

INSTRUCTION BOOK
D 6/12

LEVER LOCK
AND
CIRCUIT CONTROLLER
Style D.6

Installation and Maintenance

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Works : Chippenham, Wilts.

Lever Lock and Circuit Controller

Style D.6

The style "D.6" Lever Lock and Circuit Controller comprises, as a complete unit, an Electric Lever Lock, for either A.C. or D.C. operation, and a Circuit Controller having accommodation for a maximum of sixteen contacts.

If desired the Lever Lock or the Circuit Controller can be supplied separately.

In addition, the Lever Lock is provided with economiser contacts and can be fitted with one or two lock proving contacts when required.

When ordering Style "D.6" Lever Locks and Circuit Controllers, the fullest possible particulars of locking positions, normal position of the slide, horizontal or vertical mounting and details of contact equipment (viz., circuit controller,

economiser and proving contacts) as well as particulars of the power supply, will give us great assistance.

We strongly recommend that all lock slides are ordered with the long notches, shown on Fig. 4a, except where the lever operates trailing points. In the latter case the points are held in position by the lever catch handle being in engagement with the notch in the floor plate segment, and it is then advisable to employ a lock slide bar with short notches, as shown in Fig. 4b. In view of the short preliminary slide bar travel available with the reduced size of notch we recommend that the economiser contact (which relies for its operation upon a certain amount of preliminary travel) is replaced by a contact box which is operated directly from the lever catch handle, thus permitting the lock magnet to be energised at the earliest possible moment in the lever stroke.

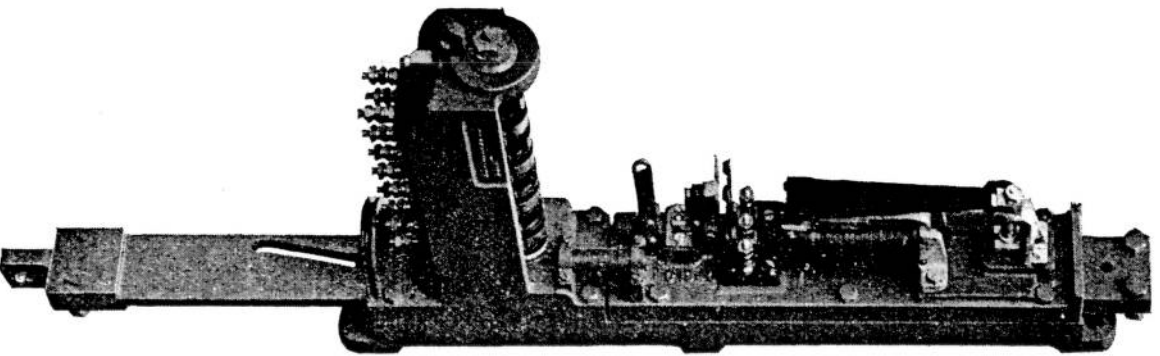
The standard lock has a stroke of 8" (and the instructions given in this book apply to an 8" stroke), but, when required, a lock slide of greater or less stroke can be supplied, and special instructions regarding the cutting of notches in a blank slide will be sent on request.

Blank contacts can be supplied also where special contact arcs are required.

Standard coil resistances for direct current operation are :—

10-volt supply	10 ohms.
20-24 volts supply	50 ohms.
110-volt supply	710 ohms.

The standard coils for alternating current supply are wound for operation on 90/110 volts, at the usual frequencies.



