

THE POST OFFICE ELECTRICAL ENGINEERS' JOURNAL



Vol. 58 Part 1

APRIL 1965

Field Trial of the Trimphone—Telephone No. 712

F. E. I. TROKE, A.M.I.E.E.†

U.D.C. 621.395.721.4

A new type of telephone incorporating several novel features and having a very modern appearance is undergoing field trial. The instrument has a handset of unique design and utilizes a tone caller instead of a magneto bell.

INTRODUCTION

IN accordance with its revised commercial outlook the Post Office is to offer an alternative telephone instrument. The modern design, approved by the Council of Industrial Design, incorporates the novel features of dial illumination, tone calling, and a unique handset—features which give rise to its name, Trimphone, from the initial letters of Tone Ringing Illuminated Model. The complete instrument, known as Telephone No. 712, is illustrated in Fig. 1.



FIG. 1—TELEPHONE NO. 712

DESCRIPTION OF TELEPHONE NO. 712

The Handset

The whole design concept of the new telephone arises from the unique handset (coded Handset No. 8), which in turn is based upon the light-weight headset used by operators and known as Headset No. 1.¹ The small transducers (Inset Receiver No. 3T and Transmitter No. 15) are mounted adjacent to one another in the earpiece cavity, the transmitter being coupled to the mouthpiece by an acoustic horn (Fig. 2). The handset

†Subscribers' Apparatus and Miscellaneous Services Branch, E.-in-C.'s Office.

¹SPENCER, H. J. C., and ROBERTON, J. S. P. A Light-Weight Headset for Telephone Operators. *P.O.E.E.J.*, Vol. 53, p. 177, Oct. 1960.

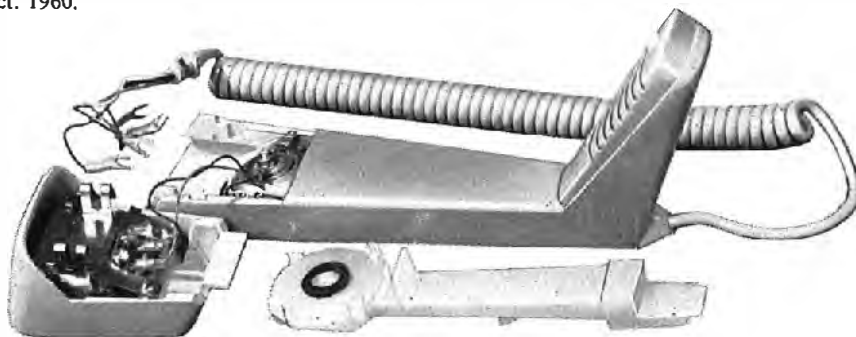


FIG. 2—HANDSET NO. 8 DISMANTLED, SHOWING AN ADDITIONAL ACOUSTIC HORN

parts are moulded in acrylonitrile butadiene styrene (ABS), a tough thermoplastic with a good surface finish that is currently used for Telephone No. 706 mouldings. The mouthpiece grid is located by a lug and attached by a screw that is then obscured by a polypropylene button; this button also has the function of preventing chafing where the mouthpiece rests on the body of the telephone. The acoustic horn, of toughened polystyrene, is fixed within the handset by adhesive; its lower end is sealed to the mouthpiece cavity, and at the top end the transmitter is held by four lugs, the interface being sealed by a neoprene washer. The horn insert provides acoustic coupling between the mouthpiece cavity and the transmitter, equalizing the frequency response in the same way as the horn in the Headset No. 1. The receiver is retained in position by a metal plate and a rubber-ring seal between the receiver and the earpiece. Two lugs, which are an extension of the metal plate, clip the earpiece on to the handle by engaging behind two moulded bosses; a special tool, which can be inserted in the joint-line, is required to release these clips. A light-weight helical cord, with four conductors and a p.v.c. covering, connects the handset to the body of the telephone.

The Telephone Body

The cover of the telephone body, moulded in ABS, is attached to the toughened-polystyrene base-plate moulding by three screws, which are inserted from the under-side as shown in Fig. 3. The gravity-switch bar, moulded from smoke-tinted polycarbonate to match the dial finger-plate, passes freely through two holes in the cover and is attached by a pivot rod to a bellcrank. The gravity-switch spring-set is mounted on a metal bracket attached to the cover; this bracket is extended to form two knife-edge bearings for the bellcrank, and a helical spring between the two parts keeps them in close contact and provides the restoring force for the gravity-switch bar.

