

## Section 62

## BRITISH POST OFFICE STANDARD DIAL, NO. 8

In connection with this device the Department has made a very important departure from the usual practice and, from their point of view, a very desirable result is obtained.

Hitherto it has been the practice to accept dials of different designs from various manufacturers, but in an endeavour to obtain uniformity of practice, simplification of stocks and maintenance, one design has been adopted as a standard, which is known as "Dial Automatic No. 8."

The dial is illustrated in Figs. 125-130.



FIG. 125.—P.O. STANDARD DIAL, NO. 8. FRONT.

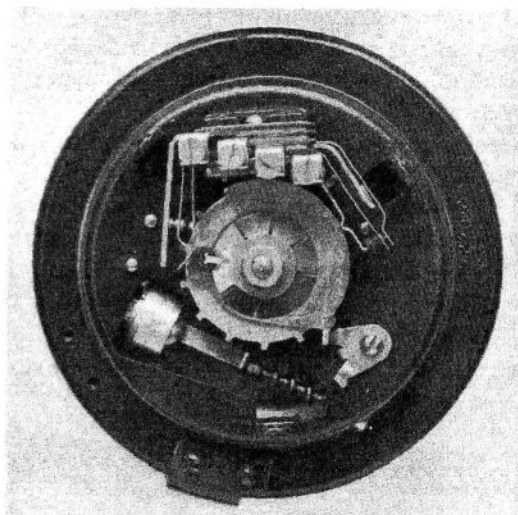


FIG. 126.—P.O. STANDARD DIAL, NO. 8. INTERIOR.

The present standard 3-point fixing has been retained. As will be seen from Fig. 125, there is a considerable gap between the finger hole 1 and the stop, to allow of an interval of time between the completion of the pull to the stop and the sending of the first impulse.

A rotating impulse cam, with teeth controlling the impulse springs, is used, instead of a geared rotating fibre segment opening the impulse springs. The impulse cam is readily removable, so that another cam with differently spaced teeth, to suit a particular system, can be inserted.

From the illustration of the rear, Fig. 127, it will be seen that the springs are assembled as a unit, so that they can be removed without the adjustments being disturbed. The clock-like driving spring is housed in a spring box situated underneath the impulse cam.

*Impulsing.*—The impulses are produced by the impulse cam which, operating in conjunction with the impulse lever, causes the impulse springs to open and close. These impulses are positive and clean, and of uniform duration. In other dials the impulses are produced by the contact springs being forced apart for the break, and then allowed to fall together for the make. The latter operation results in vibration, the main break being

followed by a series of minute breaks, as shown on an oscillogram, Fig. 130A. In a circuit in which there is considerable inductance, the vibration tends to shorten the period of make, but where there is considerable capacity, such as that due to a telephone condenser, the make period is not shortened. In the new dial the contact springs are normally held together, and permitted to fall apart for the break period. In this way vibration is eliminated, as shown in Fig. 130B. The lengths of the periods of make and break depend upon the width of the teeth of the cam. No ratchet and ratchet wheel are now necessary.