I. Mounting and Connecting to the Lever

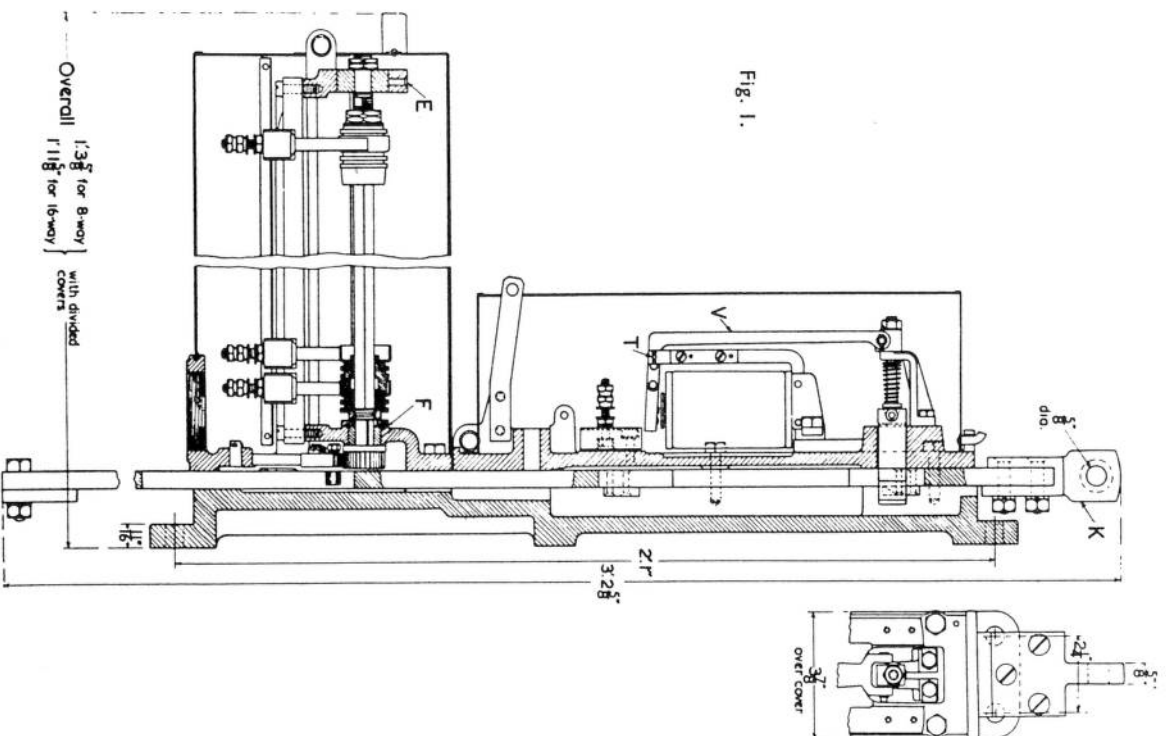


Fig. 1.

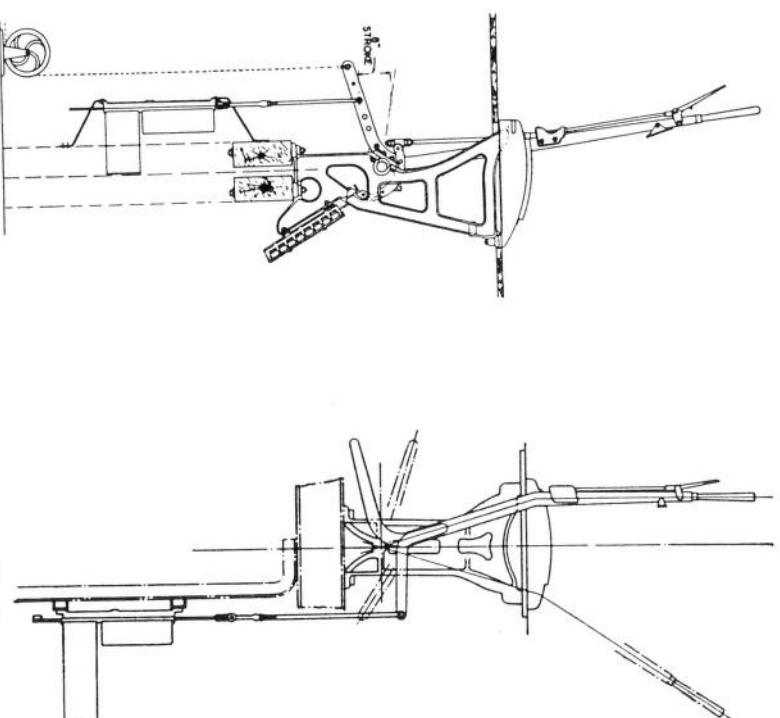


Fig. 2.

