PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventor: KENNETH CEDRIC ARTHUR KING

912,250

Date of Application and filing Complete Specification April 8, 1961.

No. 12742/61.

Complete Specification Published Dec. 5, 1962.

Index at acceptance: —Class 40(4), E15X, R22A.

International Classification: —**H04m.**

COMPLETE SPECIFICATION

Improvements in and relating to Electrical Apparatus

We, TELEPHONE MANUFACTURING COMPANY LIMITED, a British Company, of Hollingsworth Works, Martell Road, West Dulwich, London, S.E.21, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to telephone apparatus and in particular to telephone apparatus for use in so-called secret communication systems in which the speech signals are modified to render them unintelligible to an unauthorised person.

According to the invention, there is provided telephone apparatus for secrecy communication over a normal telephone circuit including a conventional telephone instrument, said apparatus comprising a secrecy telephone instrument incorporating a transmitter, a coupling device, and speed signal scrambling means between said transmitter and coupling device, and having a support base adapted to receive and support the handset of said conventional telephone instrument and to couple said coupling device to the speech circuit of said handset when the latter is received and supported by said base.

By a normal telephone circuit including a conventional telephone instrument is intended any telephone circuit primarily designed for normal speech communication and terminating at at least one point in a telephone instrument having a handset which is, in normal use, lifted by a telephone user and applied to the ear. It may thus be of the modern hand microtelephone type having a transmittter and receiver mounted in a removable handset, or of the older type in which the transmitter is attached to the support base or stand and only the earpiece is removable as the handset. Furthermore, by speech signal scrambling means is intended means operative to render speech signals unintelligible to an unauthorised listener.

The various features and advantages of the invention will be apparent from the following description of preferred embodiments thereof given by way of example and illustrated in the accompanying drawings, of which:—

Figure 1 is a perspective view of a secrecy telephone instrument in accordance with the invention,

Figure 2 is a block schematic circuit diagram of the apparatus included in the speech path of the instrument of Figure 1, and

Figure 3 is a block schematic circuit diagram of an alternative form of such apparatus.

In the preferred embodiment of the invention the secrecy instrument is intended for use in conjunction with a standard British Post Office type hand microtelephone. It comprises a supporting base 1, having recesses 2 and 3 which serve to accommodate the transmitter and receiver housings respectively of the standard hand microtelephone. Each of these recesses preferably has a lining of sound-absorbent resilient material serving to seal off the earpiece and mouthpiece of the handset of the conventional instrument, when in the position shown in Figure 1, such that they are acoustically isolated as regards sounds in the room or other enclosure in which the instrument is located. The resilient material also serves to hold the handset firmly in position on the secrecy instrument.

It is convenient also to provide a spring clip (not shown) to hold the handset in position, the main use of this clip being to retain the secrecy handset firmly on its associated base when not in use or when in transit.

The supporting base 1 houses at least one coupling device and the electrical apparatus required to modulate or scramble the outgoing speech and to demodulate the

incoming speech. Conveniently, the apparatus is provided with power from a small battery housed in the base 1, the battery being connected into circuit by means of an ON/OFF switch 4 mounted on the base or, alternatively, by a "Pressel" switch (not shown) in the handle portion of the handset which automatically switches the battery into circuit when the handle is grasped in use.

A further alternative is the provision of a switch in one of the recesses, this switch being operated automatically by the direct action of pressing the standard handset into the recess. The secrecy handset in this case is so shaped that it does not operate the switch when housed in the base.

The secrecy handset 5 is connected electrically to the apparatus in the base 1 by means of a cord 6.

To use the apparatus for a secrecy call, the transmitter 7 and the receiver 8 of the handset 9 of the standard telephone 10 are pressed into the recesses in the base 1, the secrecy handset 5 having first been removed.

The placing of the standard instrument handset in the recesses of the secrecy instrument couples the transmitter and receiver of the secrecy handset into the speech circuit of the standard instrument via the scrambling and unscrambling circuits and the coupling device. Thus speech entering the handset in use is rendered unintelligible before it is transmitted from the conventional instrument to the switchboard or exchange and unauthorised listening at either of these locations is prevented.

