



Style "M"

**ELECTRIC POINT  
AND  
LOCK MACHINE**

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*INSTRUCTIONS FOR  
INSTALLATION & MAINTENANCE*

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THE  
**WESTINGHOUSE BRAKE & SAXBY SIGNAL CO. LTD.,**

82, YORK ROAD, KING'S CROSS, LONDON, N. 1.

1922.





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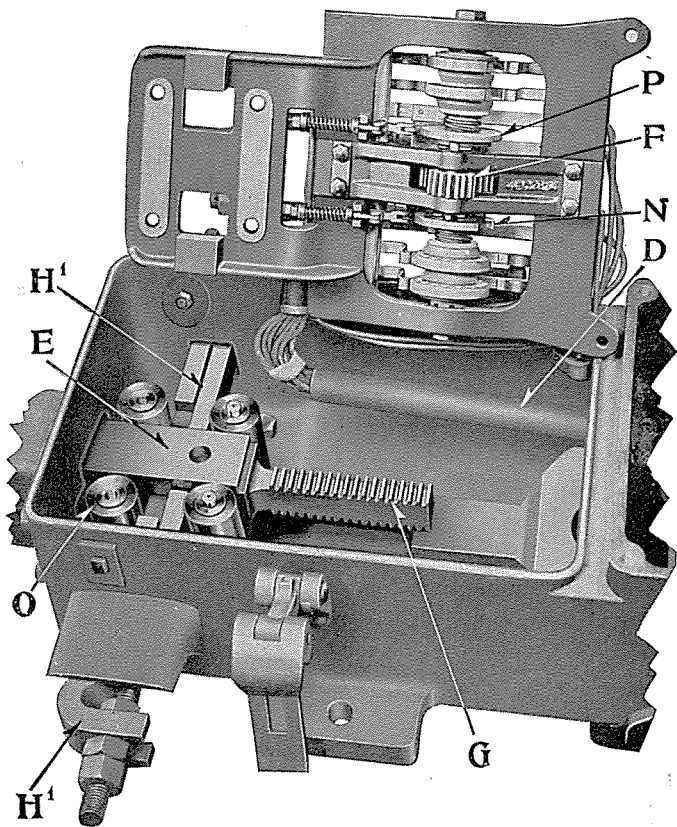


Fig. 1.—Style "M" Lock Box and inverted view of Circuit Controller.

# STYLE "M" ELECTRIC POINT AND LOCK MACHINE.

All Machines are arranged for right-hand location as shewn in Fig. 2, when sent out from works, unless otherwise specified.

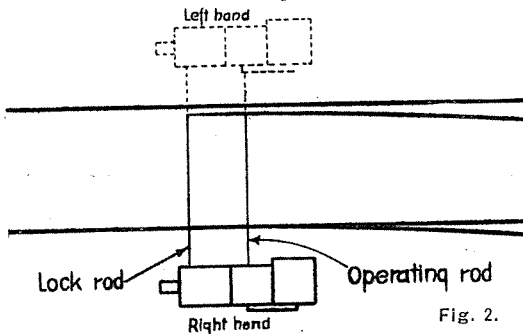


Fig. 2.

## CONVERTING FROM RIGHT HAND TO LEFT HAND ACTION.

To convert the machine for left-hand location, proceed as follows: Be sure that the machine is in the position which brings the lock box E-G at the end of its stroke nearest the worm gear and motor, which is the position opposite to that shown in Fig. 1. Then unfasten the screw bolts and screws by means of which the circuit controller is fastened to the case. Swing the controller up into the position shown in Fig. 1, turning it about the wire conduit D as a centre. Lift up the lock box E-G, turn it upside down and replace it on the driving studs in the locking bar. Replace the circuit controller in its original position, and fasten it down. Care should be taken that the circuit controller segments have not moved while the pinion F is out of mesh with rack G. *The reversal of the lock box enables the same locking blades to be used for right hand or left hand working.*



# INSTALLATION.



## PREPARING LOCATION.

Before installing the machine care should be taken to see that the surface of the timbers on which it is to rest has been properly prepared, as otherwise when the machine is bolted into position undue strain may be thrown on to the lugs. It should be noted that the supporting lugs at the motor end of the machine require their support to be  $\frac{1}{2}$  in. lower than the others. Fig. 3 gives the necessary dimensions for the fixing of the machine. Fixing holes are provided for  $\frac{3}{4}$  in. bolts.