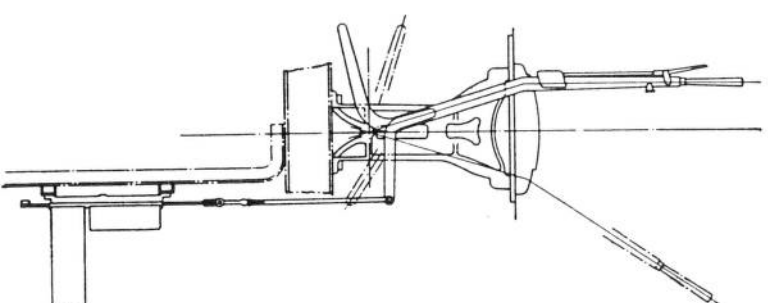


Fig. 3.

The Lever Lock and Circuit Controller may be mounted either horizontally or vertically. The lock mounted horizontally has a driving lug (K) attached to one end and an adjustable coupling can be supplied for connecting to the lever. It is important that the lever tail shall be drilled so that the resultant stroke on the lock slide is exactly 8", otherwise correct operation of the lock and contacts will not be obtained.

When the lock is mounted vertically it is essential that the Circuit Controller is below the Lever Lock.

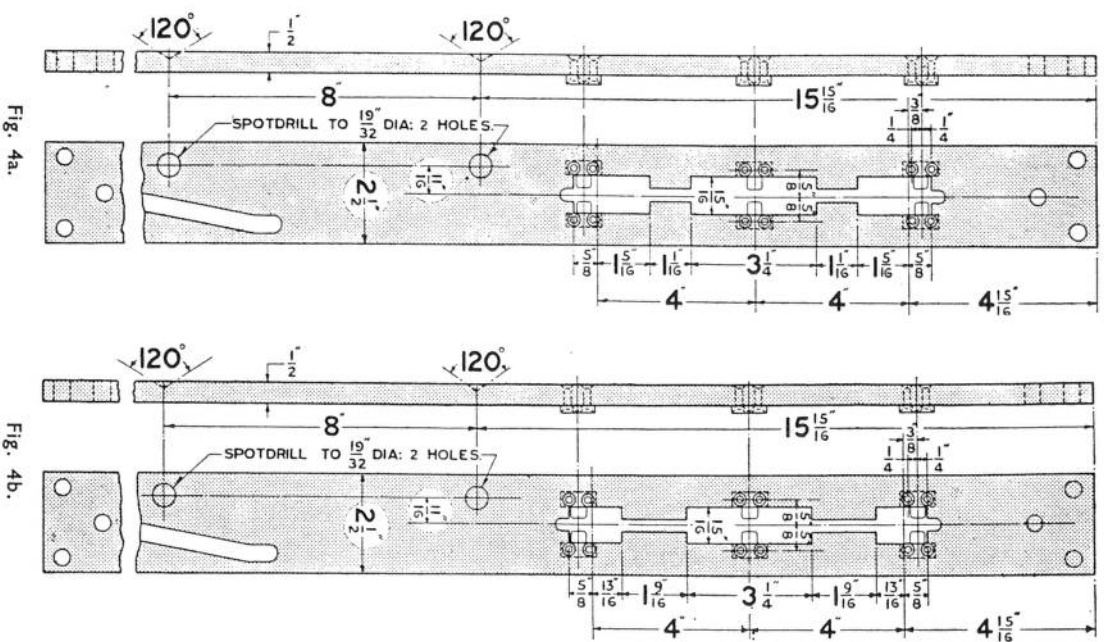


Fig. 4a.

Fig. 4b.