Incoming scrambled speech is unscrambled in the demodulating circuit before it reaches the secrecy handset but remains unintelligible to unauthorised listeners at any point in the line circuit behind the secrecy instrument.

It will be readily apparent that, with the two instruments the user can exercise a choice as to whether to conduct a conversation in normal fashion using only the standard instrument, or with secrecy, using the secrecy instrument and can, if required, change from normal to secret conversation in the middle of a conversation. In secrecy communication, the conventional handset is lifted from the cradle of the standard instrument and placed on the base 1 in the manner described, the secrecy handset associated with the latter then being used in the normal manner.

A block schematic circuit diagram of a preferred form of the apparatus is given in Figure 2. Speech from the microphone 12 of the secrcy handset passes through filter 13, which limits the speech frequency band, to a modulator 14 driven by an oscillator 15. The filter 13 conveniently has a pass-band of 200 to 2300 cycles per second (c.p.s.) and the oscillator has a frequency of 2500 c.p.s. The lower of the two sidebands produced by modulation is selected by a further filter 16. Due to this modulation process, the speech signals are "inverted" in frequency and, as such, are unintelligible. The modulated speech is then amplified at 17 and fed to coupling coil 19 via a hybrid circuit 18. The magnetic field produced by the coupling coil is sufficient to cause energisation of the winding of the earpiece 8 of the standard handset 9. In this manner, the earpiece 8 acts as a magnetic pick-up and transmits the speech signals over the telephone line 20 via the circuit associated with the standard instrument 10.

In this form of apparatus, the microphone 7 of the conventional handset is not used during secrecy communication. It is effectively rendered "dead" by the surrounding and enclosing resilient material of the housing recess 2.

Incoming scrambled speech over the line 20 is received on the earpiece 8 and is transmitted by magnetic induction to the demodulator 21 via the hybrid circuit 18. The unwanted frequencies arising as a result of demodulation are rejected by a filter 22 and the resulting intelligible speech is amplified at 23 and rendered audible by the earpiece 11 of the secrecy handset. Conveniently, all the filters have the same pass-band.

The circuit of an alternative, but more expensive, form of apparatus is given in Figure 3. In this form of apparatus, the modulated speech from the amplifier 17 is converted into sound energy by an earpiece-type "loudspeaker" serving as one part of the coupling device and housed in the bottom of the recess 2 of the base 1 (Figure 1). This sound energy is re-converted to electrical energy by the adjacent microphone 7 and fed to line 20 via the circuit of the standard instrument 10.

Incoming speech signals are converted into sound energy in the normal way by the earpiece 8 and re-converted into electrical signals by an adjacent microphone 25 serving as the other part of the coupling device and housed in the bottom of the recess 3. These signals are then demodulated and fed to the earpiece 11 in the manner described in connection with Figure 2.

WHAT WE CLAIM IS:—

1. Telephone apparatus for secrecy communication over a normal telephone circuit including a conventional telephone instrument, said apparatus comprising a secrecy telephone instrument incorporating a transmitter, a coupling device, and speech signal scrambling means between said transmitter and coupling device, and having a support base adapted to receive and support the handset of said conventional telephone instrument and to couple said coupling device

to the speech circuit of said handset when the latter is received and supported by said base.

2. Apparatus as claimed in Claim 1 in which said secrecy instrument incorporates speech signal unscrambling means between said coupling device and the receiver of the instrument.

3. Apparatus as claimed in Claim 1 or 2 in which the support base is formed with recesses serving to receive the earpiece and mouthpiece of a conventional hand microtelephone type handset when placed upon said base.

4. Apparatus as claimed in Claim 3 in which resilient sound absorbent material is disposed in at least one of said recesses so as to be engaged by the mouthpiece of the conventional handset when seated on the base and serving acoustically to isolate such mouthpiece.

5. Apparatus as claimed in Claim 4 in which the sound absorbent material is disposed in both recesses.

6. Apparatus as claimed in Claim 3, 4 or 5 in which the coupling device is located in one of said recesses to couple to the earpiece of the conventional handset when placed on said base in predetermined orientation.

