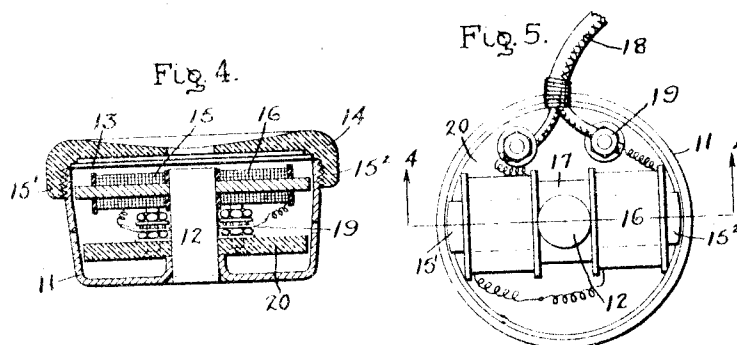
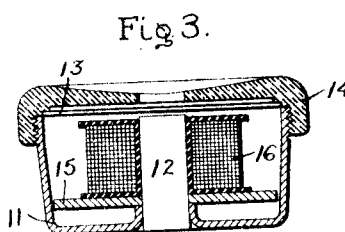
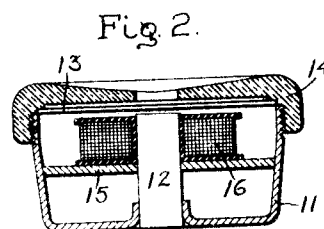
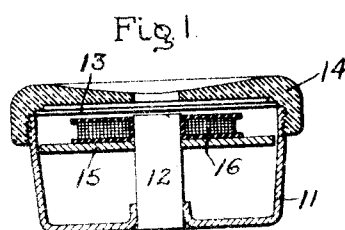


Aug. 4, 1925.

1,548,698

A. P. YOUNG ET AL
TELEPHONE TRANSMITTER AND RECEIVER, LOUD SPEAKING
TELEPHONE, AND LIKE SOUND EMITTING DEVICE
Filed Sept. 30, 1924



Inventors:
Arthur P. Young;
John H. Butcher;
by *Wanda S. Hunt*
Their Attorney.

UNITED STATES PATENT OFFICE.

ARTHUR PRIMROSE YOUNG, OF KENILWORTH, AND JOHN HENRY BUTCHER, OF RUGBY, ENGLAND, ASSIGNORS TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

TELEPHONE TRANSMITTER AND RECEIVER, LOUD-SPEAKING TELEPHONE, AND LIKE SOUND-EMITTING DEVICE.

Application filed September 30, 1924. Serial No. 740,802.

To all whom it may concern:

Be it known that we, ARTHUR PRIMROSE YOUNG and JOHN HENRY BUTCHER, subjects of the King of Great Britain, residing, respectively, at Kenilworth and at Rugby, in the county of Warwick, England, have invented certain new and useful Improvements in Telephone Transmitters and Receivers, Loud-Speaking Telephones, and like Sound-Emitting Devices, of which the following is a specification.

Our present invention relates to sound-emitting or transmitting instruments, such as loud-speaking telephones or transmitters, and particularly to an improved arrangement of magnetic circuit for such instruments.

According to the present invention, in sound instruments in which a permanent magnet is located centrally of a cup-shaped or bowl-shaped vessel of magnetic material, a magnetic path is provided, extending from the magnet to the side of the vessel, to serve as a shunt path for the flux associated with current in the actuating coil or coils.

The preferred construction comprises a spider-bracket, washer or disc of a magnetic material adapted to fit round the magnet and lie in a plane at right angles to the principal axis thereof. This spider-bracket, washer or disc may be secured to the side of the vessel leaving a small air gap around the magnet, or secured to the magnet leaving a small air gap between itself and the side of the vessel; or, thirdly, it may be secured both to the magnet and the side of the vessel, thus providing a shunt path without any air gap.

In any of the above constructions the actuating coil may be disposed around the permanent magnet and the magnetic shunt may be arranged between the actuating coil and that pole of the permanent magnet which rests upon the base of the vessel. Obviously, in cases in which the coil occupies only a relatively small length of the magnet, a number of positions are available between the lower end of the coil and the base of the vessel in which the magnetic shunt may be mounted. Generally speaking, when the magnetic shunt is mounted near the free end or near the base of the magnet, a small air-gap or equivalent reluctance will be included

in the shunt circuit, and, as the magnetic shunt is placed nearer the centre or neutral point of the magnet, the reluctance or air-gap will be decreased.

The invention further comprises arranging an actuating coil on the shunt path instead or directly on the magnet. Two or more actuating coils may be employed, each being disposed radially with respect to the magnet upon an arm of the spider-bracket. Preferably similar coils, symmetrically disposed in the same plane around the magnet, are used, and the spider-bracket may consist of only two diametrically-projecting cores, formed of soft iron laminations or the like, secured to the magnet on opposite sides thereof and in a plane at right angles to the axis of the magnet.

