E4819 OR 2,482,148 SEARCH ROOM

Sept. 20, 1949. C. BECKMAN ET AL 2,482,148

ELECTRODYNAMIC TELEPHONE HANDSET

Filed Sept. 10, 1945

Fig. 1

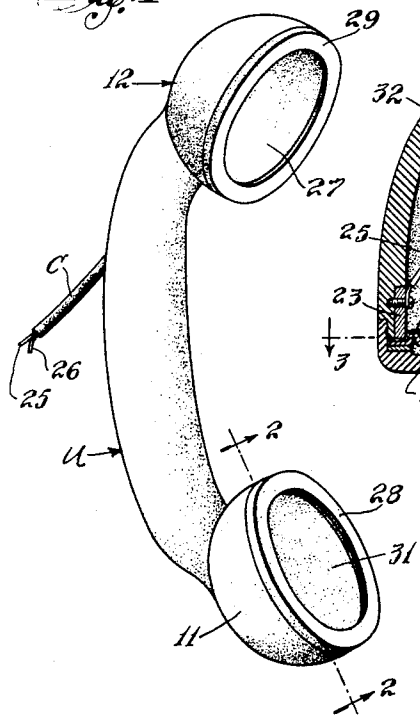


Fig. 2

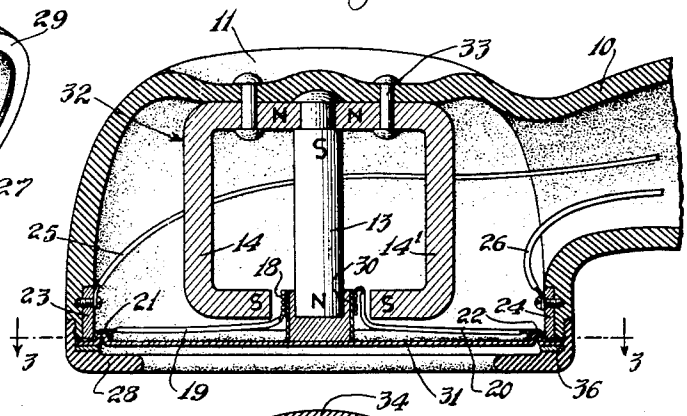


Fig. 3

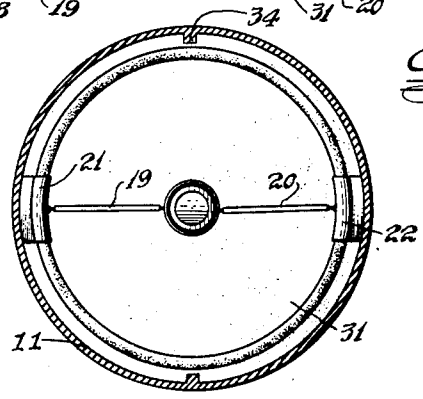


Fig. 4

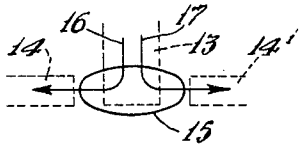


Fig. 5

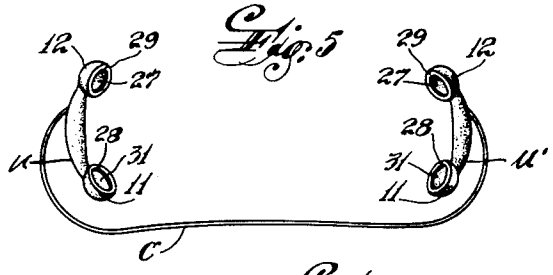


Fig. 6

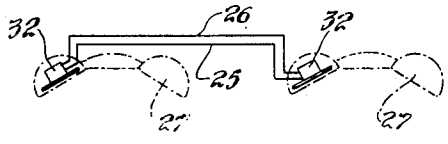
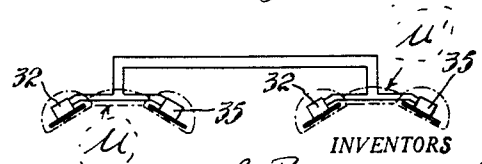


Fig. 7



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ELECTRODYNAMIC TELEPHONE HANDSET

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2 Claims. (Cl. 179—115.5)

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This invention relates to improvements in telephone systems such as are used to communicate sound from a point of origin to a point removed therefrom.

