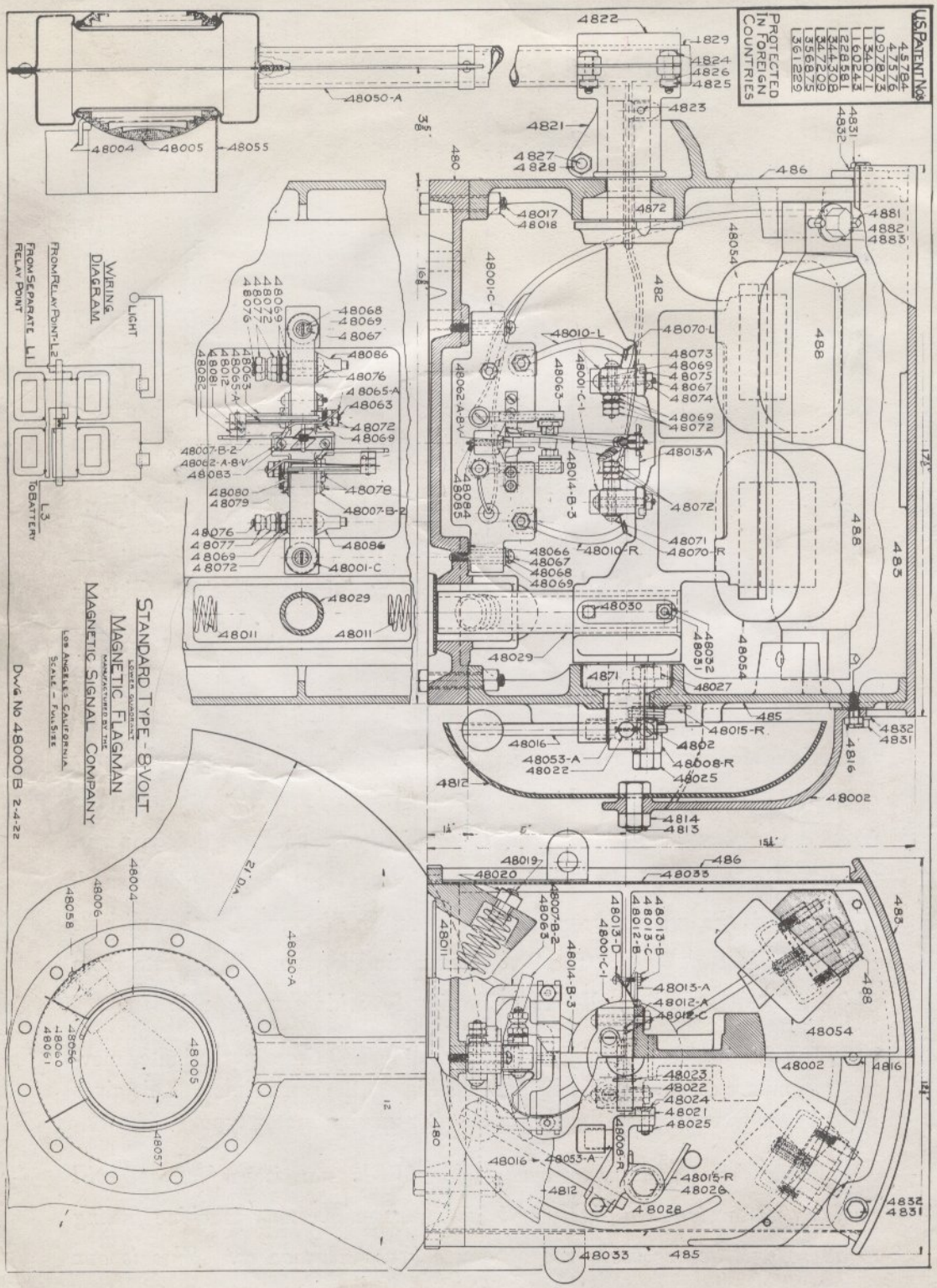
The mechanism itself requires only the regular inspection required by any electrical or mechanical device. There are but three wearing parts—the contact finger and two stationary contact guides, which parts in normal service should not require replacing for two to three years, and then at a very nominal labor and material cost. In making repairs or replacements it is not necessary to remove the mechanism from the pole, as all such repairs may be made on the pole by the maintainer in a few minutes' time.

The Magnetic Flagman is built to "stand up." All parts are oversize—tested for strength—and after assembly, before shipment, each machine is subjected to a rigorous test.

Practically all steam road Magnetic Flagmen operate on twelve 500 ampere hour rectangular primary cells, and it is definitely proven that the battery life with Magnetic operation is from three to five times that with motor operation. The initial impulse of current required for starting the machine is 2.5 amperes at 8 volts, and impulses required thereafter are 1.5 amperes. Therefore, because of the relative short time current is being consumed, .7 ampere is the average required to operate the Flagman together with its gong and 2½-watt light. The 8-volt Magnetic Flagman will operate from 5½ to 12 volts equally well—thus allowing for wide current variation.

The flag oscillates rapidly, approximately 120 times per minute, moving thru an arc of 70 degrees, the gong striking at the same times. This gives a far better warning than the slower, shorter-moving motor type.

When shipment is made each Magnetic Flagman is perfect, and will perform its service in a highly satisfactory manner. Any machine failing to do so will be replaced free of any charges whatsoever. This is our absolute guarantee.



Type JH-8 Magnetic Wigwag Flagman Mechanism (For 8-volt direct current operation, no brake, two position with bell)

Parts for Type JH-8 (8-Volt D. C.) Magnetic Flagman

Additional parts for Type KC-8 (8-volt D.C. Brake) on page 19.

Drawing No. 48000-B

Number	Name
480	Base
482	Armature
483	Top Cover
485	Bell End
486	Hood End
488	Magnet
4812	Bell
4813	Bolt (Bell Cover and Support)
4814	Nut (Bell Cover and Support)
4816	Cap Screw (Bell Cover and Support)
4821	Flag Holder
4822	Flag Holder Clamp
4823	Flag Holder Pin
4824	Bolt (Flag Holder)
4825	Nut (Flag Holder)
4826	Lock Washer (Flag Holder)
4827	Clamp Bolt (Flag Holder)
4828	Lock Nut (Flag Holder)
4829	Pipe Cap
4831	Cap Screw (Top Cover)
4832	Washer (Top Cover)
4871	Ball Bearing (Bell End)
4872	Ball Bearing (Flag End)
4881	Set Screw (Magnet)
4882	Cap Screw (Magnet)
4883	Washer (Magnet)
48001-C	Porcelain Terminal Board
48001-C-1	Porcelain Bracket Support
48002	Bell Cover
48004	Retainer Spring (Lens)
48005	Lens
48006	Support (Light Receptacle)
X-48006	Support (Light Receptacle) (For 2-light flag)
48007-B-2	Stop, (Movable Finger)
48008-R	Striker Hub, Right
48008-L	Striker Hub, Left
48010-R	Flexible Connection, Right
48010-L	Flexible Connection, Left
X-48010	Extra Flexible Connection (For 2-light Flag)
48011	Flag Buffer Spring
48012	Clamp Block (Stationary Contact)
48012-A	Pin (Movable Finger Contact)
48012-B	Spring (Movable Finger Contact)
48012-C	Cotter Key (Movable Finger Contact)
48013-A	Bracket (Movable Finger Contact)
48013-B	Screw (Movable Finger Contact)
48013-C	Nut (Movable Finger Contact)
48013-D	Washer (Movable Finger Contact)
48014-B-3	Movable Finger Contact
48015-R	Bell Ringer Spring, Right
48015-L	Bell Ringer Spring, Left

Number	Name
48016	Bell Striker
48017	Connecting Bolt (Base)
48018	Connecting Nut (Base)
48019	Bolt (Buffer Spring)
48020	Nut (Buffer Spring)
48021	Striker Lug
48022	Striker Lug Tripper
48023	Cotter Key (Tripper)
48024	Screw (Striker Lug)
48025	Nut (Striker Lug)
48026	Bolt (Striker Hub)
48027	Nut (Striker Hub)
48028	Cap Screw (Striker Hub)
48029	Buffer
48030	Set Screw (Buffer)
48031	Bolt (Buffer)
48032	Nut (Buffer)
48033	Door
48050	Standard Flag Complete with Fixtures
48050-A	Flag and Support
X-48050	Flag Complete with Fixtures (For 2-light machines)
48053-A	Rubber Buffer (Bell Striker)
48054	Magnet Coil
48055	Light Shield
48056	Light Receptacle
48057	Light 2½ watt
48057-A	Light 5 watt
48058	Screw (Light Receptacle Support)
48060	Screw (Light Receptacle)
48061	Nut (Light Receptacle)
48062-A-8-V	Contact Guide—Long
48063	Bracket (Stationary Contact)
48065-A	Stationary Contact
48066	Lead Washer (Terminal Board Support)
48067	Screw
48068	Lock Washer (Terminal Board Support)
48069	Brass Washer (Terminal Board Support)
48071	Screw (Bracket)
48072	Nut (Bracket)
48073	Screw (Light Terminal)
48074	Nut (Armature Insulation)
48075	Copper Lock
48076	Screw (Binding Post)
48077	Nut (Binding Post)
48078	Screw (Finger Stop)
48079	Copper Lock (Finger Stop)
48080	Nut (Finger Stop)
48081	Copper Lock (Stationary Contact)
48082	Cap Screw (Stationary Contact)
48083	Screw (Contact Guide)
48084	Copper Lock (Contact Guide)
48085	Nut (Contact Guide)

Installation and Maintenance Instructions
8-Volt Standard Magnetic Flagman

1. Wiring. See wiring diagrams for installation of 8-volt D.C. Signal on page 29. Note! It is important that two separate lines be brought from signal to relay as shown in above mentioned diagrams to eliminate possibility of 2½-watt lamp burning out through counter E.M.F. from field magnets.