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It will be noted that in Fig. 2 the slide is driven from the top and the slide is normally "in at top," while in Fig. 3 the slide is normally "out at top." In this connection it is important to note that the relative positions of the normal and reverse lock notches in the lock slide will vary according to the normal position of the slide, i.e., normally in at top or normally out at top. (See also Fig. 4.)

If a lock is ordered for operation in the horizontal position the coil spring for the lock dog "M" is not fitted, and it is important that this spring must be fitted should the position for operation be changed from horizontal to vertical.

The driving lug (K) can be attached to either end of the lock slide.

2. Lock Slide

The lock slide may be despatched either with the lock notches correctly cut and throw-down dogs riveted on, or with the slide uncut so that the notches can be cut on the site.

When the notches are to be cut on the site the slide must be marked off to the dimensions given on Figs. 4a or 4b (see para. 2, page 3), or alternatively a template can be supplied for the purpose.

In addition to cutting the lock notches and riveting on the throw-down dogs, the slide must be countersunk in two places to operate the economiser contacts. It is recommended that the positions of these countersinks are marked off while the slide is connected to the lever.

The slides shown in Fig. 4 are for Normal and Reverse Locks and also Normal and Reverse Indication Locks; with a blank slide only those actually required need be cut.

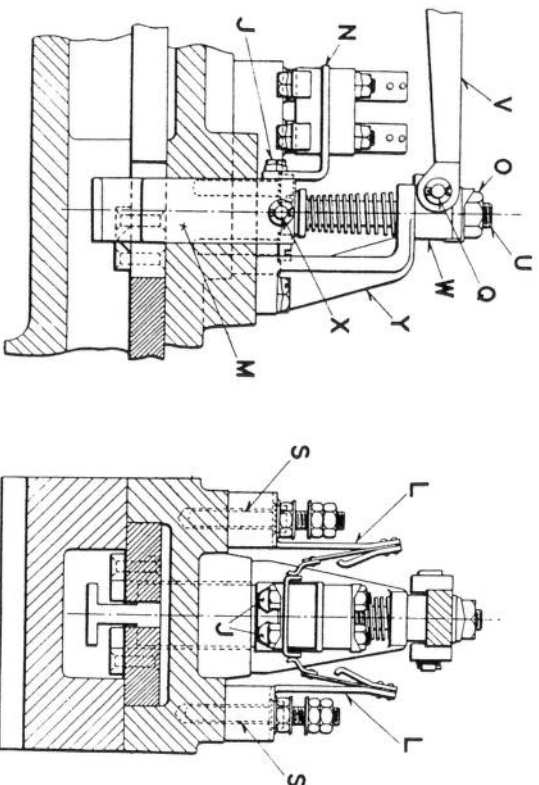


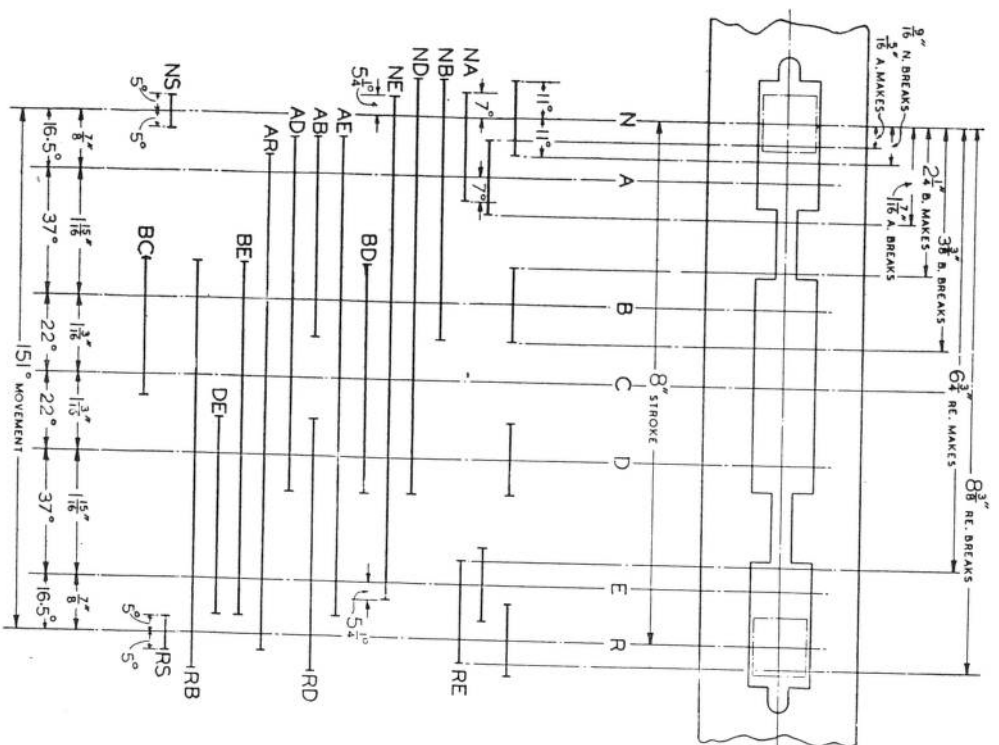
Fig. 5.

