Dec. 20, 1949 W. C. BAILEY ET AL 2,492,125

BUZZER IN TELEPHONE RECEIVER FOR SIGNALING

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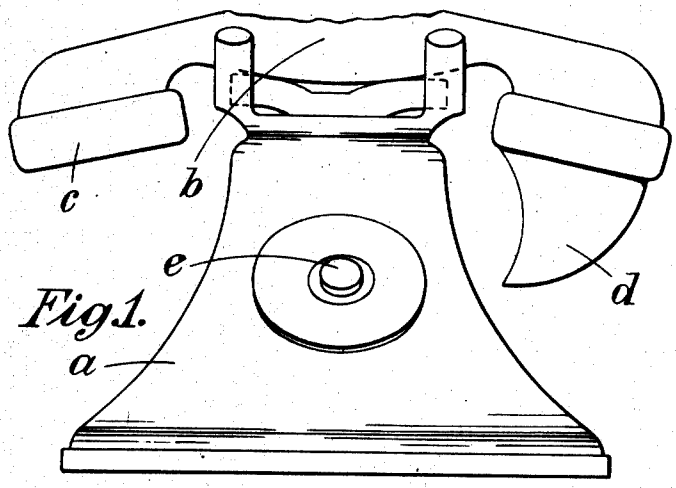


Fig.1.

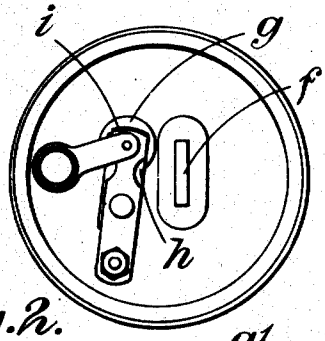


Fig.2.

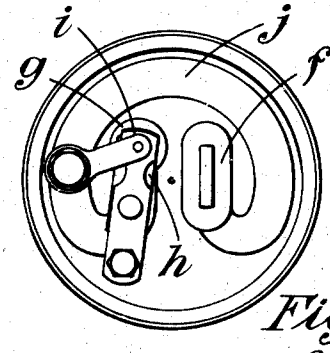


Fig.3.

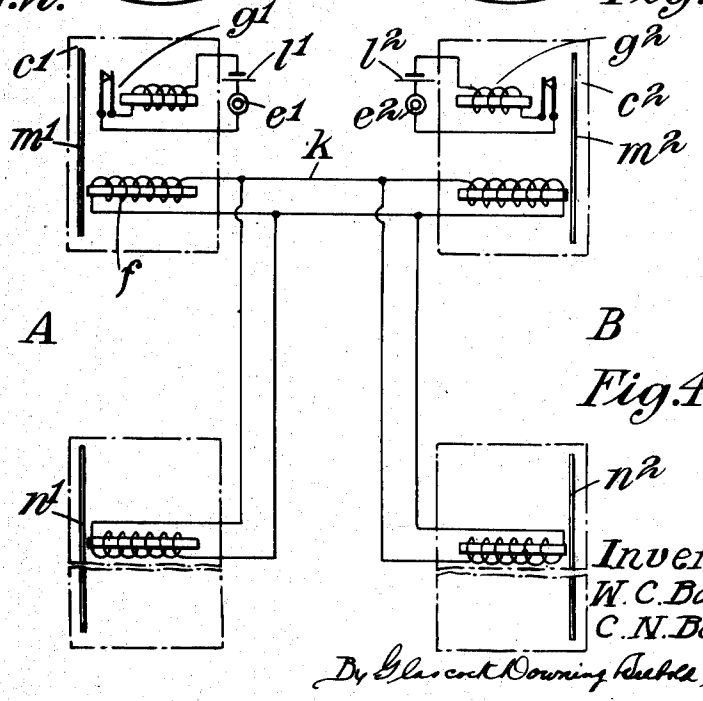


Fig.4.

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BUZZER IN TELEPHONE RECEIVER FOR SIGNALING

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5 Claims. (Cl. 179—118)

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This invention relates to telephone apparatus of the Bell-type intended to be connected to a line for the transmission of speech without the use of a source of current, the object of the invention being to simplify telephone systems of this type and to reduce their cost of manufacture and maintenance to a minimum.

The main feature of the invention consists in that the ear-piece of a telephone receiver of the Bell-type encloses a buzzer inserted in a local electric circuit which is entirely separate from the electrical transmission line, so that when the buzzer is locally operated the air vibrations produced by it within the ear-piece will cause the diaphragm of the receiver to vibrate and by its to and fro movements vary the magnetic flux in the core associated therewith, thereby transmitting the calling signal to the other end of the transmission line.

The buzzer unit is of the well-known construction comprising an electromagnet, vibrating armature and a spring make-and-break contact. The vibrating armature may vibrate clear of the diaphragm, or it may make contact therewith so as to communicate its vibrations thereto.

The core of the buzzer electromagnet may be magnetically separate from the core of the telephone receiver, or the two cores may be constituted by the two pole ends of one and the same electromagnet, preferably of a horse-shoe magnet, the coils thereof being, of course, connected to their respective and entirely separate circuits.