2. Position of Flagman Mechanism. Set machine on bracket so that movable diamond rests equally on either side of stationary diamond guide No. 48062-A—shimming under base of machine if necessary, bearing in mind possible deflection due to weight of workman on bracket. *Do not set by levelling or changing position of movable finger.* Further test machine after installation with resistances to see that armature will pull over on either set of magnets at the same minimum voltage. Make this voltage test at relays.

3. No. 48065-A Stationary Contacts. See that stationary contacts have sufficient tension to force movable contact finger against diamond guide. Opening between movable finger contact and stationary contacts upon breaking of contact should be $\frac{3}{32}''$.

4. Stationary Diamond and Movable Finger Diamond. Keep greased or oiled.

5. No. 48010-R and L Flexible Ribbons. Keep smooth and straight to prevent kinking.

6. No. 4871 and 4872 Ball Bearings. Require oiling every six months.

7. Gong Mechanism. Inspect occasionally, ascertaining if No. 48016 gong strikers are equally adjusted and striking with equal force.

8. No. 48022 Striker Lug Tripper. Keep dry at sliding portion. Do not oil.

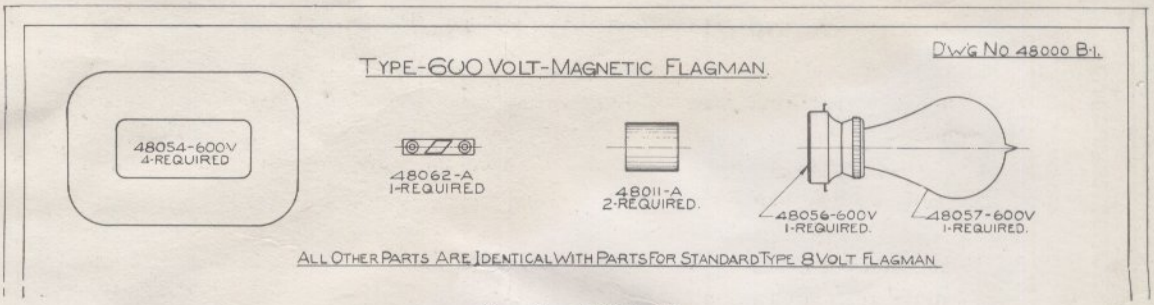
9. No. 48021 Striker Lugs. Keep a slight amount of grease on wearing part. New wearing surfaces can be obtained whenever necessary by making a quarter turn of lug.

10. After inspecting machine remove any dust that may have accumulated and see that same is kept clean as possible.

11. After machine is placed in position and connections made, lock doors and only open at regular inspection periods.

12. Order repair parts by number and name, specifying type or serial number of machine for which they are required.

Type JH-600 Standard 600-Volt Magnetic Flagman



Drawing 48000 B4

Number	Name	Number	Name
48054-600 V	Coil	48056-600 V	Lamp Receptacle
48062-A	Contact Guide—Short	48057-600 V	Lamp 110V 25W Mill Type
48011-A	Rubber Buffer		

The 600-volt Magnetic Flagman is standard on many electric and interurban lines, its operation being controlled by trolley or track contacts and Simplex Relays. Its performance is similar in every respect to the 8-volt, and its construction identical, with the exception of the coil winding and a few slightly different parts—illustrated above.

Installation and Maintenance Instructions for 600-Volt Flagman

In installing 600-volt Flagman no resistance in series with magnet coils is necessary; however, a 1000 ohm resistance tube should be placed in series with the 220-volt 16 C.P. carbon filament lamp, as shown in diagrams on page 31. If 110-volt 25-watt Mazda lamp is used, place 2000 ohm resistance tube in series.

If steel pole support is used, place wood blocks between mechanism and iron offset bracket for insulation.

Contact opening between movable finger contact and stationary contact upon breaking should be adjusted to $\frac{3}{16}$" to prevent drawing of arc.

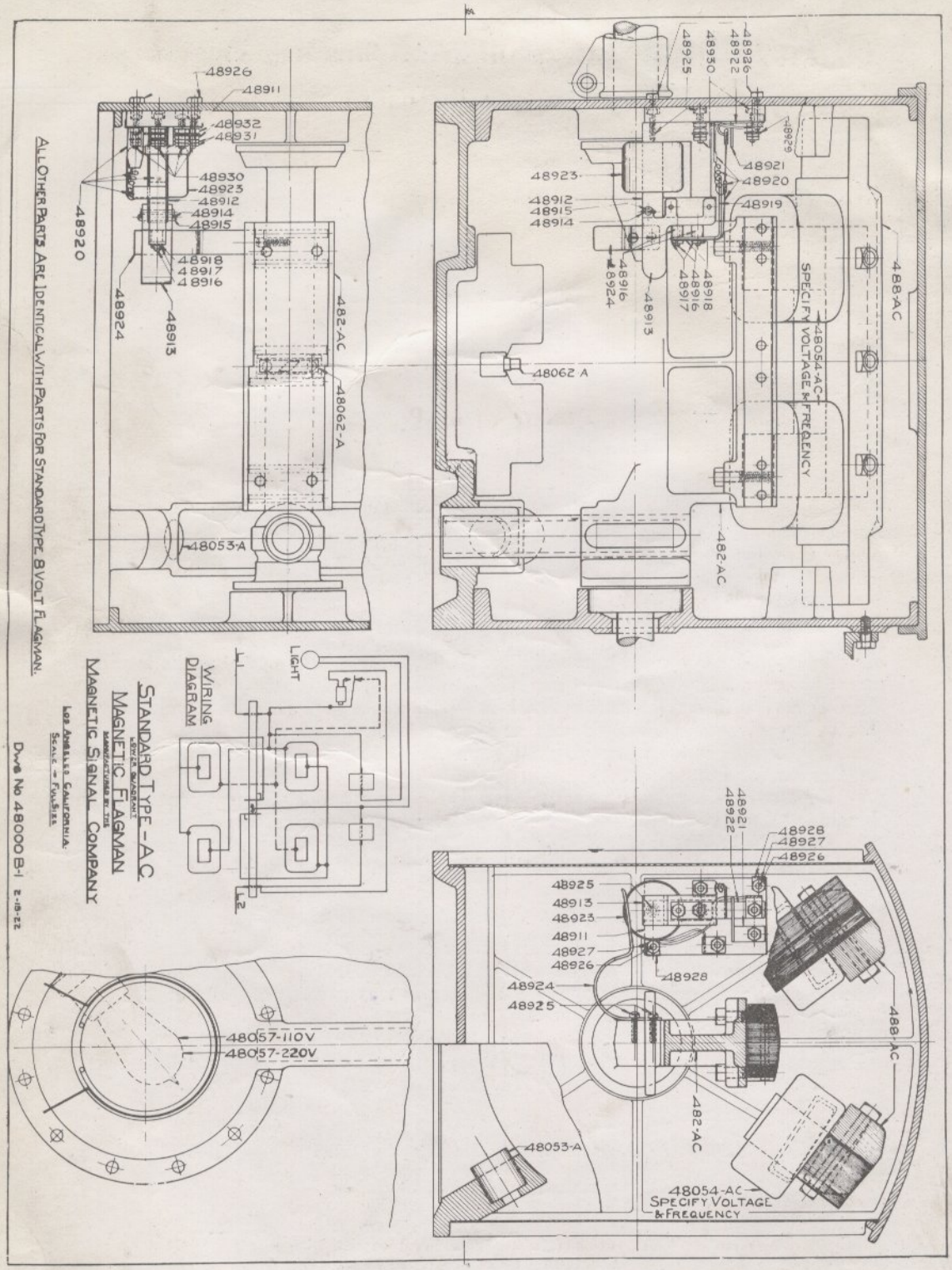
Otherwise installation and maintenance instructions for the 600-volt mechanism are identical with those for the 8-volt machines as stated on page 14.