3. Adjustment of Lock Dog

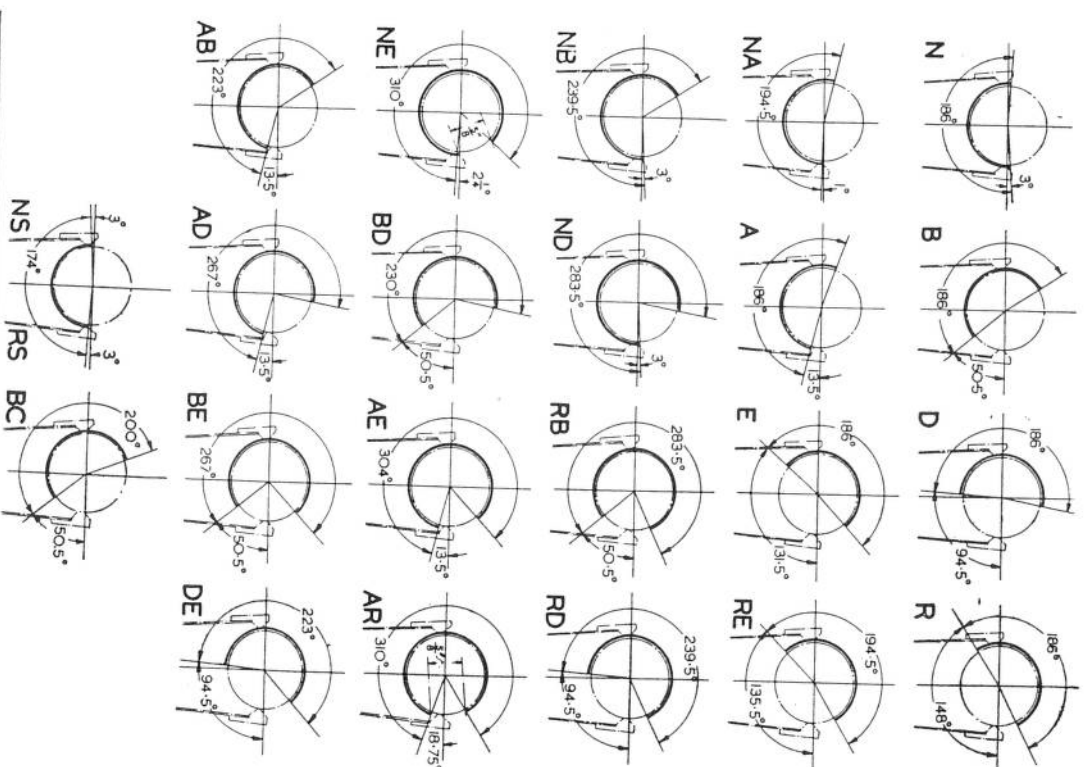
If for any reason it is necessary to adjust the Lock Dog "M", Fig. 5, this can be carried out by removing pins "Q" and "X" and slacking back lock nut "O." If lever "V" is now raised, the threaded block "W" can be rotated, thus enabling the lock dog "M" to be raised or lowered in relation to the lock slide.