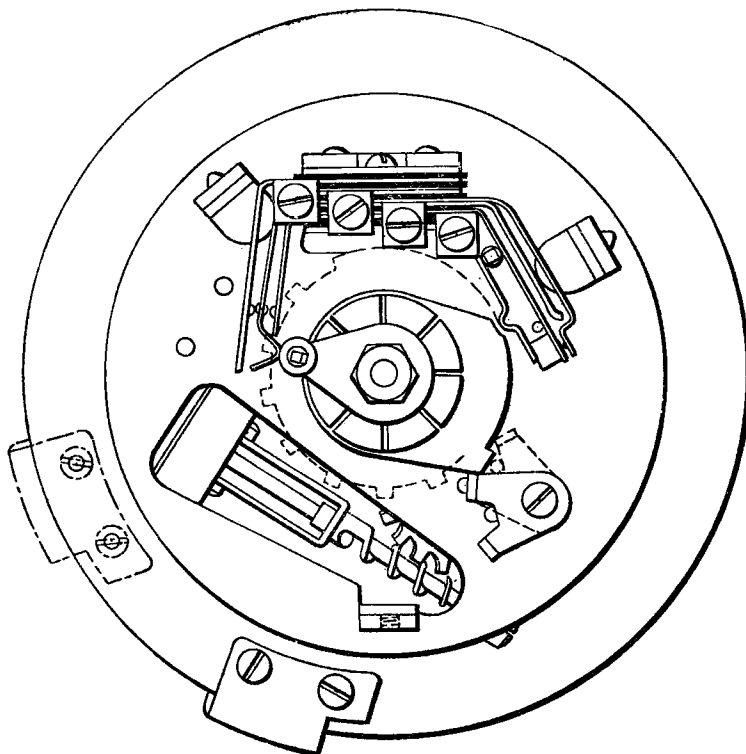


FIG. 127.—P.O. DIAL, AUTOMATIC, NO. 8. INTERIOR.  
HORIZONTAL SECTION.

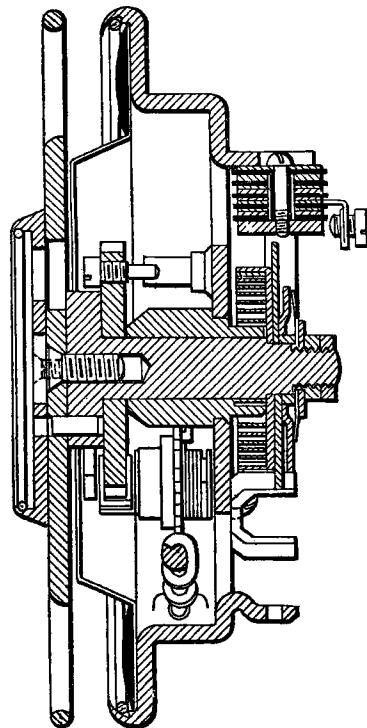


FIG. 128.—P.O. DIAL, AUTOMATIC,  
NO. 8. TRANSVERSE SECTION.

A dial fitted with a standard cam sends ten impulses per second, the length of each break being 63 milliseconds ( $\cdot 063$  second), and of each make 37 milliseconds ( $\cdot 037$  second). Cams to give other ratios of break to make can be fitted.

*Minimum Pause.*—This is an arrangement by which a certain minimum time (about 300 milliseconds) must elapse after the release of the dial plate and the sending of the first impulse, to ensure that selectors have time to perform their hunting operation. Without this facility it is possible when dialling numbers, such as 1-1-1, for the impulses to arrive before a free selecting switch has been found.

This minimum pause is provided for by the slipping cam fitted above the impulse cam, as shown in Fig. 127.

The function of the slipping cam is to screen two of the gaps in the impulse cam, so that when the dial is actuated and released, a pause, equivalent to two complete impulses,

is made before an impulse is sent, thus definitely providing the time required by the exchange apparatus to find an idle line in all circumstances.

The action of the slipping cam is dependent upon the phosphor-bronze spring washer, which provides sufficient friction to ensure satisfactory action without causing the cam to wear.

Provision is made for the retention or elimination of this feature as required. Such