1200-Volt Direct Current Magnetic Flagman

We do not furnish a special machine for above purpose; however, our 600-volt machine with resistance to reduce voltage to 600 makes a very reliable installation. Such resistance should be 4200 ohms with continuous current capacity of 140 milamps.

Proper Reference for Ordering Two Position Lower Quadrant 600-Volt Flagman

Number	Name	Shipping Wt.
JH-600	Magnetic Wigwag Flagman Mechanism (Above for 600-volt direct current operation, no brake, including bell.)	260 lbs.
KC-600	Magnetic Wigwag Flagman Mechanism (Above for 600-volt direct current operation, with brake, including bell.)	265 lbs.



Type MB (Alterating Current) Magnetic Flagman

Parts for Type MB (Alternating Current) Magnetic Flagman

Drawing No. 4800-B-1

All parts not specified on this list are identical with parts for type JH-8 (8-volt D. C.) Magnetic Flagman, see pages 12 and 13.

Number	Name
48053-A	Rubber Buffer (Flag)
48054-AC	Magnet Coils (specify voltage and frequency)
48057-110-V	Lamp
48057-220-V	Lamp
48062-A	Contact Guide (Short)
482-AC	Laminated Armature
488-AC	Laminated Magnet

Coil Cut-Out Parts

Number	Name
48911	Base
48912	Magnet Core
48913	Armature
48914	Cotter Key (Armature Pin)
48915	Armature Pin
48916	Insulating Studs
48917	Insulating Stud Nuts
48918	Copper Lock (Stud Nuts)
48919	Contact Stop
48920	Contact Finger Complete
48921	Contact Pole, Upper
48922	Contact Pole, Lower
48923	Coil (Specify voltage and frequency)
48924	Contact Closing Lever
48925	Magnet Core Screws
48926	Main Support Screws
48927	Nut (Main Support Screws)
48928	Copper Lock
48929	Binding Post Washers
48930	Binding Post Screws
48931	Binding Post Nuts
48932	Binding Post Nuts

Brake Parts for A. C. Brake Machines Listed on Page 19.

The alternating current Magnetic Flagman should be installed and maintained identically the same as the 8-volt—excepting the additional coil cut out, suggestions for maintenance of which appear below.

Remove armature pivot occasionally, thoroughly cleaning, and under no circumstances apply oil to any part of this mechanism. See that entire mechanism is kept clean.

See track circuit diagrams for installation of A. C. Magnetic Flagman on page 30.

Note proper reference for ordering Alternating Current Magnetic Flagman Mechanisms on page 18.

Standard A. C. Magnetic Flagman

Because of the variation in alternating current it has been a problem to develop a device of any nature that would operate in a thoroughly reliable manner, but by constant effort and experiments we have developed an alternating current Magnetic Flagman of unqualified success. This has been accomplished through the use of an additional mechanism termed a coil cut-out.

By use of the coil cut-out the armature, to which is attached the flag, will pull over on 75 volts—110-volt circuit—and operate on considerably less than that. After the flag has attained its normal speed one set of coils automatically cuts out and remains out unless there should be a drop in voltage, in which event it will again cut in.

The Southern Pacific and Chicago, Milwaukee & St. Paul have installed many A.C. Magnetic Flagmen equipped with coil cut-out, and officials in charge of these operations are highly pleased with the results they are obtaining.

A. C. Magnetic Flagmen are Furnished in the Following Types

In ordering be sure to specify correct type number as shown below.

Type No.	Name	Approx. Domestic Shipping Weight—Pounds
MB-55-25	Magnetic Wigwag Flagman Mechanism..... (Above for 55 volts, alterating current, 25 cycle operation, no brake, two position with bell and coil cut-out)	260
MB-55-60	Magnetic Wigwag Flagman Mechanism..... (Above for 55 volts, alternating current, 50 or 60 cycle operation, no brake, two position, with bell and coil cut-out)	260
MB-110-25	Magnetic Wigwag Flagman Mechanism..... (Above for 110 volts alternating current, 25 cycle operation, no brake, two position, with bell and coil cut-out)	260
MB-110-60	Magnetic Wigwag Flagman Mechanism..... (Above for 110 volts, alternating current, 50 or 60 cycle operation, no brake, two position, with bell and coil cut-out)	260
MB-220-25	Magnetic Wigwag Flagman Mechanism..... (Above for 220 volts, alternating current, 25 cycle operation, no brake, two position, with bell and coil cut-out)	260
MB-220-60	Magnetic Wigwag Flagman Mechanism..... (Above for 220 volts, alternating current, 50 or 60 cycle operation, no brake, two position, with bell and coil cut-out)	265
PA-55-25	Magnetic Wigwag Flagman Mechanism..... (Above for 55 volts, alternating current, 25 cycle operation, with brake, two position, with bell and coil cut-out)	265
PA-55-60	Magnetic Wigwag Flagman Mechanism..... (Above for 55 volts, alternating current, 50 or 60 cycle operation, with brake, two position with bell and coil cut-out)	265
PA-110-25	Magnetic Wigwag Flagman Mechanism..... (Above for 110 volts, alternating current, 25 cycle operation, with brake, two position, with bell and coil cut-out)	265
PA-110 60	Magnetic Wigwag Flagman Mechanism..... (Above for 110 volts, alternating current, 50 or 60 cycle operation with brake, two position, with bell and coil cut-out)	265
PA-220-25	Magnetic Wigwag Flagman Mechanism..... (Above for 220 volts, alternating current, 25 cycle operation, with brake, two position, with bell and coil cut-out)	265
PA-220-60	Magnetic Wigwag Flagman Mechanism..... (Above for 220 volts, alternating current, 50 or 60 cycle operation, with brake, two position, with bell and coil cut-out)	265

Brake Attachment

Unless otherwise specified all two position machines are equipped with brake. The brake is substantial and positive, requiring no additional current, and serves not only to hold the flag in contact in the event of excessive wind, but to bring it to a complete stop upon train clearing block.

Practically all railroads demand brake, but machine can be furnished without it, if so desired.

Parts for Type KC Brake (D. C. Machines)

Part Number	Part Name
KC-210	Brake Drum
KC-211	Brake Lining
KC-212	Brake Band
KC-213	Brake Band Rivets
KC-220	Spring
KC-221	Spring Screw
KC-222	Spring Nut
KC-223	Spring Bar
KC-230	Armature, left
KC-230-1	Armature Bracket
KC-230-2	Armature Bracket Screws
KC-230-3	Armature Wire Lock
KC-230-4	Armature Support
KC-230-5	Armature Support Rivets
KC-231	Armature, right
KC-232	Armature Pins
KC-236	Armature Stop
KC-237	Armature Stop Screws
KC-238	Armature Stop Nuts
KC-239	Armature Stop Lock
KC-240	Brass Washers
KC-241	Brass Nuts

Parts for Type PA Brake (A. C. Machines)

Part Number	Part Name
PA-210	Brake Drum
PA-211	Brake Lining
PA-212	Brake Band
PA-213	Brake Band Rivets
PA-220	Spring
PA-221	Spring Screw
PA-222	Spring Nut
PA-223	Spring Bar
PA-230	Armature, left
PA-230-1	Armature Bracket
PA-230-2	Armature Bracket Screws
PA-230-3	Armature Wire Lock
PA-230-4	Armature Support
PA-230-5	Armature Support Rivets
PA-231	Armature, right
PA-232	Armature Pins
PA-236	Armature Stop
PA-237	Armature Stop Screws
PA-238	Armature Stop Nuts
PA-239	Armature Stop Lock
PA-230	Brass Washers
PA-241	Brass Nuts

Note: We are unable to place cut of above parts in this issue of our catalog. However blueprint of same may be had on request.

The two accompanying cuts illustrate the Type LB Magnetic Three Position Flagman with flag behind shield at "Safety." Details of construction and operation on page 21.

Type LB Three Position Magnetic Flagman

The Magnetic Three-Position, or Hold Clear machine operates identical with the two-position machine—with the addition of two holding coils and a mechanical latching device. When block is clear, the red flag is entirely concealed behind flag shield, and when train enters block the flag is released from shield—oscillating, at same time ringing gong, until train has passed out of block, when it again returns to position behind shield. Should for any reason hold-clear mechanism fail, flag would drop from shield and continue to oscillate until the latch picks it up, or the trouble located and repaired.

