

The
GEOPHONE
Handcombination Telephone



The birth of the "candlestick" telephone was coincident with a number of scientific developments of outstanding importance, chief amongst these being the introduction of the well-known solid back transmitter. Since that time, it can truly be said that the use of this subscribers' instrument has become a custom in the telephone world and although everything else appertaining to the art of transmitting speech has been examined, analysed and improved to the utmost possible extent, the amount of attention given to what is, in fact, a most important detail, has indeed appeared small to the casual observer.

On pursuing the matter closely, many reasons will be found to explain the apparent oversight and to mention the most obvious,

it will be appreciated that there has been a certain reluctance on the part of Administrations to adopt new and totally different types of instruments when the most economic practice is to standardise and adhere to one or two definite classes. Before hoping to succeed with the introduction of any new form of subscriber's instrument, the manufacturer has therefore been compelled to effect improvements of such a nature and value that there will no longer be any reason for hesitation in adopting a new standard.

Investigations during recent years proved that the essential feature of any new telephone would be a standard of transmission efficiency not previously reached in the average commercial instrument, in other words, superior

to that of the "candlestick" with solid back transmitter and Bell receiver. In addition, it was realised that simplicity in construction, absolute reliability and longer service life would have to be attained before such an instrument would possess sufficient definite advantages over existing types.

At the same time, the greater appeal of the handcombination indicated that a departure would be necessary from the "candlestick" form, if the new telephone were to receive public approval.

It was then, on these broad lines, that development work proceeded, resulting in the introduction of the **GEOPHONE** Set, a new telephone of outstanding merit, produced by The General Electric Co. Ltd. In design, efficiency and all other respects this instrument definitely meets the requirements which have been outlined and incorporates valuable improvements in every detail.

In the past, different classes of instruments have been used for wall and table purposes and in the latter case, the bell set and pedestal have generally been separate units. To effect the greatest simplicity and to reduce the number of parts to an absolute minimum, the **GEOPHONE** Set has been produced in the form of a complete unit, normally prepared for table use and adapted for wall mounting by the addition of metal brackets. It will thus be seen that this single type, in addition to having the least possible number of parts, actually replaces two forms of instrument, thereby solving many of the problems attending the maintenance of a telephone system. From an economic point of view the value of one standard form of subscriber's instrument cannot be overestimated.

The compact nature of the new telephone

renders it ideal for table use, absolute stability being ensured by the incorporation of the ringer and other parts in the base of the pedestal. This point is, of course, most essential in the automatic type when the act of dialling would tend to displace an instrument of very light construction.

One of the most interesting features is the handcombination in which transmitter and receiver are assembled in a handle consisting of a single Bakelite moulding. The internal connections are moulded in this handle and permanent screw connectors for the cord are provided immediately beneath the transmitter. This permits replacement of the cord in the easiest possible manner.

The new transmitter which is of the inset pattern, provides an improved standard of transmission efficiency and articulation and its design is such that any variation in efficiency is negligible, irrespective of the position in which the handcombination is held. The inset is secured in position by the mouthpiece which can be easily removed by means of a tool which is provided. The transmitter connections are made by spring contacts and replacement of the inset is therefore a simple matter. To prevent adverse effects by varying climatic conditions on the functioning of the transmitter, the carbon and electrodes are contained in a hermetically-sealed capsule. This inset transmitter is of very robust construction throughout and is designed so that it can be taken down completely.

The receiver is also assembled in the form of a single unit and can readily be taken from the moulded handle. Its efficiency is assured by the use of cobalt steel magnets.

A Bakelite moulding forms the main case or pedestal of the instrument and this acts as a complete cover for all internal parts, thus

ensuring the exclusion of dust and foreign matter. A base plate is secured to this case by means of four captive screws and its removal gives access to the whole of the interior.

The various components mounted in the pedestal are disposed in a manner to facilitate their easy adjustment or replacement, the ringer and condenser being fitted on the base plate itself. The handcombination supports or cradle forks, which in all instruments of this type, are liable to receive occasional severe blows, are of the strongest possible design.

Strength and robust construction are also of the greatest importance in the cradle switch which includes a metal plunger operating springs which are positive in action. This unit practically eliminates the possibility of false impulses.

Improvements incorporated in the design of the remaining components are also worthy of notice. The condenser, which has a capacity of two microfarads is manufactured by a special process concluding in a very definite sealing operation and the use of a terminal support of high insulation value. In the ringer, the general characteristics of the British Post Office type have been retained, but its construction has been modified to include convenient mounting details for assembly in the **GEOPHONE** Set.

For use in the anti-side tone circuit of this instrument, an improved form of induction coil has been developed, having a closed laminated iron circuit. It is interesting to note that no wood is used in its construction.

The finest quality in cords is ensured by the use of G.E.C. "Long Life" tinsel conductors and to provide a high degree of insulation between terminals, a connection strip of

moulded Bakelite is employed. A three-conductor instrument cord is fitted, permitting the addition of an extension bell if desired.

When required for use on manual C.B. systems the dial aperture in the front of the pedestal is covered by a suitable dummy, the standard automatic instrument being fitted with the improved British Post Office type of dial manufactured by The General Electric Co. Ltd. and described in the January issue of this Journal. The aperture is prepared in the usual form of bayonet socket, the dial being secured by one screw only.

Mention has already been made of the qualities of the improved type of transmitter which contribute so largely to the high degree of efficiency reached in the **GEOPHONE** Set. The many considerations attaching to the performance of a combined transmitter and receiver, have, in the past, presented innumerable difficulties, but in the new telephone they have been entirely surmounted. It combines the advantages of the handcombination with a new standard of transmission efficiency and articulation. Howling, frying and excessive side tone are definitely eliminated.

In conclusion, this description will not be complete without reference to service life. The **GEOPHONE** Set has been designed expressly for use under the most unfavourable climatic conditions. The black Bakelite mouldings employed are extremely durable and provide a pleasing appearance which is permanent.

Materials and finishes for the whole of the components have also been carefully chosen in the light of previous experience and the closest investigation. The **GEOPHONE** Set is in fact the ideal telephone for tropical use.