The correct setting should give approximately $1/64$ " clearance between the lock dog and the top of the slide bar when the lever "V" is attached to the lock dog and the armature is held against the pole face.

The correct adjustment can be tested by moving the slide bar gently to and fro, preferably by hand, and noting smooth operation of the lock dog when passing a lock position.



CONTACT SETTING FOR CIRCUIT CONTROLLER
FOR
STYLE "D.6" LEVER LOCK



After adjustment the nut "O" must be tightened and the lock plate turned up.

4. Proving Contacts

Proving contacts for one or two circuits may be ordered with the lock or may be fitted afterwards.

When fitting proving contacts (see Figs. 1 and 5) it is necessary first to remove the lock dog "M" by taking out pin "Q" and pin "T" and detaching the lever "V." Bracket "Y" must then be taken off with the eye rod and dog attached. The lock dog should then be detached from the eye rod "U" by extracting pin "X" without disturbing the adjustment of block "W."

The bracket "N" and proving contacts can then be attached to the dog by screws "J" and the lock plate turned up.

Before re-assembling the dog, bracket and lever, the contact springs "L" and their insulations should be fitted to the casting by means of screws "S."

It is important to see that all parts are perfectly clean and will work freely when re-assembling them.

5. To fit Lock to Controller, or vice versa

When it is required to fit a lever lock to an existing circuit controller the cover plate must be removed to allow the magnet assembly to be bolted on to the main casting.

If the lock slide is not already provided with the necessary lock notches, these must be cut as described under Section 2, page 7, and the lock dog "M" adjusted as described in Section 3, page 8.

When fitting a circuit controller to an existing lock the cover plate must be removed and the controller

assembly bolted on, in place of the cover plate. Care must be taken when bolting down the controller to see that the contact shaft operating roller has entered the cam path in the slide. The roller arm must be below the horizontal.

The wire tube must also be fitted to carry the wires from the economiser contact and proving contacts to the wire outlet in the circuit controller cover.

When re-assembling the parts it is important to see that they are all perfectly clean and will work freely.

6. Circuit Controller Contacts

The circuit controller contacts are of the air break type and move through an arc of 151° with full stroke on the lock slide.

The usual types of contacts can be supplied and their relative arcs of "make" are given on Fig. 6a (see folding sheet). Most of the contacts have a little overlap, amounting to 3° - 4° beyond the various locking positions (N, B, D, R, etc.), but can be re-adjusted on the site if required and as described in Section 7. Certain contacts such as NS, A, B, etc., have very little overlap and are for use where only momentary "make" is required in a circuit.

The standard sizes of circuit controller have capacity for 8 or 16 contacts, but in certain instances the full complement of contacts is not ordered and spacers are fitted which can be removed if additional contacts have to be fitted at a later date (see Section 8).

7. Adjustment of Circuit Controller Contacts

A fine "Vernier" adjustment for the contact segments is provided, as described below.

Associated with each segment piece are two rings, which, together with the segment piece, form one unit. The brown bakelite ring "B" (see Figs. 7a to e, p. 12/13) fits the hexagonal spindle, on which it can slide, but not rotate. It has four pins, which engage with four of the nineteen holes in the next ring "R" (coloured red). These holes are spaced at angles of $18^\circ 57'$.

On the red bakelite ring "R" there are four pins which engage with four of the eighteen holes in the brass contact segment "P", and these holes are spaced at angles of $20^\circ 0'$. Thus for a small adjustment, the brass segment "P" is moved one hole on ring "R", and ring "R" is moved one hole on ring "B" in the opposite direction; hence the net movement is $20^\circ 0' - 18^\circ 57' = 1^\circ 3'$.

