

## ELECTRICAL CLOCKS—PULSE TYPE

**“Clock No. 48”—Description**

**1. Description.**—“Clock No. 46”, the general appearance of which is illustrated in Fig. 1, is an electrically driven master clock with a  $\frac{1}{2}$ -second beat-time mechanism, and is used to control chargeable-time electric telephone exchanges. It provides the following facilities:—

- (a) 1-second
- (b) 6-second
- (c) Three 1-second pulses during each 6-second period.

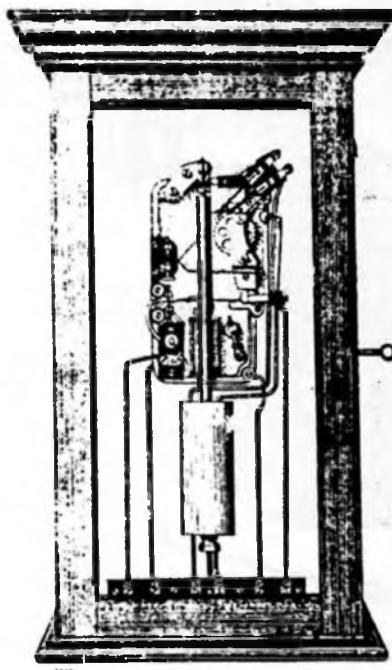


FIG. 1.—“CLOCK NO. 46”. GENERAL APPEARANCE

**2. Operation.**—The carriage U (Fig. 2) is linked to the pendulum by the forked detail L, and swings in unison with the pendulum. Carriage U carries all the controlling toggles and pawls, whose functions are as follows:—

(a) Toggle  $T1$  trails over the notched agate G1

(Fig. 3), and as the arc of the pendulum swing decreases, the toggle momentarily engages in the agate notch, causing contacts Cl to make and complete the circuit for the pendulum drive-magnet M. A non-inductive resistance S is connected across contacts Cl to reduce sparking.

(b) *Toggle T2* rides in the notched agate G2 and operates the 1-second spring-set C2 each time the pendulum swings to the left. C2 is normally adjusted to make for 150 mS., but this period can be altered by moving the agate to left or right.

(c) Pawl B rotates the count-wheel A one tooth for each complete swing of the pendulum. Every sixth tooth is deeply cut and allows pawl B to operate the 6-second spring-set C3, by engaging the trip-pawl D.

3. The three 1-second pulses every 6 seconds are derived from the normal 1-second pulses by the operation of spring-set F which is controlled by a

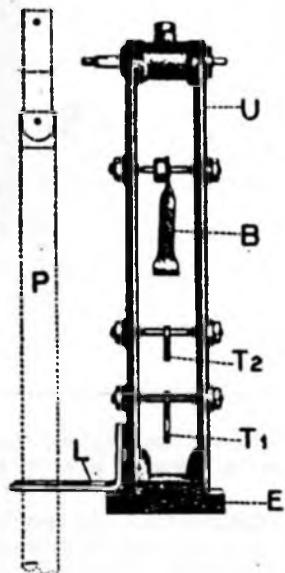


FIG. 2.—“CLOCK NO. 46”. SIDE VIEW OF IRON CARRIAGE.