When the present invention is applied to loud speaking telephones or telephone transmitters of great power, the size of the vessel and of the magnet may be increased and/or the number of turns of the actuating coils.

By way of example the accompanying drawing shows the invention applied to telephone receivers of the watch case type.

Figs. 1, 2 and 3 are cross-sectional views of modifications in which the actuating coil is located upon the central magnet. Figs. 4 and 5 show a modification in which an actuating coil is placed on the shunt path; Fig. 4 being a section about the line 4-4 in Fig. 5, except that the cap and diaphragm are not shown in Fig. 5.

Like reference numerals are used to designate similar parts, and 11 indicates the cup-shaped or bowl-shaped vessel of magnetic material, which may itself form the casing of the instrument, in which case it is preferably lacquered, bronzed, or treated in some similar manner or it may be placed in a covering of ivory, wood, or the like. Centrally and axially of the bowl 11 is located the permanent bar-magnet 12 making contact with the bottom of the vessel. The bar-magnet is shown as being circular in section. A magnetic diaphragm 13 is retained against the open end of the vessel by means of a cap of insulating material 14 adapted to screw on to the open end of the vessel 11. The shunt path is designated by the reference numeral 15. In Figs. 1, 2 and 3, it may be in the form of a disc or washer, or of a num-

ber of radially-extending arms, and the coil 16 is arranged so as to occupy substantially the whole of the magnet between its free pole and the shunt path. In Figs. 1 and 3 a small air-gap is included in the shunt path, but in Fig. 2 the reluctance of the shunt path, which is associated with the neutral point of the magnet, is a minimum.

In the arrangement shown in Figs. 4 and 5, the shunt path is formed by two diametrically-projecting limbs 15¹ and 15² secured to the central magnet by means of a clamping-piece 17. Two actuating coils are provided, each arranged upon one of the limbs of the shunt path. These actuating coils are connected so that when current of given sense is impressed on the coils, like poles are produced at the free ends of the limbs. A small air-gap is left between each limb and the vessel, say, approximately of .01 inches. The telephone leads 18 may be secured to the terminals 19 mounted upon a piece of insulating material 20.

In the construction shown in Figs. 4 and 5, the path of the flux due to an oscillating current in the coils comprises the limbs 15¹ and 15², a portion of the central magnet, the air-gap between the diaphragm and the free end of the magnet, and a portion of the side of the vessel. The oscillating flux therefore travels along a relatively small portion of the magnet and consequently there is less tendency for the magnet to become deenergized by the influence of the oscillating flux in this arrangement than, for instance, in the construction illustrated in Fig. 3.

With slight modification the invention may be applied to loud-speaking telephones or telephone transmitters of various types.

What we claim as new and desire to secure by Letters Patent of the United States, is:—

1. The combination in a sound instrument of a receptacle of magnetic material, a permanent magnet arranged centrally therein and a member of magnetic material which forms a shunt magnetic path between the magnet and the side of the receptacle.

2. The combination in a sound instrument of a receptacle of magnetic material, a permanent magnet arranged centrally

therein and a member of magnetic material which forms a shunt magnetic path between the magnet and the side of the receptacle, said member being separated from the side of the receptacle by a short air gap.

3. The combination in a sound instrument of a receptacle of magnetic material, a permanent magnet arranged centrally therein and a member of magnetic material which forms a shunt magnetic path between the magnet and the side of the receptacle, said shunt magnetic path being so formed as to include a short air gap.

4. The combination in a sound instrument of a receptacle of magnetic material, a permanent magnet arranged centrally therein and a member of magnetic material which forms a shunt magnetic path between the magnet and the side of the receptacle, said member extending in a plane at substantially a right angle to the axis of the magnet.

5. The combination in a sound instrument of a receptacle of magnetic material, a permanent magnet arranged centrally therein, a member of magnetic material which forms a shunt magnetic path between the magnet and the side of the receptacle and an actuating coil surrounding said member.

6. The combination in a sound instrument of a receptacle of magnetic material, a permanent magnet arranged centrally therein, a pair of members of magnetic material projecting diametrically from the magnet toward the sides of the receptacle and a pair of actuating coils surrounding said members.

7. The combination in a sound instrument of a receptacle of magnetic material, a permanent magnet arranged centrally therein, a pair of members of magnetic material projecting diametrically from the magnet toward the sides of the receptacle and a pair of actuating coils surrounding said members, said members being separated from the side of said receptacle by a short air gap.

In witness whereof, we have hereunto set out hands this fourth day of September 1924.

ARTHUR PRIMROSE YOUNG.
JOHN HENRY BUTCHER.