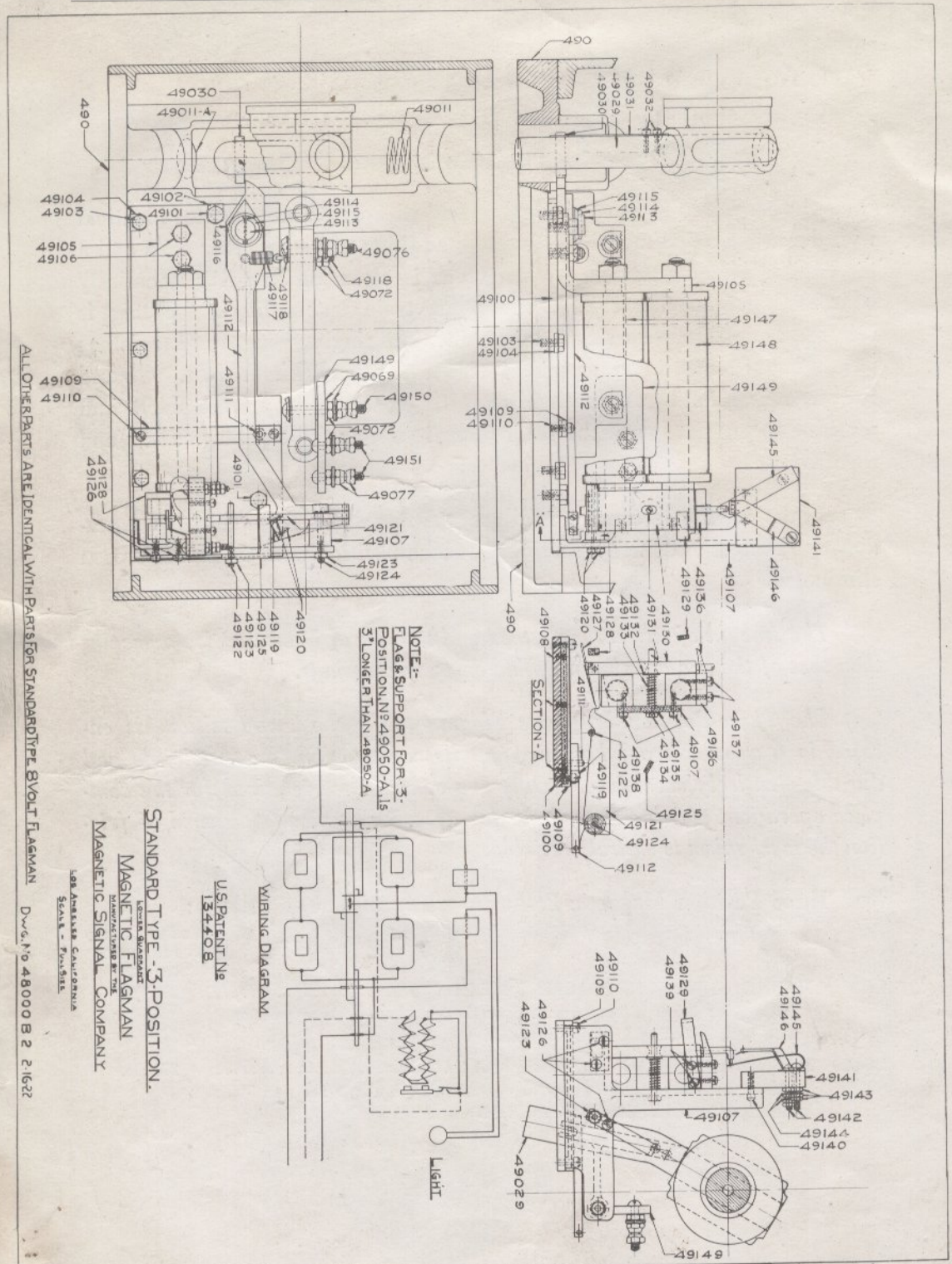
In the event of a complete failure, the flag drops from shield to a stationary "Danger" position, remaining in such position until trouble has been eliminated.

The amount of current consumed and the cost of operation is no greater than that of the two-position machine on busy crossings.

The Three-Position Magnetic Flagman, like the Two-Position, is encased in a weather-proof housing, and its construction is both simple and durable—entirely accessible. Only two contacts are required for the complete operation, and because of the few wearing parts and absence of friction the mechanism is entirely reliable.

Three Position Magnetic Flagmen are furnished as follows:

		Weight Crated for Domestic Shipment
LB-8	MAGNETIC WIGWAG FLAGMAN MECHANISM..... (Above for 8-volt direct current operation, no brake, three position, with bell, including Look-Listen shields)	275 lbs.
LB-600	MAGNETIC WIGWAG FLAGMAN MECHANISM..... (Above for 600-volt direct current operation, no brake, three position, with bell, including Look-Listen shields)	275 lbs.



Type LB Three-Position Magnetic Flagman

Parts for Type LB-8 (8-Volt D. C.) Standard Three Position Magnetic Flagman, Drawing No. 48000-B2

Number	Name
49000	Main Base
49007	Movable Finger Stop
49011-A	Rubber Buffer
49011	Spring Buffer
49029	Buffer Steel Rod
49030	Lock Pin (Square-Obsolete)
1-49030	Lock Pin (Round-Standard)
49031	Flat Spring for Lock Pin (Obsolete)
1-49031	Wire Spring for Lock Pin (Standard)
49032	Fillister Head Screws
49042	Armature
49060	Flag Connecting Pipe
49100	Mechanism Base
49101	Cap Screw (Mechanism Base)
49102	Copper Lock (Mechanism Base)
49103	Cap Screw (Mechanism Base)
49104	Copper Lock (Mechanism Base)
49105	Back Strap and Support
49106	Cap Screws
49107	Pole Piece Support
49108	Pole Piece Support Screws
49109	Lever Arm Guide
49110	Lever Arm Guide Screws
49111	Lever Arm Stop (Back)
1-49111	Lever Arm Stop (Front)
49112	Lever Arm (Complete)
49113	Lever Arm Pivot Stud
49114	Lever Arm Pivot Stud Cotter Key
49115	Lever Arm Pivot Stud Washer
49116	Bronze Bearing Washer
49117	Lever Arm Spring
49118	Lever Arm Spring Adjusting Screw
49119	Lever Arm Shoulder
1-49119	Adjusting Screw Support
49120	Lever Arm Shoulder Screws
49121	Intermediate Lever
49122	Intermediate Lever Stop Pin
49123	Stop Nut
49124	Intermediate Lever Screw
49124	Intermediate Lever Screw Washer
49124-1	Intermediate Lever Screw Washer
49125	Latch Stop Intermediate Lever Guard
49126	Fillister Head Screws
49127	Arm Lever Shoulder Catch
49128	Armature Bracket
49129	Armature Stop
49130	Armature
49131	Armature Spring Guide
49132	Armature Spring Washer
49133	Armature Spring
49134	Armature Spring Guide Nut
49135	Copper Lock for Guide Nut
49136	Magnet Pole Extension
49137	Fillister Head Screws
49138	Fillister Head Screws
49139	Fillister Head Screws
49140	Fillister Head Screws
49141	Contact Insulation
49142	Contact Binding Post Screws
49143	Contact Binding Post Nuts
49144	Contact Binding Post Washer
49145	Flexible Contact (Complete)
49146	Rigid Contact
49147	Lower Coil Assembly
49148	Upper Coil Assembly
49149	Extension to Porcelain Terminal
49150	Binding Post
49151	Binding Post
49152	Spring Knuckle, upper
49153	Spring Knuckle, lower
49154	Aluminum Hood
49155	Upper Spring
49156	Lower Spring
49157	Top Fibre
49158	Middle Fibre
49159	Bottom Fibre
49160	Knuckle Pin
49161	Machine Bolt and Nut Spring
49162	Spring Washer
49163	Cotter Pin
49164	Terminal Screws
49165	Light Wires
49166	Flag Light Wires (Complete)
49170	Flag Complete
49179	Light Shield
49180	Three Position Shield

All parts of three position flagman not listed above are identical with two position parts shown on drawing No. 48000-B. See Pages 12 and 13

General maintenance instructions for Three Position Magnetic Flagman are the same as for 8-volt two-position flagman as shown on page 13, with these additions:

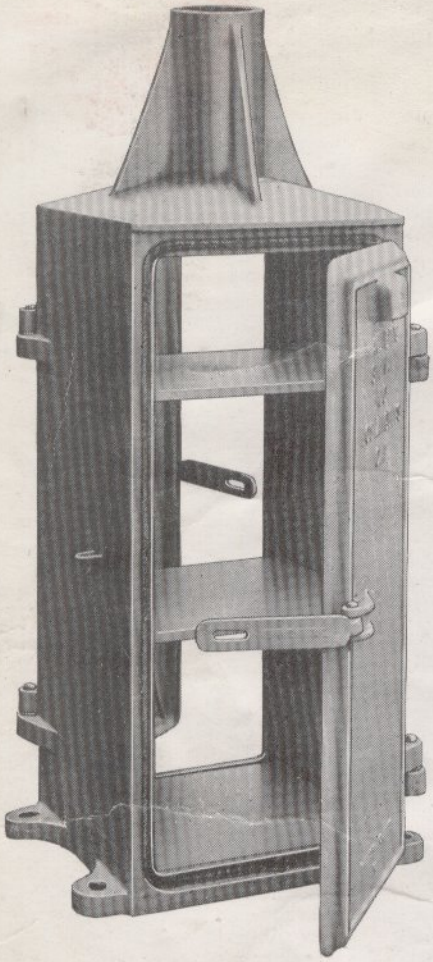
Tension of Lever Arm Spring (No. 49117) should be just sufficient to cause Lever Arm (No. 49112) to be locked by Intermediate Lever (No. 49131).

