TELEPHONE WORKS
COVENTRY The General Electric Co Ltd ENGLAND
CURRENT COMMENTS
QUARTERLY. OCTOBER, 1930.

The GEC PHONE

Handcombination Telephone.

THE principal features of the new single unit telephone for automatic and manually-operated common battery systems have previously been outlined in this Journal when attention was specially directed to the improved standard of efficiency reached. Reasons for the adoption of this instrument by so many of the leading Administrations are also to be found in its simplicity and adaptability It employs a relatively small number of component parts and serves both as a table and wall instrument. No longer is it necessary to stock a multitude of spare parts for many different types of telephones. The use of this form of instrument not only effects a considerable saving in capital and maintenance expenditure, but also ensures a better class of service to the subscriber.

When required as a desk set it is supplied complete with a 3-conductor cord of generous length and a moulded Bakelite connection strip. If it is desired to mount the instrument on a vertical support, and wall sets are ordered, a suitable bracket of neat design is included. In this event it is usual to dispense with the cord and connection strip, the main wiring being terminated directly in the pedestal. It will thus be seen that there are only three parts which are not common to both forms of instrument.

Although designed primarily as a complete self-contained telephone, it is so arranged that it may conveniently be used in conjunction with a separate bell box on existing systems where, for reasons of economy, it would not be desirable to withdraw from service both pedestals and bell boxes of earlier types. For such work the instrument is supplied without bell and condenser, ready for connecting to a bell box in the usual manner.

The advantage of this method of replacing an ordinary " candlestick " telephone is twofold. Firstly, the attractive features of the handcombination and its greater transmission efficiency are secured immediately Secondly, when renewal of the bell box becomes necessary, the simple addition of the bell and condenser to the pedestal completes the instrument as a single unit. In this manner and with the utmost economy, any system large or small, may be brought into line with modern practice.

The circuits of the standard instrument, with and without dial for use on automatic and manual systems respectively, are shown in Figs. 1 and 2. The remaining diagrams illustrate several methods of using the set either in its complete form or without bell and condenser in conjunction with a separate bell box. In each case T represents a transmitter, R a receiver, IC an induction coil, X a 70 ohm non-inductive resistance wound on the induction coil, K a condenser, SH a switch hook, PR a ringer and D a dial in which IM represents the impulse springs, and ON1 and ON2. the off-normal springs.

When the instrument is employed in its incomplete form, and connected to a bell box comprising a two winding induction coil (IC1), bell and condenser, the circuit conditions will be as shown in Fig. 3. In the complete instrument facilities are provided for connecting an extension bell in the usual manner but Fig. 4 is included to show a convenient method of using an induction coil type of bell box as an extension bell. This arrangement involves changing over one cord connection in the terminal field of the pedestal. Figs. 5 and 6 show the circuit conditions for both forms of instrument when using a bell box consisting of a bell and condenser only or one from which the induction coil has been removed and the connections strapped across. In all these four arrangements where a separate bell box is employed the anti-side tone feature is retained, the instrument is free from howling, and the bells do not " tinkle " during dialling.

Another method is indicated in Fig. 7 where the line terminals of the bell box are connected directly to the line terminals in the pedestal, no alteration to the instrument connections being necessary. On an automatic system there is one disadvantage in this arrangement ; the bell box ringer would " tinkle " during dialling.

The transmitting and receiving efficiencies obtained with the single unit instrument and with the various combinations are given in the following table, and are expressed in miles of standard cable better or worse than British

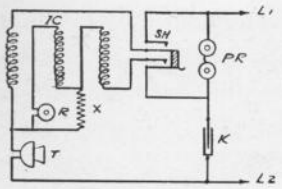

FIG. 1

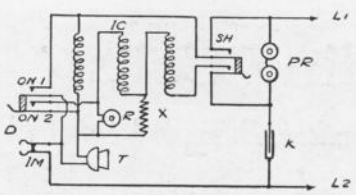

FIG. 2

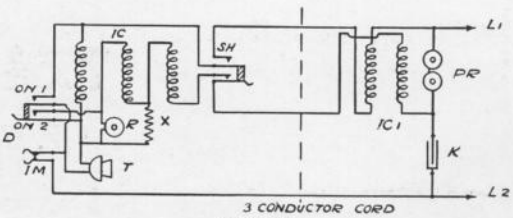

FIG. 3

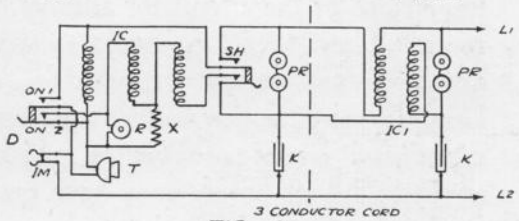

FIG 4

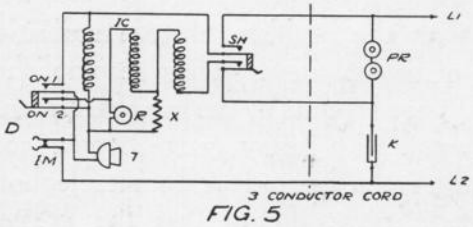

FIG. 5

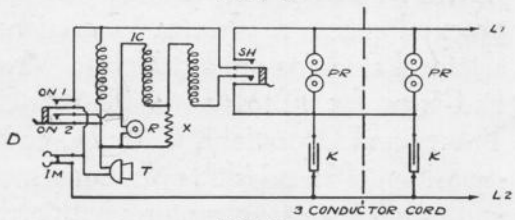

FIG. 6

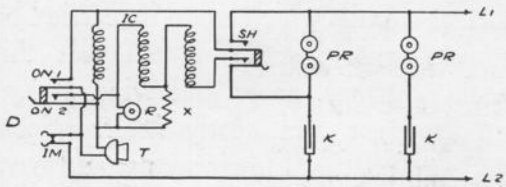

FIG 7

Post Office standards (1 M.S.C. = .92 decibels).

Diagram.	*Transmission.*	*Reception.*
Fig. 1	3 better	1 better
Fig. 2	3 ,,	1 ,,
Fig. 3	6 ,,	1 worse
Fig. 4	6 ,,	equal
Fig. 5	3 ,,	1 better
Fig. 6	4 ,,	1 worse
Fig. 7	4 ,,	1 better

With regard to transmission the British Post Office standard has hitherto been considered unattainable in commercial transmitters, and an allowance of 3.5 M.S.C. worse than standard has been made, representing the average level of efficiency which could be reached in the ordinary solid back type. It will thus be seen from the table that the transmission efficiency of the new instrument is not only superior to that of all earlier types employing solid back transmitters, but is considerably higher than a standard which in the past, it has been virtually impossible for the manufacturer to reach.

In two instances of the use of the instrument with a separate bell box, that is, when the two winding induction coil is retained, and also when the two condensers are included (Figs. 3 and 6), the table shows that there is a tendency for transmission to be improved still further, but at the expense of reception. This is, of course, more satisfactory than the reverse, as an improvement in transmission does not involve an increase in noise level which would accompany an increase in receiving efficiency