An additional feature of the invention consists in that the telephone receiver is adapted to act also as a transmitter in the manner of the well-known Bell telephone system. In the latter system in which both the transmitter and the receiver comprise an electromagnet and a diaphragm of magnetic material, it was necessary to place the instrument alternately to the mouth and ear for transmitting and receiving alternately or there were two separate instruments of the same construction, one for receiving and the other for transmitting. In the present invention the casing of the ear-piece is extended radially by a tubular arm terminating in a mouth-piece which is located in front of the mouth of a person using the ear-piece and wherein there is accommodated an electromagnet and a diaphragm of magnetic material as in the case of the ear-piece, the windings of the two electromagnets of the single instrument being connected to the transmission line, preferably in parallel with each other.

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Referring to the accompanying drawings illustrating the invention by way of example:

Figure 1 is an elevation of the instrument;

Figure 2 is a plan view of the inside of the ear-piece in which the buzzer electromagnet is entirely separate from the telephone electromagnet;

Figure 3 is a sectional elevation of a modification of the ear-piece in which the telephone coil and the buzzer coil are mounted on the two pole pieces of a horse-shoe magnet;

Figure 4 shows the diagram of connections.

Referring to Figure 1 *a* is the stand of the instrument and *b* the combined receiver and transmitter comprising the ear-piece *c* and the mouth-piece *d*. *e* is the push-button for operating the buzzer which is mounted in the ear-piece by closing the circuit of a small electric battery accommodated inside the stand *a*.

Referring to Figure 2 showing the inside of the ear-piece, *f* is the telephone electromagnet, the pole face of which lies close to the vibrating diaphragm (not shown) and *g* is the buzzer electromagnet which operates an armature *h* and thereby a spring make-and-break contact device *i*.

In the modification shown in Figure 3 use is made of a horse-shoe magnet *j* provided with two pole pieces which, together with the coils wound thereon, respectively constitute the telephone and the buzzer electromagnets *f* and *g*.

The transmitter which is accommodated in the mouth-piece *d*, shown in Figure 1, consists solely of a vibrating diaphragm of magnetic material and an electromagnet facing it in close proximity, the coil of which is connected in parallel with the telephone coil in the ear-piece.

The operation of the apparatus will now be described with reference to the diagram shown in Figure 4.

c', *g'* and *d'* being the telephone receiver, buzzer and transmitter respectively at the end A of the transmission line *k* and c^2, g^2, and d^2 the same constituents at the other end B of the line, the operation is as follows: A calls B by pressing the button *e'* on the stand of his instrument, wherein the battery *l'* is accommodated, whereby the buzzer *g'* is operated. The sound produced within the telephone receiver *c'* causes the diaphragm *m'* to vibrate, its to and fro movements relatively to its associated electromagnet inducing currents in the coil thereof, which currents are transmitted through the line *k* to the other end B where they cause the diaphragm m^2 of the ear-piece to vibrate sufficiently strongly to be

heard at a distance from the instrument. Speech communication takes place by A speaking into the mouth-piece of his instrument and listening on the ear-piece thereof and B by speaking into the mouth-piece and listening on the ear-piece of his own instrument.

In the diagram shown in Figure 4 n' and n^2 are the vibrating diaphragms mounted in the respective mouth-pieces of the two instruments installed at the two ends of the line, the said vibrating diaphragms being associated with electromagnets which, as stated above, are connected in parallel with the respective telephone electromagnets mounted in the ear-pieces at the respective ends.

When B wants to call up A he presses the button e^2 on his instrument thereby closing the circuit of the battery l^2, the sound produced by the buzzer g^2 causing the diaphragm m^2 of the ear-piece to vibrate and transmit the calling signal by the currents which are induced owing to the variations in the magnetic flux of the telephone core mounted in this ear piece.

The details for carrying the invention into effect may be modified without departing from the scope of the invention as claimed in the appended claims.

We claim:

1. Telephone apparatus to be connected to a line for the transmission of speech and of a calling signal without the use of a source of current inserted in the line circuit comprising: an ear-piece for the reception and a mouth-piece for the transmission of speech, each of said pieces enclosing an electro-magnet inserted in the line circuit and an iron diaphragm arranged in the path of the magnetic flux produced by the electro-magnet; a local electric circuit which is entirely separate from the transmission line and which consists of a buzzer comprising an electro-magnet and a moving armature operated by the latter, both enclosed in the ear-piece, a battery and a push-button, whereby when the said local circuit is closed and the buzzer is thereby operated the air vibrations produced within the ear-piece by the moving armature of the buzzer will cause the diaphragm of the receiver to vibrate and by its to and fro movement relative to the electro-magnet in the line circuit, will induce in the latter a current which is transmitted along the line.

2. Telephone apparatus as claimed in claim 1, in which the buzzer within the ear-piece consists of an armature, a spring make-and-break contact and an electro-magnet associated therewith, the winding of which is in the said local electric circuit and the core thereof is magnetically separate from the core of the electro-magnet associated with the diaphragm.

3. Telephone apparatus as claimed in claim 1 in which the electro-magnet in the ear-piece is of the horseshoe type having two pole-ends, one of the pole-ends serving as a core facing the iron diaphragm for the transmission along the line and the other one forming the core of the buzzer.

4. Telephone apparatus as claimed in claim 1, comprising a stand, a push-button mounted on the stand, a battery for the buzzer circuit within the stand and a removable member on the stand incorporating the ear and the mouth piece.

5. Telephone apparatus as claimed in claim 1, in which the windings of the receiving and transmitting electro-magnets enclosed in the ear-piece for the reception and mouth-piece for the transmission are connected in parallel to the transmission line.

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