Occasionally clean Lever Arm Pivot Stud (No. 49113), and apply a few drops of 3-in-1 oil.

Clean and apply 3-in-1 oil to Lever Arm Guide (No. 49109).

See track circuit diagrams on page 32 for installation of three-position Magnetic Flagman.

Style No. 101-4 Battery and Instrument Case



No. 101-4 Battery and Instrument Case illustrated is of cast iron construction designed to accommodate twelve 500 ampere hour rectangular cells, together with necessary relays, resistances, terminals, etc.

To facilitate inspection it is equipped with two doors, well gasketed, also ventilators to prevent sweating. This case serves as a pole base for 4½" O.D. pole.

Dimensions follow:

Height over all.....55¼"
Base of housing to bottom of pole.....44"
Shelves (three) .....⅝" x 14⅞" x 17"
Between Shelves .....14¼"
Terminal Board .....¾" x 8½" x 15"
Foundation Bolt Holes...13" x 20½" C to C (1" bolts)
Weight .....500 lbs.

For complete installation using this case, specify the following:

Type of Magnetic Flagman desired.

One No. 101-4 Battery and Instrument Case.

One No. 144-11 Steel Pole (Base of housing to bottom of flag 12')

One No. 174 Offset Bracket.

Three No. 180-4 Double Pole Steps.

One No. 155 Assembly ½" conduit and fittings.

One No. 150 Cable Entrance.

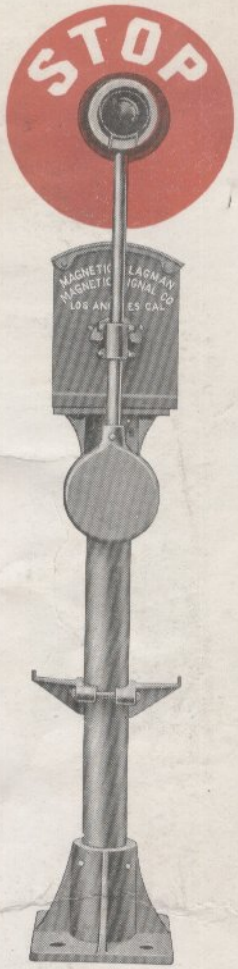
Wood Instrument Cases

STYLE 340-4 WOOD INSTRUMENT CASE, for attachment to 4½" O.D. Pole, complete with resistance tubes, switches, fuses, relay base board, and terminals; wired and assembled complete for installation of two Simplex Relays controlling high voltage Magnetic Flagman.

STYLE 340-5 WOOD INSTRUMENT CASE, for attachment to 5" O.D. Pole, complete as above.

A. R. A. Cast Iron Relay Boxes

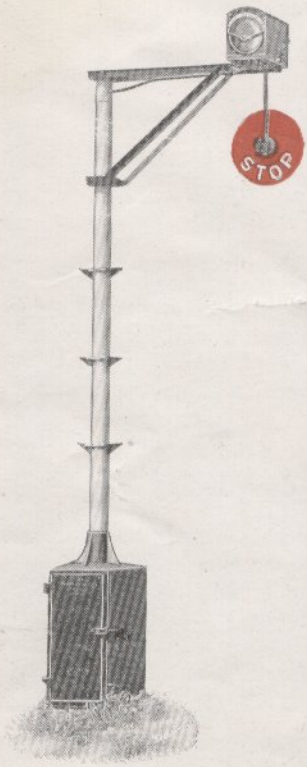
We are in a position to furnish the above in any size required, as well as special battery boxes, instrument cases, etc.



Cut at right illustrates center of highway installation of Upper Quadrant Magnetic Wigwag Flagman. Flag plainly visible in either direction.

Assembly complete, as shown at right, consists of the following:

1 Upper Quadrant Magnetic Wigwag Flagman Mechanism. (Specify type desired.)
1 No. 108-4 Cast Iron Pole Base, to fit 4½" O. D. Pole.
1 No. 144-15 Steel Pole, 4½" O. D. 15' long—or length desired.
4 No. 180-4 Cast Iron Pole Steps, (Double Pattern)—or number desired.
1 No. 114-4 Upper Quadrant Mechanism Support Casting. (To fit 4½" O. D. Pole.)
1 No. 150 Special Cable Entrance.

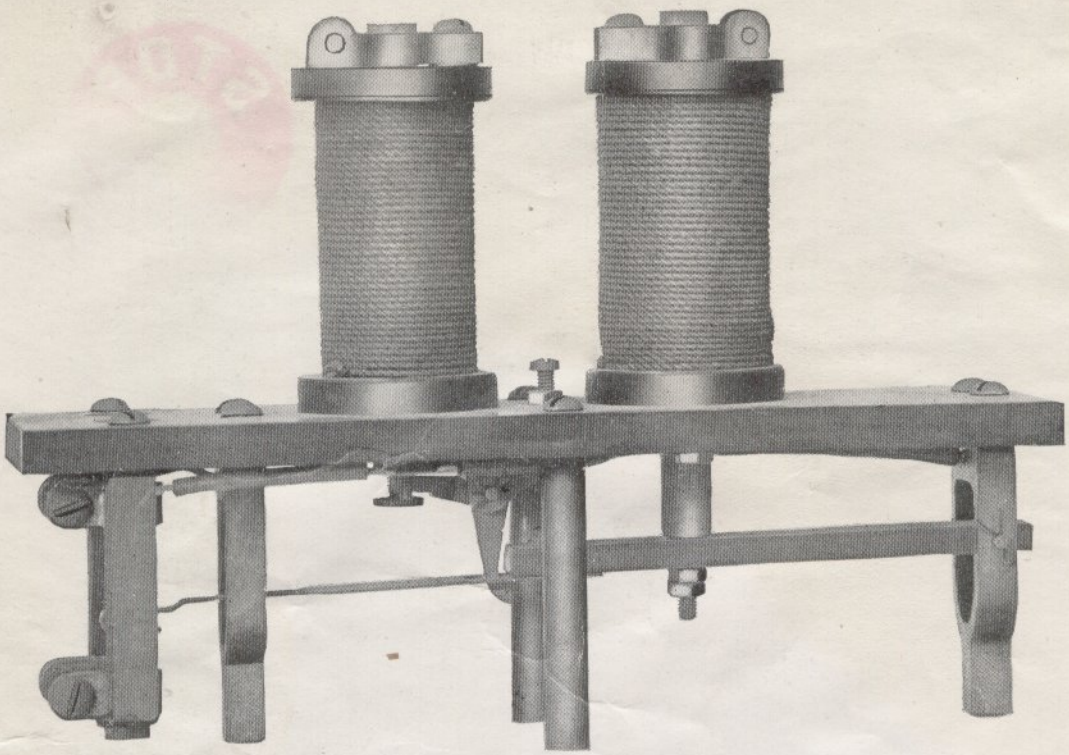


Cut at left illustrates standard installation of lower quadrant Magnetic Wigwag Flagman at side of highway.

Assembly complete, as shown at left, consists of the following:

1 Magnetic Wigwag Flagman Mechanism. (Specify type desired)
1 No. 101-4 Battery and Instrument Case.
1 No. 144-11 Steel Pole, 11' long 4½ O. D.
1 No. 174 Offset Bracket Complete.
3 No. 180-4 Cast Iron Pole Steps—Double Pattern.
1 No. 155 Assembly ½" Iron Conduit, with fittings for bringing wires from signal mast to mechanism.
1 No. 150 Special Cable Entrance.

Flags of special design manufactured to meet individual requirements.



No. 501 Simplex Relay

Width	Length	Height	Shipping Weight
3¼″	8⅝″	6½″	8 lbs.

The Simplex Relay is the result of years of experimental and development work —and is now acknowledged to be the most efficient and substantial device on the market. It is used in connection with high voltage D.C. operation and for a considerable period has been installed on the San Pedro main line (4 track) of the Pacific Electric, being operated every few minutes at varying speeds, without a failure. Its success has led to its adoption by this system.