The dial (Fig. 3) is mounted on the base plate and protrudes through a close-fitting hole in the cover; to permit alignment it is flexibly mounted by a three-legged p.v.c. moulding. The pulse mechanism is identical to that of the Dial No. 21, but the body is modified to contain a luminescent tube behind a translucent number-ring. A thin coating of aluminium is vacuum-deposited on the surface of the cavity within which the tube is fitted; the coating provides a highly efficient reflector to make the best use of the light emitted by the tube. This is a sealed glass tube that has a fluorescent coating on the inner surface and is filled with a small

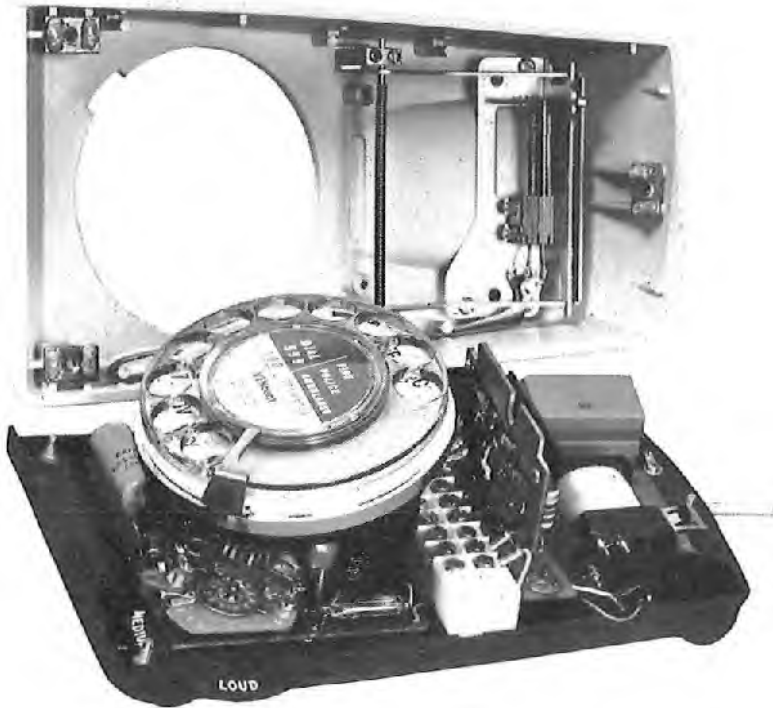


FIG. 3—TELEPHONE NO. 712 WITH COVER REMOVED

quantity of tritium, a low-intensity radioactive gas (an isotope of hydrogen). The low-energy Beta radiation energizes the fluorescent coating and is then absorbed by the glass. The secondary radiation (Bremsstrahlung) which then arises has been confirmed by both the Post Office Radiological Officer and the Radiological Protection Service to be much less than the recommended maximum for luminous wrist watches. The tube is expected to have a useful life of at least 10 years. The illumination, although unnoticeable under normal levels of incident light, is ample to enable the telephone to be located and used in the dark. The fingerplate, transparent to avoid masking the low-level illumination as well as being an attractive design feature, is moulded in smoke-tinted polycarbonate, a tough thermoplastic.

For those installations requiring a single press-button, a micro-switch with a change-over contact can be mounted at the front of the baseplate with its polycarbonate press-bar projecting beneath the front edge of the cover. The 4-way line-cord enters the baseplate at the rear edge, whereas the handset cord enters at the side, conventionally from the left, but it may be transferred to the right if preferred.

The Tone Caller

Beneath the dial is mounted the printed-wiring board of the tone caller (Fig. 4), which is used instead of the more usual magneto bell; it emits a pleasantly-modulated tone, the volume of which is adjustable. The tone-caller circuit (Fig. 5) consists of a single-stage transistor oscillator tuned to about 2,000 c/s, the basic waveform being modulated by the ringing frequency. The output feeds a modified rocking-armature receiver that is positioned by the circuit board above an orifice in the base. The diode D1 acts as a half-wave rectifier of the incoming ringing current, resistor R1 and capacitor C1 smooth the waveform, resistor R3, with other resistors in