7. Apparatus as claimed in Claim 3, 4 or 5 and having two coupling transducers disposed one in each of said two recesses so as to provide coupling to the earpiece of the conventional handset when placed on the base.

8. Apparatus as claimed in any one of the preceding claims in which the secrecy circuits are arranged to be rendered effective in response to the placing of the conventional handset on the support base.

9. Apparatus as claimed in Claim 8 in which said support base incorporates a switch arranged to control energisation of said secrecy circuits and disposed to be actuated by the weight of a conventional handset placed on said support base.

10. Telephone apparatus for secrecy communication substantially as herein described with reference to the accompanying drawings.

A. A. THORNTON & CO.,
Agents for Applicants.

Leamington Spa: Printed for Her Majesty's Stationery Office by the Courier Press.—1962.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

912250 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

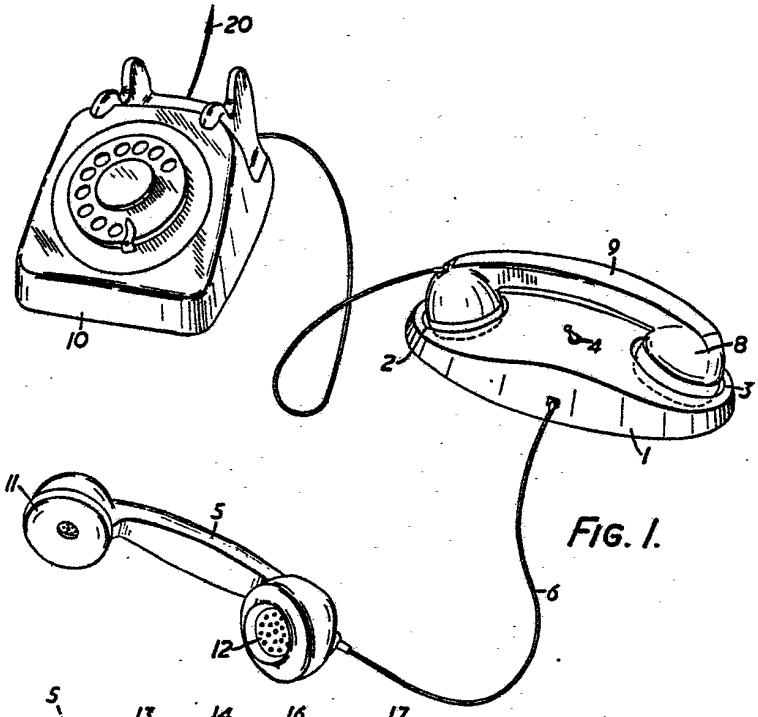

FIG. 1.

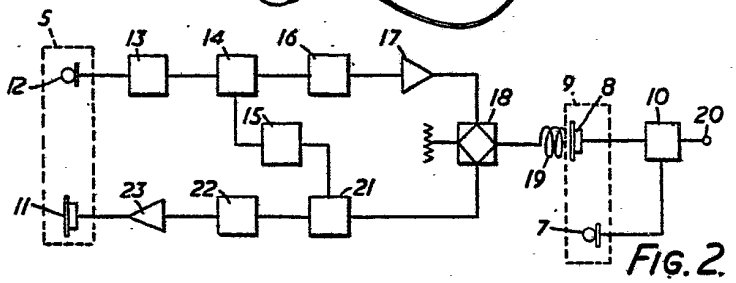

FIG. 2.

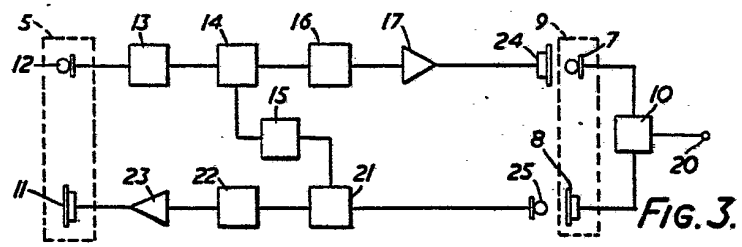

FIG. 3.