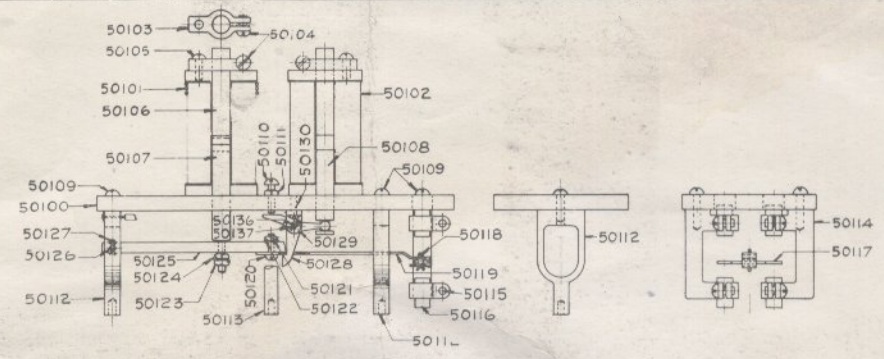
Installation Instructions for Simplex Relay

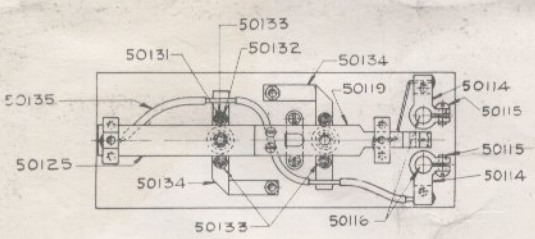
Mounting. Simplex Relays should be mounted on base board insulator shelf (⅜″ thick Bakelite, Condensite, or Ebony Wood), using four No. 50175 Base Board Terminal Pins furnished with each relay. This mounting greatly facilitates proper installation as well as simplifying inspection and maintenance work. (Instrument cases complete with relay base board, terminals, switches, resistance tubes, fuses, assembled and wired complete can be furnished either according to our standards or specifications of user.)

Important. In installing Simplex Relays wire as per diagrams on page 31, connecting each coil with resistances as specified. *Do not connect directly in series with 600-volt D.C. line.*

See Page 28 for maintenance instructions

Simplex Relay





U.S. PATENT No 916039

SIMPLEX RELAY
MANUFACTURED BY THE
MAGNETIC SIGNAL COMPANY
LOS ANGELES, CALIFORNIA
SCALE - FULL SIZE

DWG No 48000 B 3 2-16-22

Drawing No. 48000-B3

Parts for Simplex Relay

Number	Name
50100	Base
50101	Coil
50102	Coil
50103	Core Clamp
50104	Core Clamp Screw
50105	Core Clamp Screw
50106	Stationary Core
50107	Stopping Solenoid Plunger
50108	Starting Solenoid Plunger
50109	Base Screw
50110	Stop Adjusting Screw
50111	Stop Adjusting Nut
50112	Bracket Leg
50112-A	Bracket Leg, right
50114-R	Carbon Contact Support, right
50114-L	Carbon Contact Support, left
50115	Carbon Clamp Screw
50116	Carbon Contacts
50117	Contact Bar
50118	Contact Cotter Key
50119	Contact Finger
50120	Contact Finger Screw
50121	Contact Finger Nut
50122	Contact Finger Copper Lock
50123	Stopping Solenoid Plunger Nuts
50124	Stopping Solenoid Plunger Lock
50125	Insulating Arm
50126	Arm Pin
50127	Insulating Arm Pin CotterKey
50128	Latch
50129	Latch Bracket
50130	Bracket Screw
50131	Coil Screw
50132	Coil Nuts
50133	Coil Washer
50134	Copper Connection
50135	Connection Wire
50136	Latch Pivot Pin
50137	Latch Pin Cotter Key
50175	Base Board Terminal Pins. (For Mounting Relays to base-board insulating shelf)

Instructions for Care and Maintenance of Simplex Relay

The essential and important parts of this relay to be covered at each inspection are as follows:

Carbon Contacts No. 50116—Keep clean, well trimmed and level.

Carbon Clamp Screws No. 50115—Keep well tightened at all times.

Contact Bar No. 50117—Keep clean and straight, see that it has free and easy end and side movement to allow self-centering when making contact with carbons.

Stopping Solenoid Plunger No. 50107 and Starting Solenoid Plunger No. 50108 } Maintain free and easy movement at all times.

Stationery Core No. 50106—Should be maintained in a position to allow of proper movement up and down of the Solenoid Plungers. The one on Starting Coil should be adjusted just high enough to allow the point of Latch No. 50128 to clear nicely when coil is energized; and the Stopping Coil adjusted so that when coil is energized the raising of Arm No. 50125 will allow Contact Bar No. 50117 to press firmly against both of top position Carbon Contacts, insuring positive contact. The adjustment of these Stationery Cores is made by loosening Core Clamp Screws No. 50104 in Core Clamp No. 50103 on top of each Solenoid Coil. This allows the Stationery Cores to be moved up or down as needed.

Be sure that these Core Clamp Screws are always tight. Should they be allowed to loosen, the upward movement of the plunger will tend to drive the Stationery Cores out of place and by so doing, throw relay out of adjustment sufficient to cause a possible failure.

Stopping Solenoid Plunger Nuts No. 50123, Stopping Solenoid Plunger Lock No. 50124—Located on bottom end of Stopping Solenoid Plunger, should be kept properly adjusted and tight, to allow of free movement of Insulating Arm No. 50125, preventing binding.

Stop Adjusting Screw No. 50110, Stop Adjusting Nut No. 50111—Should be kept adjusted so that when Latch No. 50128 is in the Hold-Clear position, the stop heel of Latch will touch set screw in such a manner as to prevent Insulating Arm No. 50125 from rubbing on inside portion of Latch, thus preventing friction.

Contact Finger Screw No. 50120, Contact Finger Nut No. 50121, Contact Finger Copper Lock No. 50122, Core Clamp Screw No. 50105 should be kept tight at all times, as should all other screws, nuts and bolts on the entire relay.

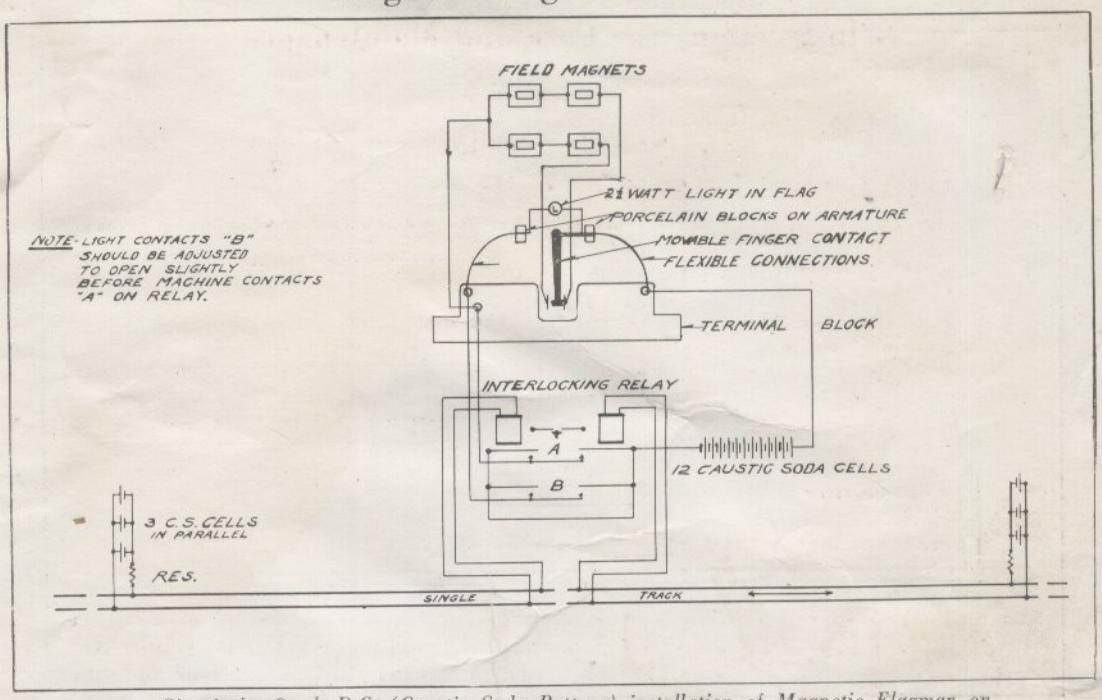
To Change Carbon Contacts—Loosen Carbon Clamp Screw No. 50115 and the Carbon Contacts may be removed or adjusted, by sliding up or down.

To Remove Contact Bar—Remove Contact Cotter Key No. 50118 and bar may be removed. See that Cotter Key points are always kept well spread.