the circuit, controls the bias applied to the transistor, and the frequency of oscillation of the circuit is determined by capacitor C3 and the inductance of the receiver. Thermistor TH1, diode D2 and capacitor C2 provide a threshold to guard the circuit against false operation by random pulses on the line. Thermistor TH2 in parallel with resistor R4 delays the build-up of the volume if the LOUD or MEDIUM settings of the volume-control are used, and resistors R5 and R6 attenuate the output for MEDIUM and SOFT settings of the volume control. The knurled edge of the control knob projects through a slot in the rim of the baseplate so that it is just visible beneath the edge of the cover. Instead of a bell on/off switch, a locking screw can be withdrawn from the volume control, permitting the knob to be turned to an OFF position. The shunt resistor R2 is incorporated to improve the performance of an additional magneto bell, which may be connected in series with the tone caller if required.

Circuit Arrangement

The circuit of the Telephone No. 712 is the same as that of the basic Telephone No. 706, incorporating the Induction Coil

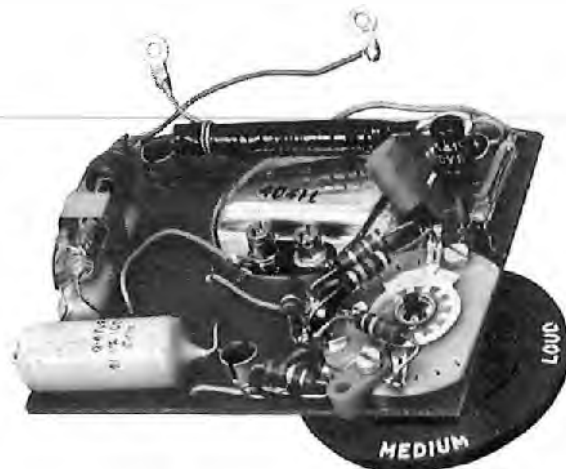


FIG. 4—TONE-CALLER UNIT FOR TELEPHONE NO. 712

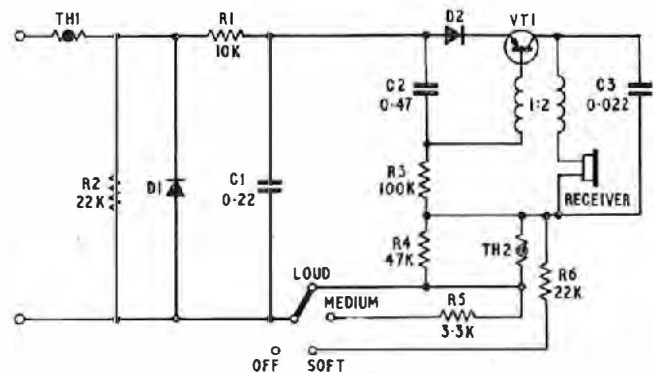


FIG. 5—CIRCUIT OF TONE CALLER

No. 31, and Regulator No. 1A, but, to economize in space, three $0.9 \mu\text{F}$ capacitors of metallized polyester film encased in polypropylene are used instead of the larger $1.8 + 0.9 \mu\text{F}$ unit used in the Telephone No. 706.² The same 19 terminals are provided to facilitate connexion of the new telephone as an alternative to the Telephone No. 706 in extension plans in accordance with standard arrangements.

PERFORMANCE

It is essential that the transmission performance of the new telephone should be at least as good as that of the Telephone No. 706. Exhaustive tests at the Post Office Research Station, using loudness comparisons by trained crews, measurements of pure-tone sensitivity/frequency characteristics, and conversation tests in which subjects are permitted to hold the handset as they wish, show that

²SPENCER, H. J. C., and WILSON, F. A. The New 700-Type Table Telephone—Telephone No. 706. *P.O.E.E.J.*, Vol. 52, p. 1, Apr. 1959.

the performance of the new instrument is comparable to that of the Handset No. 3.

FIELD TRIAL

Production of this new telephone commenced in the early part of 1965, and an initial quantity of 1,000 is to be accepted by the Post Office. These will be offered to selected customers on a trial basis in order that the validity of the radical design can be proven in use by members of the public. The first contract will be completed later in the year with any modifications which the field trial may show to be necessary. It will then become freely available with a choice of three two-tone colour schemes: grey-white, grey-green, and two-tone blue.

ACKNOWLEDGEMENT

The new telephone has been developed for the Post Office by Standard Telephones and Cables, Ltd., under the British Telephone Technical Development Committee procedure.