In the conventional telephone systems an external source of power is incorporated in the telephone circuit and is essential for the actuation of the telephone instruments and for the reproduction of the sound waves in the receiving telephone.

Attempts have been made in the prior art to provide telephone systems dispensing with an external source of power, by connecting the diaphragms of sending and receiving instruments with a taut cord or the like. Such systems have been found to be inefficient and to have the obvious objection that the telephone instruments had to be held taut to avoid damping the sound waves.

The object of our invention is to provide a telephone system wherein no external source of power is used, wherein the telephone instruments may be freely held and moved in use, and wherein the transmission of sound is obtained in an efficient, accurate and faithful manner.

A further object of the invention is to provide a telephone system which is self-sufficient, is powered by the sound waves to be transmitted and wherein the sound is transmitted and faithfully reproduced in telephone instruments of novel design.

Further advantageous objects attained by the use of our invention will become apparent from a consideration of the following description and the accompanying drawings, in which:

Fig. 1 is a side elevational view of a telephone unit embodying our invention,

Fig. 2 is an enlarged, fragmentary sectional view thereof, taken on line 2—2 of Fig. 1,

Fig. 3 is a horizontal sectional view, taken on line 3—3 of Fig. 2,

Fig. 4 is a diagrammatic view of a principle utilized in carrying out our invention,

Fig. 5 is an elevational view of a telephone system embodying our invention,

Fig. 6 is a diagrammatic view thereof, and

Fig. 7 is a diagrammatic view of another form of our invention.

In the drawings, Figs. 1–6 illustrate a form of our invention wherein the telephone unit U of the system embodying our invention comprises a tubular hollow casing 10 terminating in sound chambers 11 and 12 with which casing 10 is in open communication. Chamber 11 is provided with sound transmitting means generally designated as 32, chamber 12 being provided with an outer cap or ring 29, preferably of resilient material.

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Transmitter 32 comprises permanent magnet members 13, 14 and 14' fixed to the chamber 11 by any suitable means as by rivets 33, so that the member 13 will be medially disposed in said chamber with the free end N thereof spaced from the free ends S of members 14, 14' which are arranged in radially spaced relation thereto. The magnet members 13, 14 and 14' are preferably made of a highly magnetized alloy which will provide a permanent intense magnetic field 15 around the free end N of member 13, said field 15 being defined by the magnetic lines 16, 17 flowing radially from member 13 as shown in Fig. 4.

A diaphragm 31, preferably made of paper, plastic or other suitable non-metallic material, is peripherally held in the chamber 11 adjacent the open end thereof by a screw cap 28 or the like; gasket 36 is preferably interposed between the cap 28 and diaphragm 31. A wire coil 18 is fixed to an open spool 30 medially mounted on the diaphragm as shown in Fig. 2. The coil 30 is thus positioned in the intense magnetic field 15 of the permanent magnet members so that in reciprocating in said field responsive to the vibrations of diaphragm 31 (when words or other sounds are directed against the diaphragm) pulsations of current will be induced in the coil 18 as will be apparent to those skilled in this art. The opposite ends of coil 18 are connected to lead wires 25, 26 directly, or, as shown in Fig. 2, by connecting said lead wires to inserts 23, 24 molded in or otherwise affixed to the chamber 11. The free ends 19, 20 of coil 18 are connected to said inserts in any desired or convenient manner, as by baring and positioning said ends atop foil strips 21, 22 secured to the diaphragm 31 adjacent the periphery thereof, (or by securing the same to said foil strips) for contact and registry with the inserts 23, 24 on assembly of the parts as shown in Fig. 2. The chamber 11 and the diaphragm 31 may be provided with complementary keying means 34 to assure the proper registry of the parts on assembly. The structure described and shown in Figs. 1 and 2 provides a telephone unit U adapted to be manually or otherwise held with the speaking or transmitting end 11 adjacent the user's mouth; the cable C containing the lead wires 25, 26 of the wire coil carries the current induced in the coil by the vibrations of diaphragm 31.