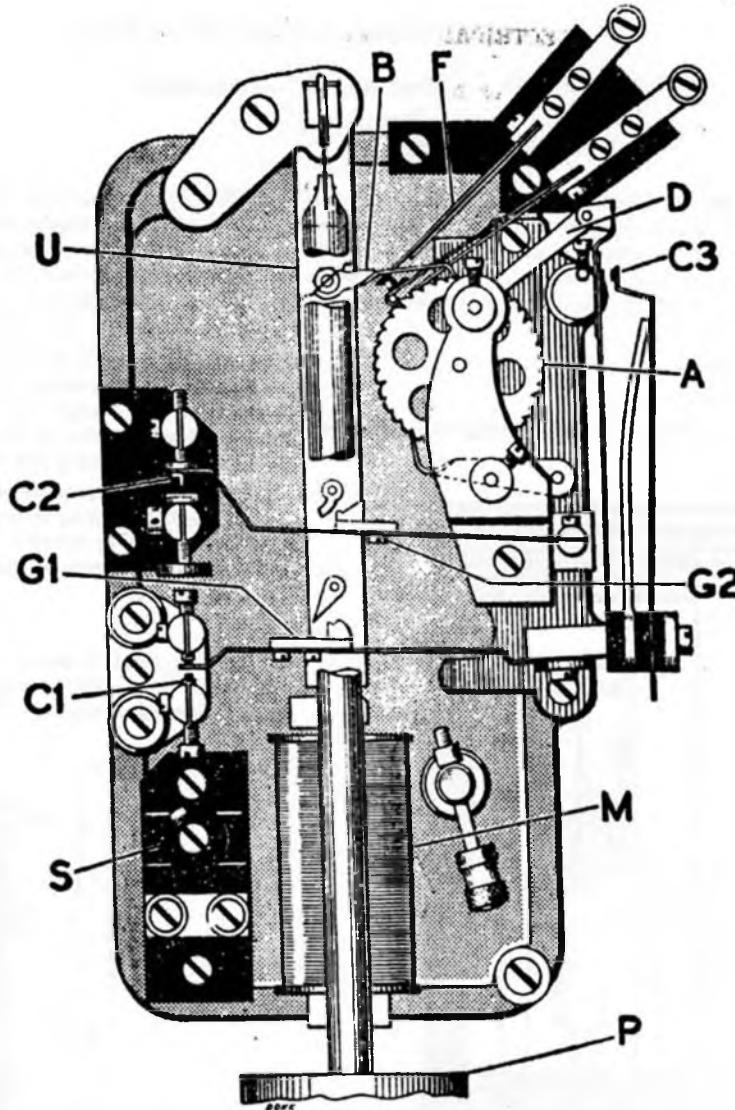


FIG. 3.—“CLOCK NO. 46”. MECHANISM

cam-wheel situated behind wheel A. This spring-set makes for 3 seconds in every 6 seconds.

**4. Adjustment.**—The pendulum is regulated by raising or lowering the pendulum bob P by means of the rating nut. Raising the bob causes the clock to gain.

Sv6.2.3  
(From EI Miscellaneous Time B1328)

**5. The following Instructions also relate to “Clock No. 46”:**

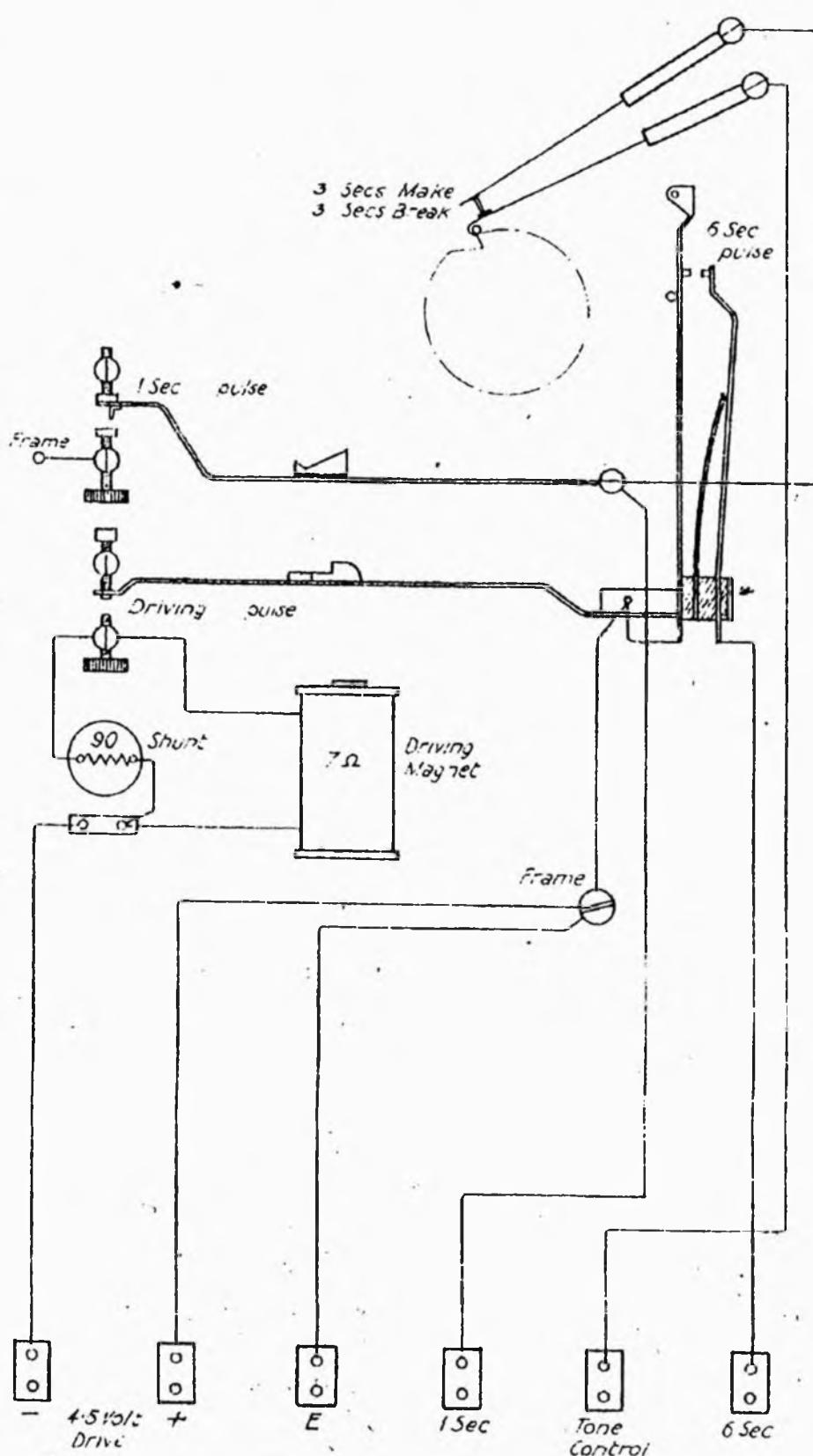
- (a) G0016 (spare parts)
- (b) R0014 (maintenance routines)

E N D

CLOCK, No. 46.

