Siemens Brothers' Standard Dial

A few of the Dials we have supplied to Telephone Administrations in various parts of the World.

Siemens Brothers' Standard Dial

Introduction.

In the whole field of automatic telephony no piece of apparatus is of greater importance than the impulse transmitter, which is more commonly known simply as the "dial." Upon the correct functioning of this mechanism largely depends the reliable operation of all the switching apparatus at the exchange. When, in addition to this fact, it is appreciated that instead of being under the constant supervision of efficient maintenance engineers it is situated at the subscriber's station and is frequently subjected to mishandling by users, it will be evident that it merits the most careful attention, both in design and manufacture.

In the development of our dial every detail has been made the subject of careful and thorough investigation, particular attention being paid to accessibility for repair or replacement of parts liable to accidental damage. The advantages of all existing types of dial have been duly considered in conjunction with the proposed schemes of our own engineers, with the result that we have evolved a dial that is unsurpassed for efficiency and longevity.

In consequence of its robust construction, its regular and sharp impulsing, and its "minimum pause" feature, our dial is generally recognised as being far superior to dials of other makes. This superiority received recognition from the British Post Office some years ago, when they adopted our dial as their standard, and it is interesting to note that despite the utmost efforts on the part of our competitors, it still remains the standard dial.

Among other Administrations which have adopted our dial are those of Australia, New Zealand, Japan, South Africa and Egypt.

Siemens Brothers' Standard Dial

(Code No. 18)

Operation.

The method of operating our No. 18 dial, which differs from our No. 5 dial only in that it is provided with a larger Instruction Card and is fitted with steel washers on both sides of the slipping cam, is the same as that normally employed with impulse transmitters of this type. The subscriber inserts his finger into the hole corresponding to the letter or numeral required and rotates the finger-plate until the finger reaches the fixed stop. The finger is then withdrawn and the dial returns to normal under the tension of the driving spring, simultaneously transmitting to the exchange a series of impulses corresponding to the letter or numeral dialled. This operation is repeated for each letter or numeral in the number required. On each return motion the mechanism is under the control of the governor, which ensures that the rotation takes place at a fixed and uniform speed.

General Construction.

The size of the dial is the same as that of our previous types, having an overall diameter of $3\frac{1}{8}''$ and an overall depth of $1\frac{1}{8}''$. The 3 point fixing has been retained. Since this size and method of fixing is in fairly general use, our dial, besides being suitable for all telephones designed to take our previous types, is also interchangeable with a number of other makes.

A front view of the dial is shown in Fig. 1, from which it can be seen that it is of neat and pleasing appearance and has no exposed screw heads to invite tampering by the subscriber or other unauthorised persons.

The diameter of the finger-holes and the distance between the finger-plate and the number-ring are so arranged that, while there is no difficulty whatever in seeing both the letters and the numerals, the finger is only allowed to enter the hole sufficiently far to ensure easy dialling, and cannot rub against the number-ring behind. The normal finish of the finger-plate is relieved oxidised copper, so that wear round the finger-plate is in no way detrimental to its appearance.

Fig. 1. Front View of the Dial.
(Actual size)

The number ring is white vitreous enamel on copper and cannot be scratched. It is so shaped that it prevents dust from entering the dial—a feature of which the value will be readily appreciated.

The finger-stop is of adequate proportions to withstand rough usage and is secured to the underside of the case so that it can readily be replaced, should occasion arise, without disassembling the dial. It should here be noted that by far the majority of mechanical failures in dials of other makes have been found to be due to damaged finger-stops and plates.

Fig. 2 gives the rear view of the dial, showing the impulse sending and speed governing arrangements. The spring set, being a complete unit, can be removed and replaced without alteration to any of the dial adjustments.

The Drive.