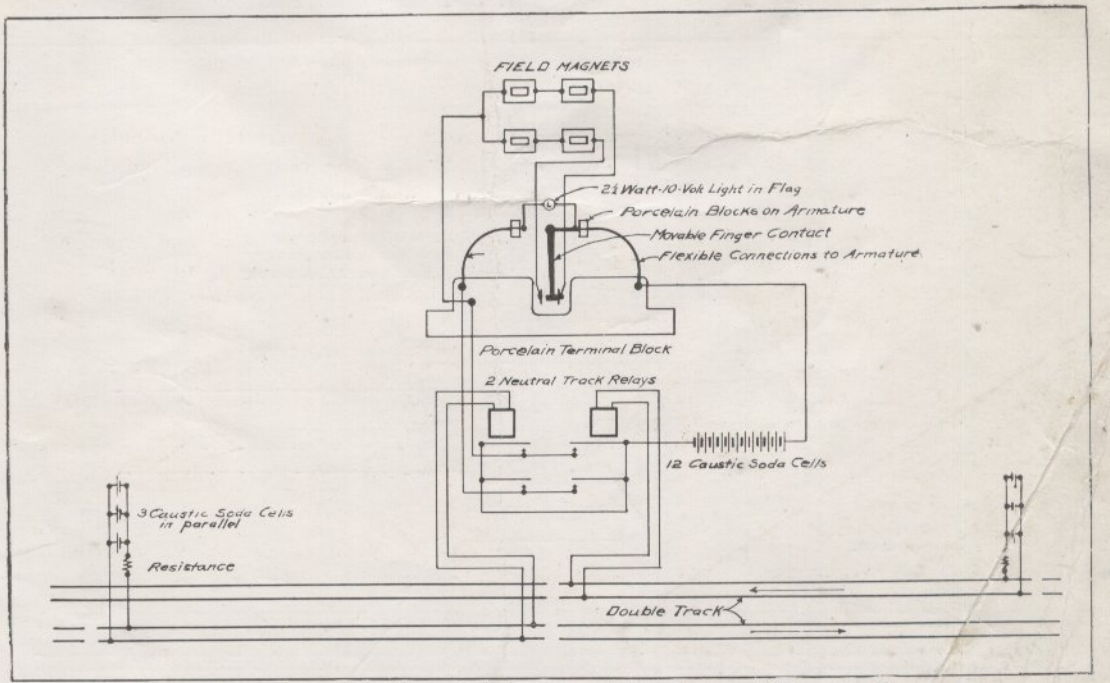
To Replace Relay Solenoid Coils—Remove Coil Nuts No. 50132 on under side of relay and the coils may be removed by a gentle upward pull.

Keep all parts clean at all times. Use NO oil or grease.

Magnetic Flagman Circuits

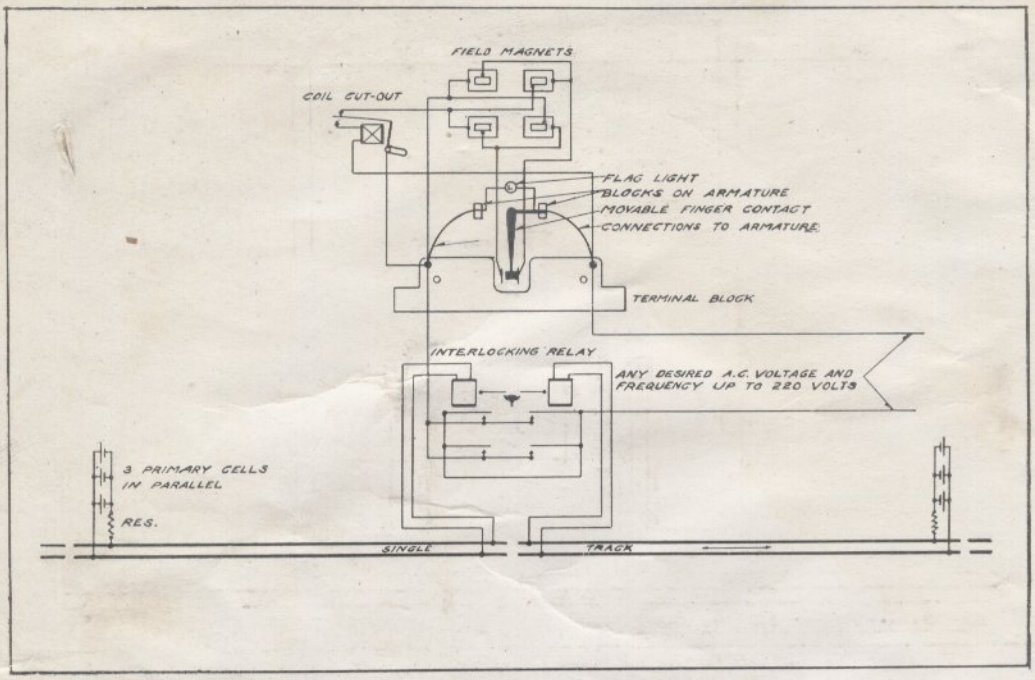


Circuit for 8-volt D.C. (Caustic Soda Battery) installation of Magnetic Flagman on single track steam line. Traffic in both directions. Signal controlled by D.C. track circuits.

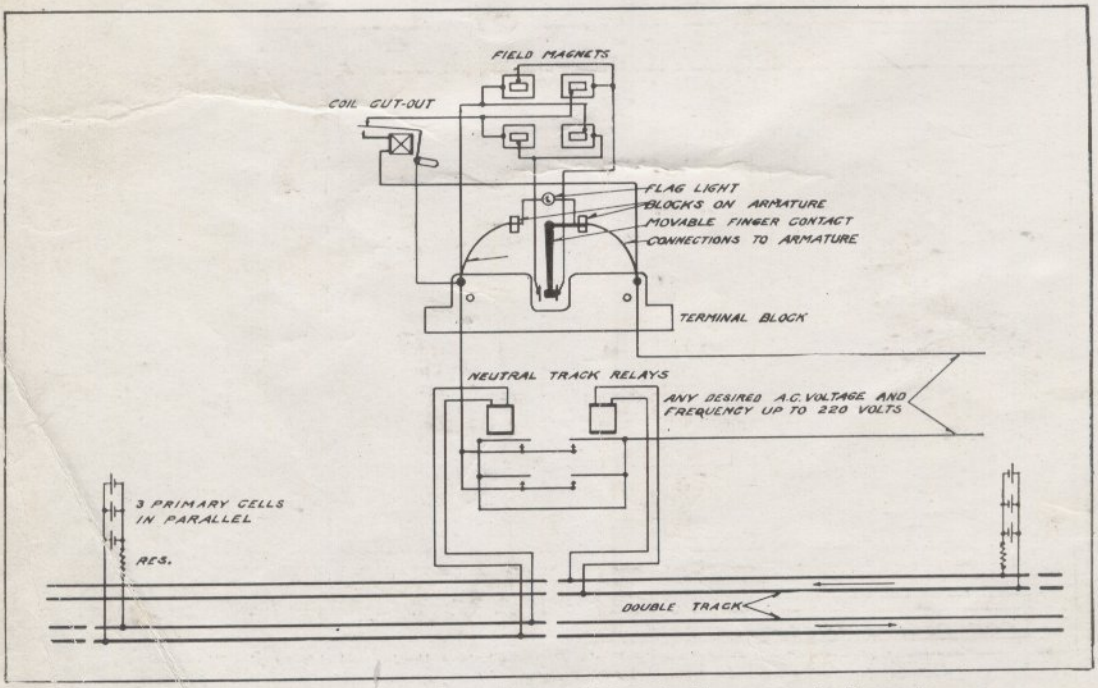


Circuit for 8-volt D.C. (Caustic Soda Battery) installation of Magnetic Flagman on double track steam line. Signal controlled by D.C. track circuits.

Magnetic Flagman Circuits

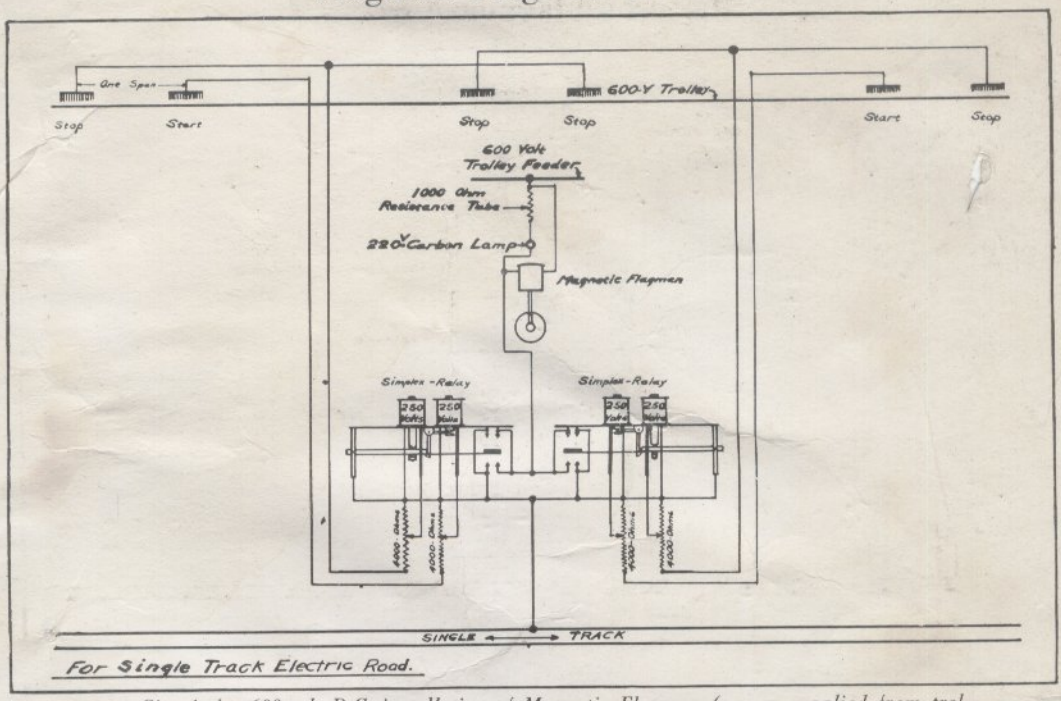


Circuit for Alternating Current installation of Magnetic Flagman on single track steam line. Traffic in both directions. Signal controlled by D.C. track circuits.