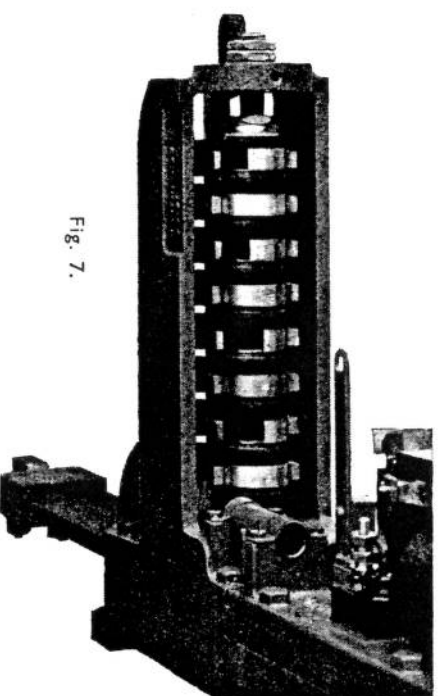
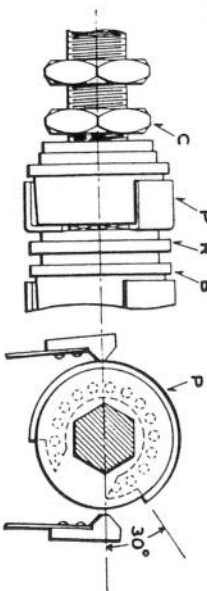


Fig. 7.

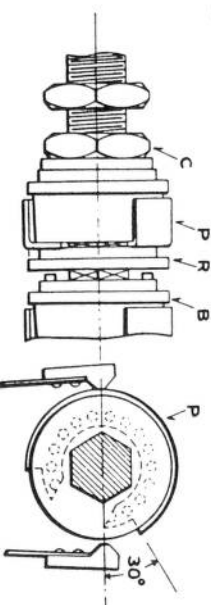
The illustrations following show the angular movements of the contact segment necessary to obtain an adjustment of $1^{\circ} 3'$.

Fig. 7a



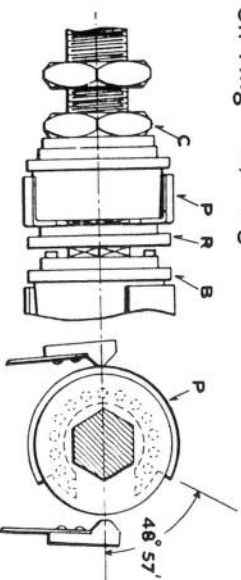
To make the adjustment :—
 (1) Slack off lock nut, and then slack back nut "C" a few turns (a spanner, Fig. 9, is provided for this purpose), sufficient to enable the pins on ring "B" to be disengaged from the holes in ring "R," Fig. 7a.

Fig. 7b



(2) Separate by placing fingers of one hand on contact segment "P" and ring "R," and fingers of other hand on ring "B," Fig. 7b.

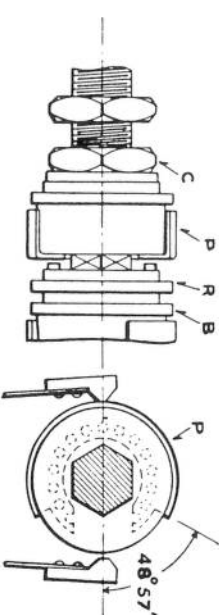
Fig. 7c



(3) Now rotate contact segment "P" together with ring "R" in the desired direction. It is helpful, after the first slight movement, to press contact segment

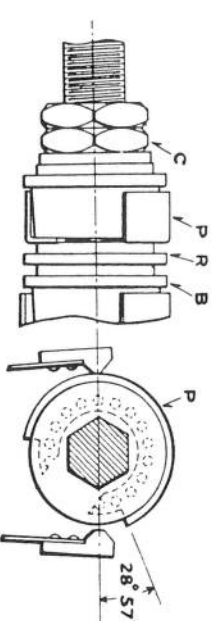
"P" and ring "R" gently against ring "B" in order to feel when the pins on ring "B" engage with the next holes in ring "R," Fig. 7c.