DIAGRAM OF CONNECTIONS.

Drawn	Checked	Approved	Date
J.H.	P.W.	6/10/03	12-10-03
3 Secs Make was 4 Secs 3 Secs Break was 2 Secs			
TRANSFERRED FROM S. B.C.H. EDITORIAL ADMINISTRATION			
SPECS PR480			



# ELECTRICAL CLOCKS (PULSE TYPE)

## Clocks No 36 and No 46 - Inspection and Cleaning

(Maintenance Routine Instruction (MRI) No R455)

### 1 GENERAL

This Instruction details the procedure which should be adopted on routine inspection, or when a fault occurs. The complete routine should be performed on the occasion of each fault.

### 2 PROCEDURE

- a Ensure that the clock is correctly fixed. Renew fixings if necessary.
- b Dust the case, and clean the glass.
- c Clean all contacts.
- d Check all electrical connexions. Resolder or retighten if necessary.
- e Check the internal wiring; refix as required.
- f Ensure that contact springs are straight against their buffer springs or stops, and check the alignment of the contacts.
- g Check that all contact separations (springs normal) are 10 mils minimum.
- h Check that lever springs are tensioned against their buffer springs or stops with a pressure of 5 to 8 gm, measured at the tip; adjust as necessary.
- j Check that all 'make' springs have pressures of 15 to 20 gm against their buffer springs (measured at the tip); adjust as necessary.
- \* k Check that springs lift from their buffers 4 mils minimum to 6 mils maximum.
- \* l Examine the 'Hipp' toggle and agate. If the toggle does not swing freely, dismantle, clean, lubricate (see paragraph 3) and reassemble. If these parts are worn in a Clock No 36, change the clock. In a Clock No 46, requisition the required parts and repair the clock. See G0014 and G0016.
  - i When a Clock No 36 or No 46 is stopped the 'Hipp' toggle should come to rest hanging to the left of the agate and NOT in the notch. The tip can be displaced up to a maximum of 1½ mm from the vertical through the pivot with the tip of the toggle touching the agate. (See Figure No 1)

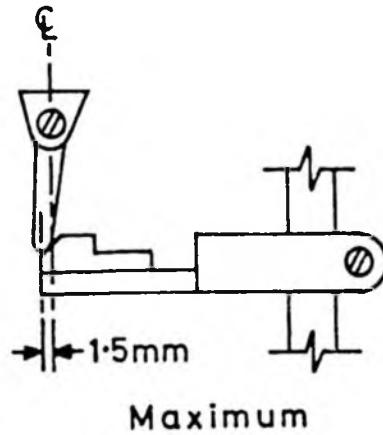
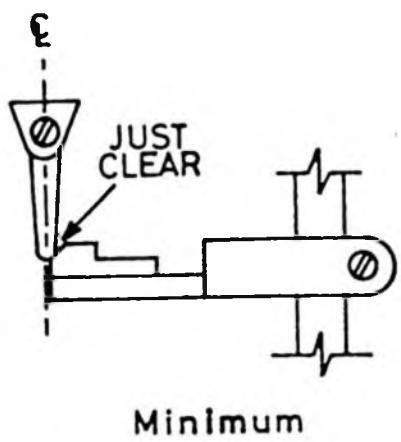


FIGURE 1

ii With the pendulum held to the left, the tip of the toggle should clear the agate holder platform.

Adjust the toggle accordingly by slight movement of the assembly.

m .. When a Clock No 36 is stopped check that the one second operating cams are 40-50 mils from their lever springs and, if necessary, adjust accordingly.

n Check:

i that each driving pawl turns its associated count wheel, so that the detent falls behind the appropriate tooth a distance equal to 20% of the tooth pitch, and

ii that when each count wheel is locked by its detent the driving pawl falls behind the appropriate tooth a distance equal to 20% of the pitch.

o Check all contacts for sparking. If observed, check spark-quench components and wiring.

\* p Check that the correcting pulses to the pendulum drive magnet are regular and that the spacing between successive pulses is  $28 \pm 2$  seconds (ie  $14 \pm 1$  complete swings) for a Clock No 36 and  $6 \pm 1$  seconds (ie  $6 \pm 1$  complete swings) for a Clock No 46. If the spacing is less than these values check that the drive magnet current is between 450-500 mA, and then check the 'Hipp' device ad described in (1). Ensure that the count wheels are free, if not lubricate their pivots as described in paragraph 3. The swing of the pendulum is regulated by raising or lowering the brass encased lead bob by means of the rating nut. The Clock will gain if the bob is raised or lose if lowered.

### \* 3 LUBRICATION

Normally master clocks should not require lubrication. To facilitate operation, however one drop of any light clock oil may be applied to the pivots of count wheels and to the 'Hipp' toggle.

END