The dial is driven by means of a flat clock spring, which is housed in a spring case in order to retain the lubricant. This type of spring ensures a uniform drive and has a considerably longer life

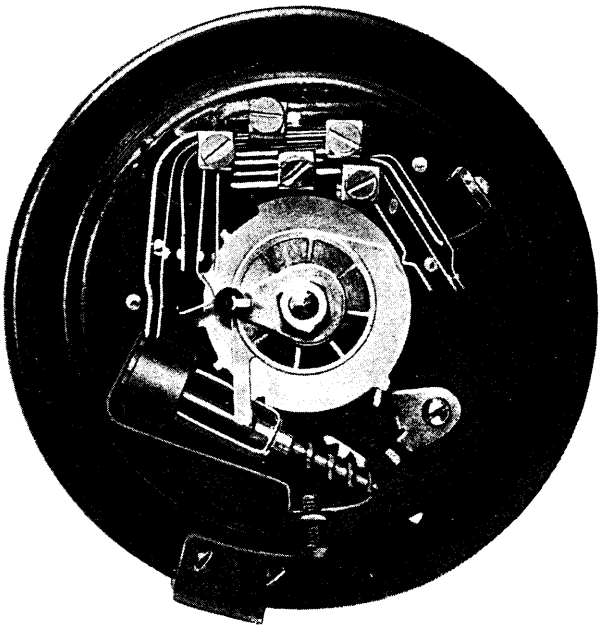

Fig. 2. Rear View of the Dial.
(*Actual size*)

than any other type, besides being better suited to a dial in which the impulse wheel is mounted on the main spindle. The driving spring is tensioned by removing the instruction card, unscrewing the rotary stop and turning the finger-plate. This operation can easily be carried out without removing the dial from the telephone.

Speed Control.

The speed of the dial is of the utmost importance, since it is upon this that the accuracy of the impulses, and consequently also the performance of the selecting apparatus, directly depends. The development of the governor used in our dial is an excellent example of efficient designing. We tested dials from all parts of the world, and found that the governors were invariably developed experimentally and were entirely dependent for the maintenance of a uniform speed on the accuracy of their adjustment. We therefore approached the problem from the opposite direction and by calculating the correct proportions of spring and mass for the rotating members, developed a governor that is remarkably constant in adjustment, and is capable of maintaining uniform speed over as wide a range as from 7 to 14 impulses per second.

The methods developed in this investigation have since been applied to the examination of the governors of numerous other types of dials, which have appeared since the introduction of our No. 5 dial. In no case, however, have we been able to find a governor that will give speed control as efficient as our own.

As can be seen from Fig. 3, the governor is of the worm and worm wheel type and is housed inside the dial case, thus being protected from accidental damage. This type is considered superior to the pinion-driven flat type, owing chiefly to the low speed and necessarily high value of the mass of the latter. The flat type does not respond quickly to varying spring pressures, with the result that changes in spring pressure cause a certain amount of variation in the speed of the dial. Some makes of dial use a lighter governor than that used by us, the speed of rotation in such cases being higher. Such governors, however, have this disadvantage, that, while they may control well at normal speeds, at lower speeds the control is inefficient and the impulses become irregular.

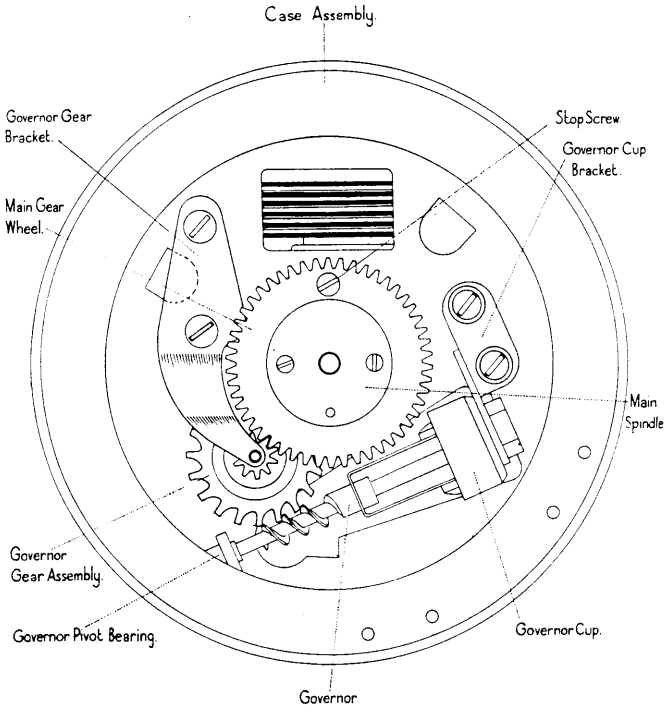

Fig. 3. Front View of the Dial with Finger Plate and Number Ring removed.

NOTE.—We are indebted to the Controller of H.M. Stationery Office for permission to reproduce Figs. 3, 6, 7 & 8. These illustrations were originally published in Post Office Engineering Technical Instructions XXV.