In certain cases it may be necessary to reduce the thickness of the timbers at the point where the machine is to be located. The amount of reduction will depend upon the type of permanent way. As a rule a drawing showing the level of the machine relative to the type of rail will be provided, if certain data has been submitted at the time of the order.

## ADJUSTING MECHANICAL CONNECTIONS.

After bolting the machine in place and preparing the mechanical connections to the points (and to the facing point lock bar where it is used) it is advisable to operate the machine by the hand crank to the centre position (this can be ascertained by measuring the stroke on the locking bar) bringing the points to their mid position and the facing point lock blade on centre ; and then adjusting the various connections before fitting the connecting pins.

While the points are in their mid position, the lock blades should of course be adjusted to have their notches an equal distance on either side of the lock box ; the distance between centres of notches having been previously adjusted to a length equal to the travel of the points at the tips of the tongues.

After the connections are coupled up, trial operations of the normal and reverse positions will show whether the correct adjustments have been made.

# POINT DETECTOR.

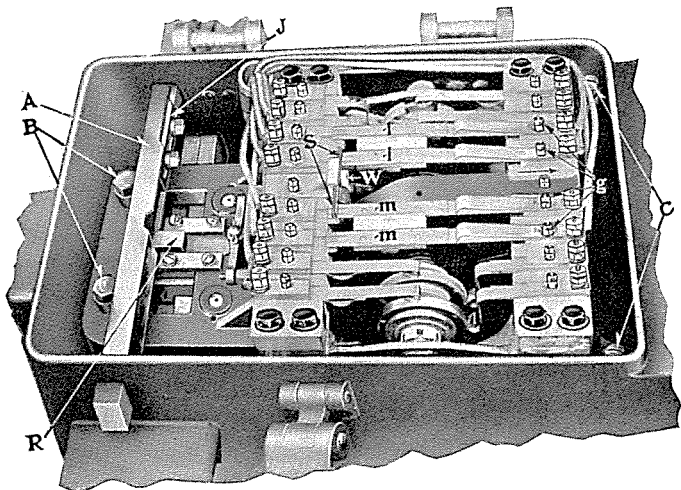


Fig. 4.

All machines are sent out with the point detector bar A dismantled and the openings for it in the casing covered. To fit up, uncover openings in the casing, insert the detector bar, attaching it to plate J by means of the fixing screws, in the position shown in Fig. 4. Connect the detector bar to the point tongues, and throw the points by hand-cranking the machine, so that the tongue furthest from the machine is closed. Adjust the detector bar coupling rod to bring dog R on the controller slide into the fixed notch on the detector bar. Then throw the machine to the other extreme position, and adjust plate J so as to bring dog R into the notch formed in end of J.



## FACING POINT LOCK BAR DRIVE.

The lock box, which is attached to the slide bar by means of dowels, performs the double function of operating the circuit controller and of transmitting power to operate the detector bar, when used. To attach the detector bar, remove the cast iron cover I (Fig. 6, page 12) from the end of the machine, and either drill out, or with a hammer break out, the  $1\frac{1}{2}$  in. dia. "bull's eye." Insert the detector bar connecting rod and apply the lock nut, running it back at least  $1\frac{3}{8}$  in. Screw the connecting rod into the lock box at least  $1\frac{1}{2}$  in., then tighten the lock nut. Clean and replace the cover; then attach external detector bar connections.

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## INDICATION CIRCUIT CONTROLLER.

After the machine has been placed in position and the mechanical connections made and tested as above, throw it by means of the hand crank to the position in which the lock box is at the end of its stroke nearest the worm gear. In this position, the indication contact springs *l-l* should be down and in engagement with their contacts. This movement of springs *l-l* is allowed by the roller *h* under the support dropping into the notch cam N (Fig. 5, page 8). The indication contact springs *m-m* should be up, one of them engaging the short circuiting strip S. (Fig. 4, page 6).

Fig. 4 shows the strips arranged for use where only one machine is controlled by the point lever. The short circuiting strips, as well as the links on the terminal box, must be changed on the machine, when more than one machine is operated from a single lever, by removing the screw W and following the directions on the wiring diagram pasted in the cover.