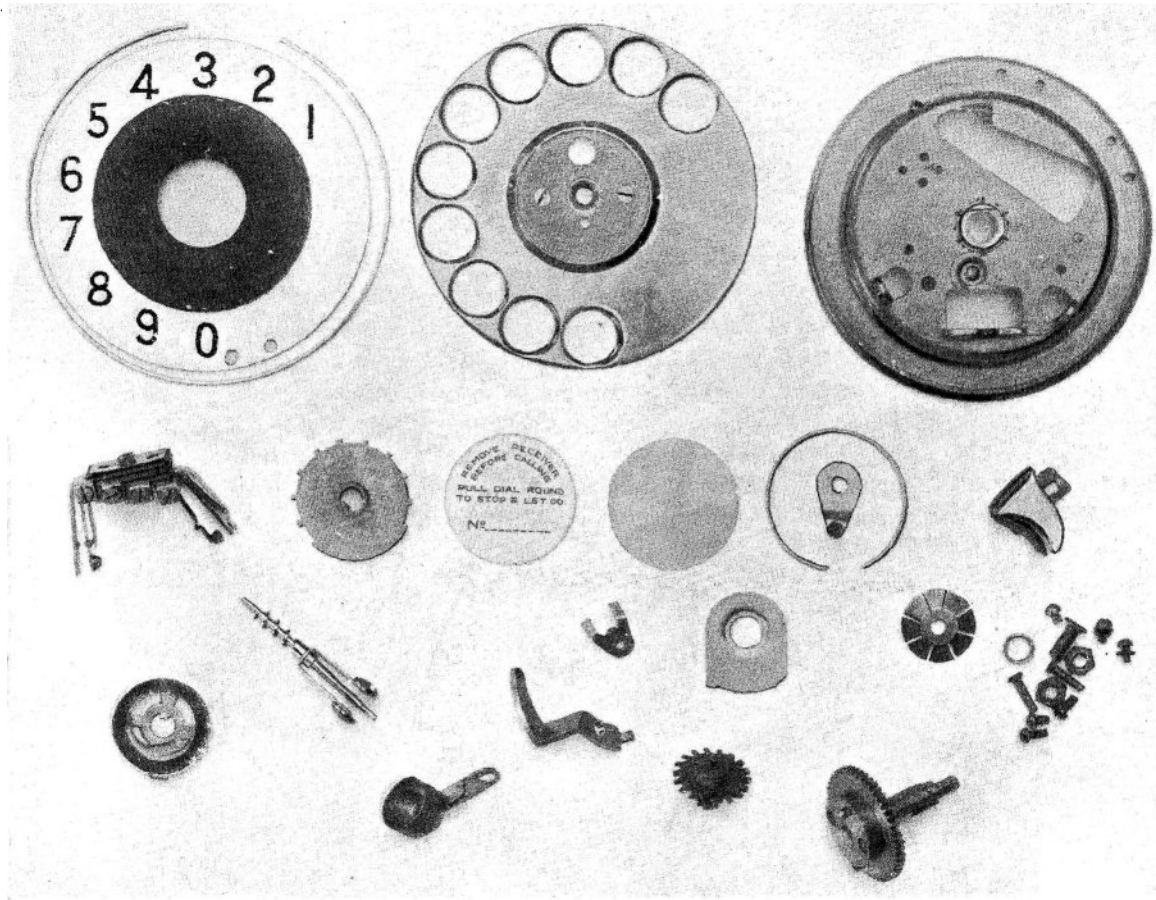


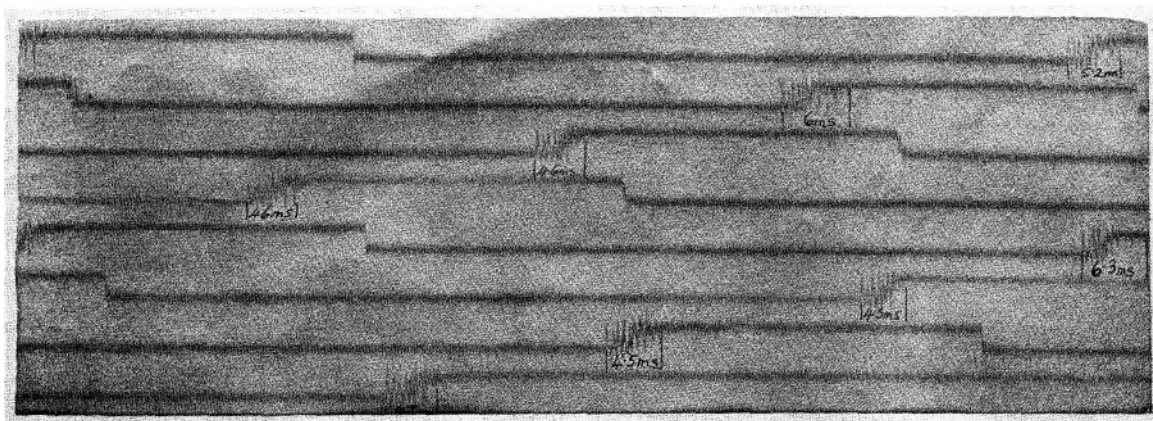
FIG. 129.—P.O. STANDARD DIAL, No. 8. PARTS.