Diaphragm 31 may likewise be vibrated re-

sponsive to current flowing into coil 18 through the cable C to set up sound waves in the unit U which will flow through the tubular hollow casing 10 to the listening or receiving chamber 12 and to the listener's ear. In the form shown in Figs. 1–6 the chamber 12 is a hollow member as generally indicated at 27.

The unit U is a complete telephone unit; by providing a unit U' of identical structure therewith, and connecting the wire coils of the transmitter members 32 of units U, U' as shown in Figs. 5 and 6, we have provided a complete telephone system for communicating sound between telephone units U and U', utilizing no external source of power for that purpose; the vibrations of diaphragm 31 in one telephone unit induce current carried by cable C to the other unit to reproduce the sound in the latter. We have found that the arrangement described provides an efficient telephone system which does not require the use of an external source of power.

In the arrangement shown in Fig. 7, the chamber 12 of each unit in the system contains a transmitter member 35 which is a duplicate of transmitter member 32 in chamber 11. In the system shown in Fig. 7, as in that of Figs. 1–6, no external source of power is used between the units U and U', the vibrations of the diaphragm in member 32 of unit U being reproduced in member 35 of unit U' (and vice versa).

The parts described may be made of any suitable material; the uses of the system are many and obvious.

The telephone units shown in Fig. 6 are connected in parallel, while those in Fig. 7 are connected in series.

Having thus described our invention what we claim as new and desire to secure by Letters Patent, is:

1. In a telephone system including a pair of telephone units, each comprising a tubular hollow-casing and sound chambers in open communication therewith, a combined speaking and sound-transmitting unit in one of the sound chambers of each telephone unit, the said combined speaking and sound-transmitting unit comprising a flat diaphragm, a wire coil fixed to the diaphragm, permanent magnetic members in the chamber juxtaposed relative to the wire coil so as to set up an intense magnetic field in which the wire coil may vibrate responsively to vibrations of the diaphragm for inducing a current in the coil, a pair of binding posts diametrically oppositely mounted in the casing of the said sound chamber, oppositely extending conductors from the wire coil to the casing attached to the binding posts, and leads passing from the binding posts through the hollow casing for transmission of current induced in the coil.

2. In a telephone system including a pair of

telephone units, each comprising a tubular hollow casing, sound chambers in open communication therewith and sound-transmitting means in one of the sound chambers, the said sound-transmitting means including a combined speaking and receiving unit in one of the chambers of each telephone unit, the said unit including oppositely disposed fixed magnets including complementary permanent magnetic brackets relatively disposed to form a substantially hollow rectangle but having ends of like polarity spaced apart but in adjacent relation, means rigidly connecting an adjacent pair of ends of like polarity to the casing of the chamber with opposite pair of ends of like polarity maintained freely spaced, a further permanent magnetic bar unit interposed between the said magnetic brackets with ends of opposite polarity relative to said pairs of ends of the magnetic brackets disposed in the space between the said magnetic brackets for closing and maintaining a closed magnetic field around the brackets, the said magnetic bar unit having a free end disposed between the free pair of ends of the said magnetic brackets, the ends of the said magnetic bar unit being adjacent to each pair of ends of the magnetic brackets but of opposite polarity relative thereto, a flat diaphragm, means peripherally holding the diaphragm, a wire coil carried by the diaphragm, an open spool medially mounted on the diaphragm and adapted to receive the free end of the said magnetic bar unit, the wire coil being fixed to the said spool and thereby positioned in the said magntic field, a pair of binding posts mounted in the casing of the sound chamber, oppositely extending conductors from the wire coil to the casing attached to the binding posts and leads passing from the binding posts through the hollow-casing for transmission of current induced in the coil.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
230,924	Coombs	Aug. 10, 1880
1,604,149	Dix	Oct. 26, 1926
2,083,537	Abrahams	June 15, 1937
2,098,402	Reifsteck et al.	Nov. 9, 1937
2,109,761	Warnke	Mar. 1, 1938
2,162,270	Mott	June 13, 1939
2,255,840	Woolf	Sept. 16, 1941

FOREIGN PATENTS

Number	Country	Date
374,946	Great Britain	June 20, 1932