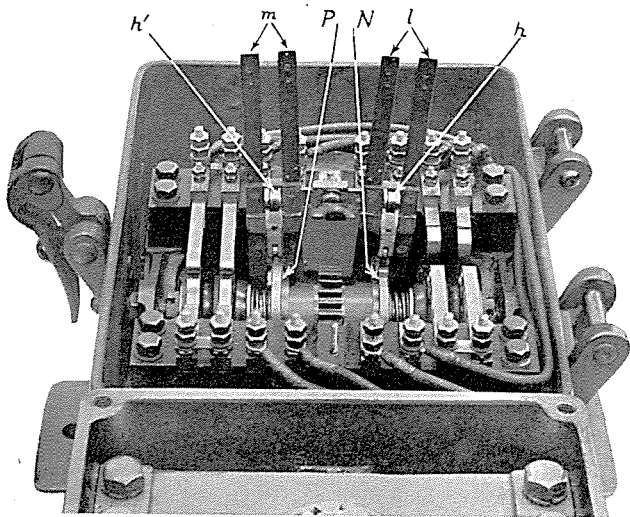


Fig. 5.

When points are in the position in which they normally lie, cam N should have its notch at the top (Fig. 5) while the notch on cam P should be down and out of sight. Unless otherwise specified, machines are sent out from the works adjusted for points to lie normally in the position shown in Fig. 2, page 3.

To adjust the machine to suit points lying normally in the reverse position to Fig. 1 proceed as follows :—

First, by means of the hand crank throw the machine over to the corresponding position, when cam P will be found to have its notch on top, while the notch on cam N will be down and out of sight. Unfasten springs *l-l* and *m-m* by removing the nuts *g* and retaining springs (Fig. 4, page 6); disengage the springs from the dowels and screws, and pull them to the right, as shown by the arrow. They can then be thrown back as shown in Fig. 5. Now force each cam against its retaining coil spring by means of a screw driver or other suitable tool, until the pins which engage it are free. Then move the cams round until they come into their proper relative positions, when they will snap back into place, the notch on N being now on top, with the notch on P underneath. Next operate the machine by the hand crank to the position it will occupy when the points are reversed, and, if properly adjusted, cam P will have its notch on top and the notch on cam N will be out of sight. Replace springs *l-l* and *m-m*, together with their retaining springs, and make them secure by the nuts *g*.

The circuit controller is adjusted as shown by the wiring diagram in the cover of the machine. Keep the operating segments tight by means of the castellated nuts. Do this by removing the split pins (one in each end of shaft), tighten up the castellated nuts, and then restore and spread the split pins. The contact springs should have a pressure of 1 to 2 pounds; contact surfaces should be free from grit, dirt, filings and cuttings. To prevent cutting, wipe the contact surfaces with a cloth which has been saturated with a non-gumming, acid-free dynamo oil. A light application of glycerine on the contact surfaces will insure against frost troubles in cold weather.

## **WIRING.**

All machines are wired alike. No external wires go directly to the circuit controller. Make the external connections to the terminal board at the motor end of the machine, and change the jumpers or leads when necessary, in accordance with the instructions on wiring diagrams.



## **CABLE OUTLET.**

An outlet arranged for 2 in. flexible metallic hose is located at the motor end of the machine.

## MAINTENANCE

M1

Worm Shaft Thrust Ball Bearing

Ordering Description

Ball Bearing, double row, radial & thrust.

35 mm. bore x 80 mm. out. diam. x  $1 \frac{3}{8}$ "

New Departure type 5307 (Bearing Service Ltd)

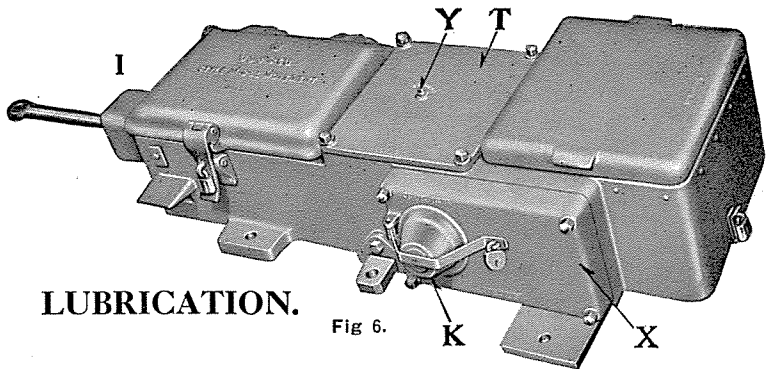
SKF

" 2307 (SKF Ball Bearing Co)

R. & M.

" MDJ35K (Gardner & Wearne)

M2 m/c SKF A/W-07



## LUBRICATION.

Fig 6.