changes are easily effected by altering the position of the finger-stop and the stop for the slipping cam. No additional parts are required, and extra holes are provided for the purpose of making the change.

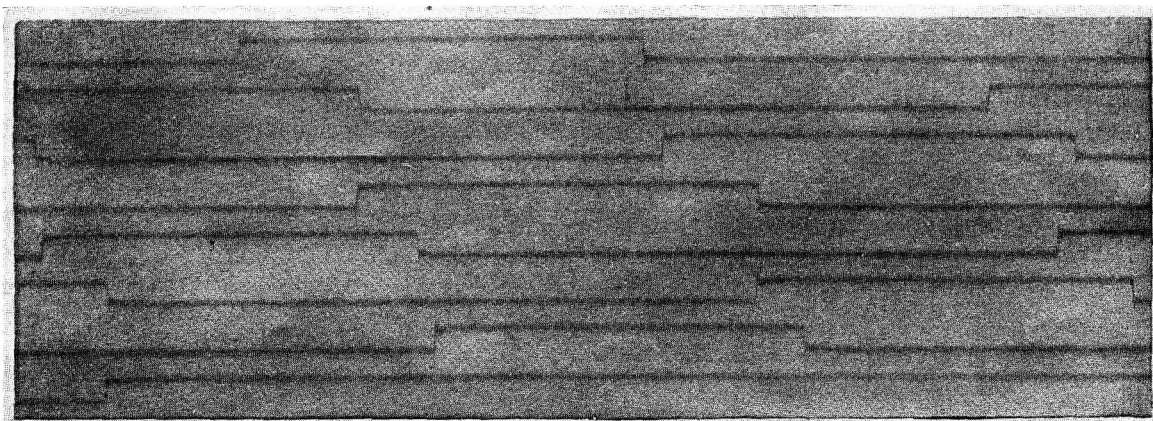
*Speed Control.*—The governor is of the worm and worm-wheel type, so proportioned as to give uniform control over a considerable range of speeds—from 7 to 14 impulses per second. It is difficult to accelerate or retard the dial seriously.

*Accessibility.*—Certain replacements and adjustments can be made without removing the dial from the telephone, or interfering with the running and adjustments.

Upon removal of the wire ring and instruction label, two screw-heads are exposed. The centre screw secures the finger-plate, the other is the spring tension and stop screw. To allow the dial to run down, or to alter the spring tension, the stop screw is slightly withdrawn out of engagement with the fixed stop (the screw may be moved back only a few turns), when any required alterations may be made.



A



B

FIG. 130.—IMPULSE OSCILLOGRAMS.

To change the enamelled number ring, the centre screw is taken out and the finger-plate lifted off. The number ring is held in position by a circular spring wire, on removal of which the former can be lifted out.

To change the impulse cam, main spring, or spring unit, or to make governor adjustments, the dial must be removed from the telephone. After the removal of the finger-plate and number ring, the whole of the interior is open for inspection, including the gearing, which consists simply of a wheel and pinion, and the governor.

The adjustment of the contact springs is as follows :—

Contact pressure at normal	20 to 30 grams.
Tension to lift lower impulse spring only from ebonite pip	
on lever	5 to 10 grams.
Contact opening	14 mils.
Follow of upper impulse spring when contacts close,	
<i>i.e.</i> the distance between the end of the buffer and	
the impulse spring	6 mils.