Fig. 7d



(4) Now press ring "R" against ring "B" so that pins on "B" go right home into holes on "R," at the same time separating ring "R" from segment "P," Fig. 7d.

Fig. 7e



(5) Rotate contact segment "P" back in opposite direction, leaving ring "R" in engagement with ring "B." Again, press the contact segment "P" gently against ring "R" during the rotation in order to feel when pins and holes engage, and finally press the whole contact assembly together and tighten nut "C" with the fingers. Make certain all pins have engaged with holes before tightening nut "C" with a spanner. Then tighten lock nut. Fig. 7e.

IMPORTANT.—If nut "C" is tightened with a spanner when some of the pins are not home in their holes, damage may be done to the bakelite insulations.

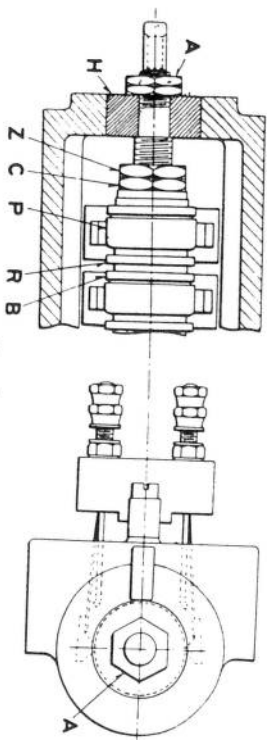


Fig. 8.

8. To remove or add Contact Segments on the Circuit Controller



Fig. 9.

To remove contacts from shaft proceed as follows:—
(See Fig. 8.)

- (a) Slack back lock nut "Z" and loosen nut "C" (using special spanner provided—Fig. 9).
- (b) Slack back and remove lock nut "A" and bush holding nut (using spanner—Fig. 9).
- (c) Slide bush "H" off the end of the shaft by applying pressure outwards on the inside surface. (This bush is *not* screwed on the shaft).

It will be found that the space provided by the removal of the bush is large enough to allow the nuts "Z" and "C," the various rings, and the contact segments to be withdrawn from the shaft. The contact springs must be held back while the rings and segments are slipped past.

After adding or removing contact segments :—

- (d) Screw nuts "C" and "Z" on shaft *by hand*.
- (e) Replace bush "H," taking care that it is clean and free from grit. Apply a **little** thin machine oil to the bush before replacing it.
- (f) Replace and tighten nut and lock nut "A."
- (g) Adjust contact segments as described in Section 7.

9. Lubrication

The bearings of the circuit controller should be lubricated with a good quality machine oil through the holes "E" and "F." (Fig. 3.) A little oil should be put occasionally on the lock slide and in the cam slot (which will be found to project from the bottom of the casing when the slide bar is "in" at the top). The lock piece needs very little lubrication but should be oiled occasionally and then the excess wiped off with a cloth ; if much oil is left on it, it is liable to become clogged and to stick.

If the lock and controller is installed in a district where the atmosphere causes discoloration of contacts, a trace of vaseline brand petroleum jelly may be applied to the segments. A very thin film of vaseline brand petroleum jelly will not cause trouble in the circuit.

10. Periodical Inspection

The style D.6 Lever Lock and Circuit Controller needs little maintenance, but a thorough periodical inspection is advisable to see that all nuts, bolts and pins, and wires, are secure and that no undue arcing or sparking is occurring at contacts.

The lock and controller should be kept clean with a soft cloth rather than with cotton waste. Covers should be kept always in position to prevent the entrance of dust.

Details of spare and replacement parts of the Lever Lock and Circuit Controller Style D.6, are given in Part 3, Section 1B, of our General Signal Catalogue, copies of which are in the possession of Chief Signal Inspectors, and other Railway Officers.