The load to be handled and the frequency of operations must determine the times between oilings. The periods stated below may be considered as a guide until a more exact determination of the times can be made. When sent out from the factory all working parts of the mechanism are sufficiently lubricated to be placed in service, except the worm gear and the crank pins and rollers, which are on the lower end of the main crank shaft.

After the machine has been installed, remove the worm gear case cover T (Fig. 6) and place in the compartment U (Fig. 7) three pints of good fluid grease, which will not congeal during cold weather, and which has a quality to properly lubricate under the high pressure developed in the machine, such as the Texas Oil Co.'s Lubricant No. 921, with which the machine is tested in the works. This will be thrown over the worm and worm gear by the paddle on the worm, and will also flow into the ball bearing Z. **For details of thrust ball bearing see P. II.**

A grease gun should be used to force about five pints of the same lubricant into the compartment housing the lower end of the crank, which is directly under the worm gear, through the opening made by removing the  $\frac{3}{8}$  in. gas plug H, Fig. 7. If a grease gun is not available, remove the lower cover V, fill with the above mentioned grease and replace the cover. At the end of the first six months, the lubricant in both these compartments should be replenished.

After the first three months, the spur gears L (Fig. 7) in the gear trains for 110-v. A.C. and D.C. machines should be removed, and the recesses in the hubs repacked, if necessary, with hard grease of good quality. The annular recesses in the inner faces of both clutch plates Q (Fig. 7) should be packed with the same grease. Care should be taken to remove any excess grease from the clutch facing. The spur gears in the gear trains for low voltage machines have no recesses for packing, but are provided with oil holes through which the bearings should be kept well lubricated with a good grade of dynamo oil.

All finished working surfaces, as well as the gear teeth in the gear train and on the circuit controller rack and pinion G and F (Fig. 1, page 2) should be kept coated with the Texaco Lubricant, No. 921, or its equivalent.

Dynamo oil of a good grade should be used to lubricate the bearings of the motor, circuit controller, main crank and worm gear shaft, also the cams, such as those driving the indication springs and the one on the point detector, and the lock rod rollers O (Fig. 1, page 2) and the rollers *h* and *h'* (Fig. 5, page 8) operating the indication springs.

The main crank bearing can be oiled through the opening in the top cover T (Fig. 6) by removing the pipe plug Y and injecting oil down into the hole provided in the main crank shaft at M (Fig. 7).

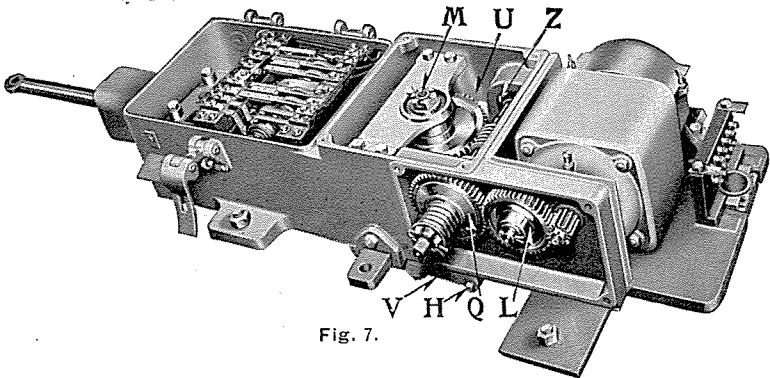


Fig. 7.

## MOTOR.

The motor commutator should be kept smooth and free from grease and gum. To clean the commutator, or to clean and grind the brushes, use a piece of fine glass or sand paper (not emery cloth).

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## CLUTCH.

On the worm shaft is a friction clutch, which should be inspected about once a month. To do this, remove the cast-iron cover X (Fig. 6, page 12) from the machine, exposing the clutch and reduction gears to view. Operate the switch several times, and note the clutch slips a little on the completion of each movement. Its adjustment can be quickly and easily changed to suit a free or stiff working point tongue.

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## TOOLS.

The following tools will be of assistance in maintaining the style M machine :—

- 1 22½° double head S box spanner, ½ in.-⅝ in. hexagon heads.
- 1 thin head lock nut spanner, 1 in. Whitworth.
- 1 grease gun, of design suitable to handle a fluid grease.
- 1 pair lineman's side cutting pliers.
- 1 screw driver, medium size.
- 1 oil can for dynamo oil.



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