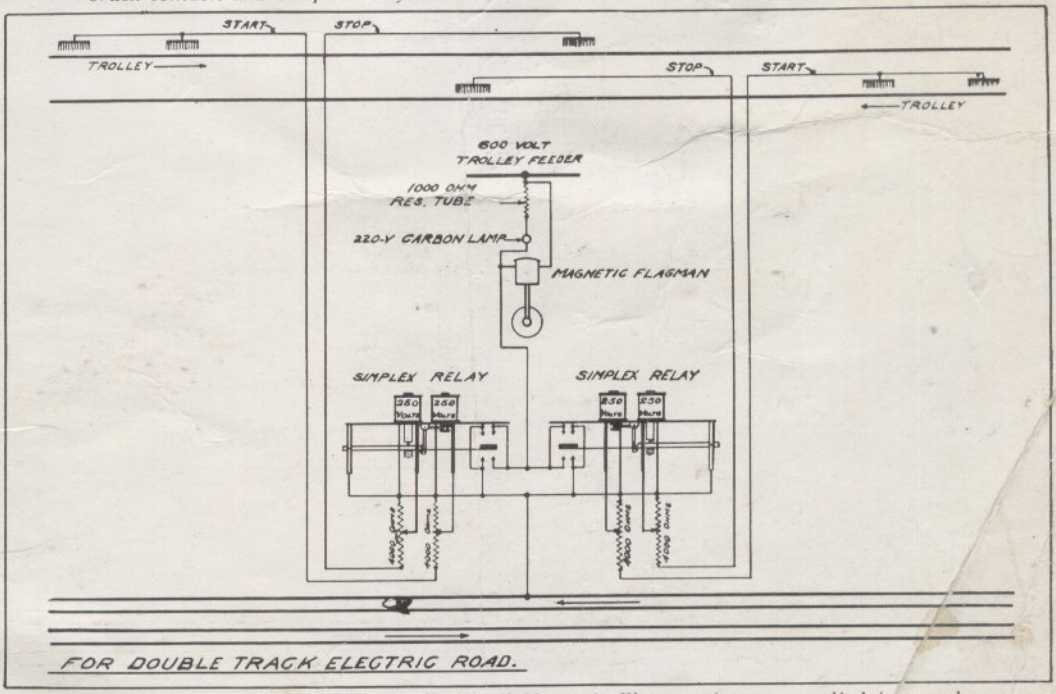


Circuit for Alternating Current installation of Magnetic Flagman on double track steam line. Signal controlled by D.C. track circuits.

Magnetic Flagman Circuits

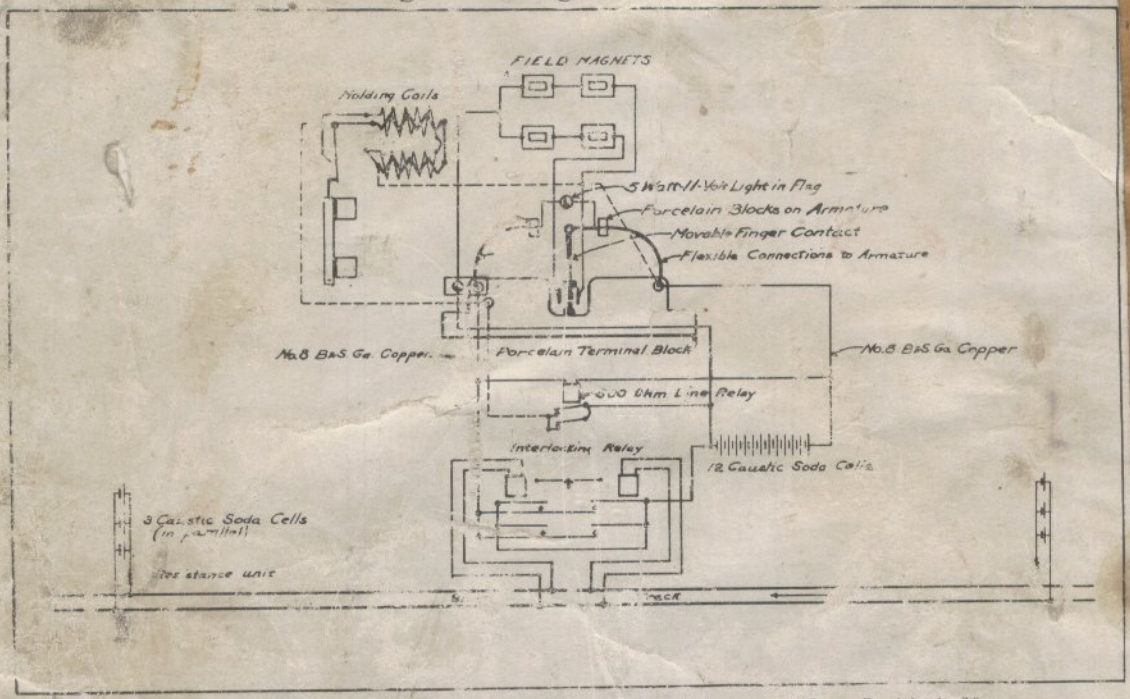


Circuit for 600-volt D.C. installation of Magnetic Flagman (power supplied from trolley) on single track electric line. Traffic in both directions. Signal controlled by trolley brush contacts and Simplex relays.

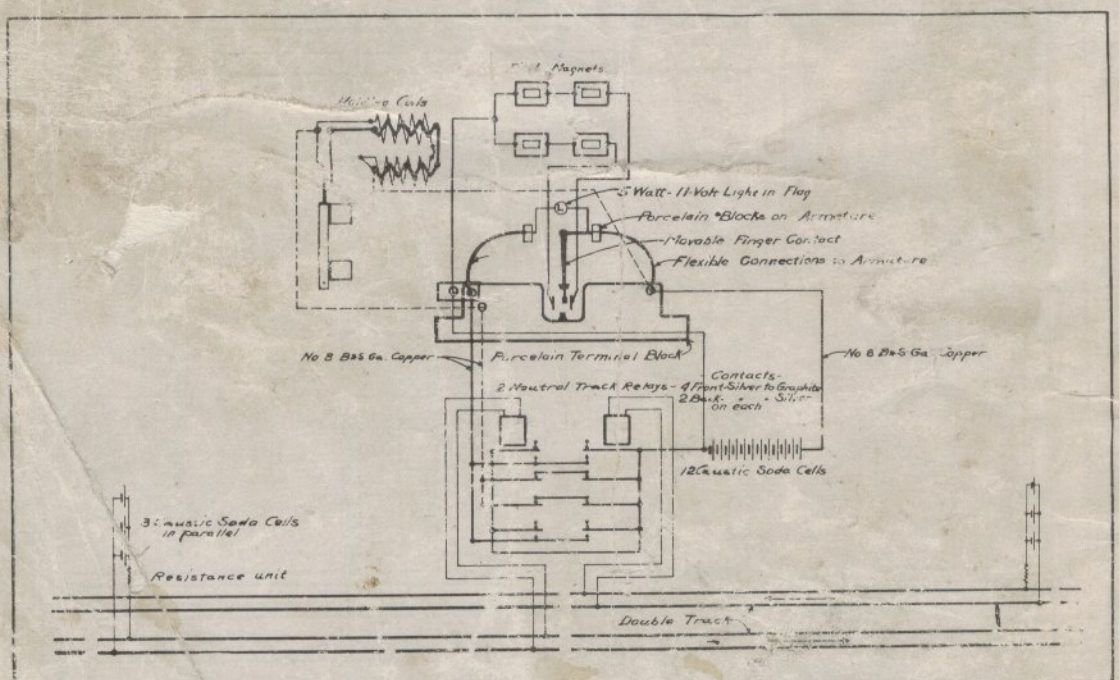


Circuit for 600-volt D.C. installation of Magnetic Flagman (power supplied from trolley) on double track electric line. Signal controlled by trolley brush contacts and Simplex relays.

Magnetic Flagman Circuits



Circuit for 8-volt D.C. (Caustic Soda Battery) installation of "Three Position" Magnetic Flagman on single track steam line. Traffic in both directions. Signal controlled by D.C. track circuits.



Circuit for 8-volt D.C. (Caustic Soda Battery) installation of "Three Position" Magnetic Flagman on double track steam line. Signal controlled by D.C. track circuits.