

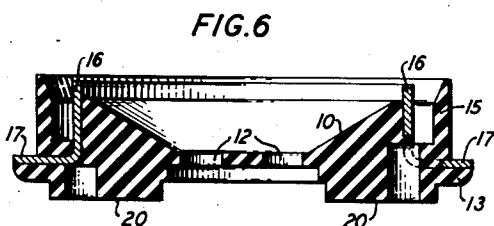
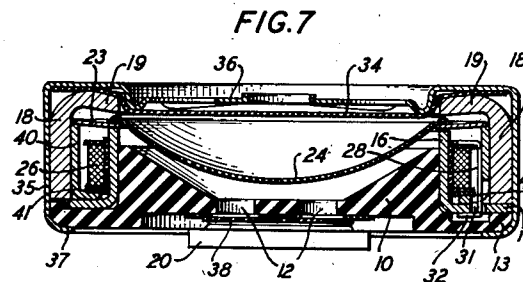
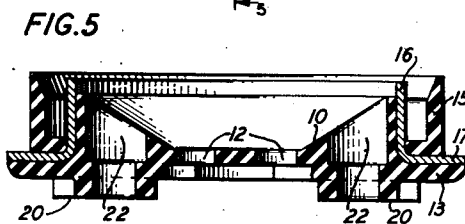
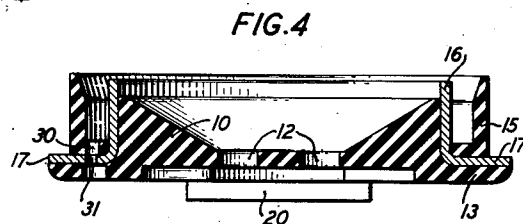
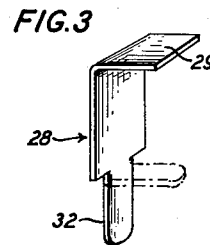
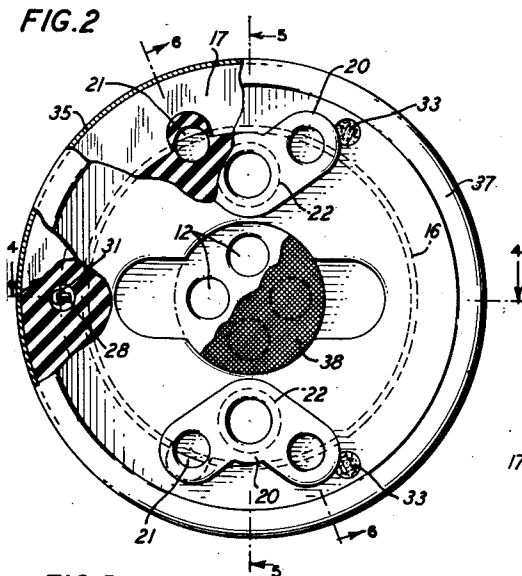
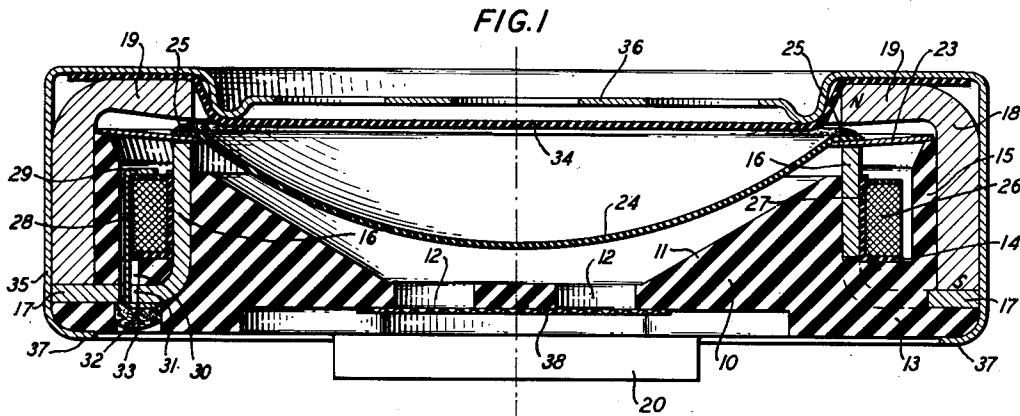
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J. F. DALTON

2,567,365

POLARIZED OPERATOR FOR TELEPHONE RECEIVERS

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INVENTOR
J. F. DALTON
BY *R. J. [Signature]*

ATTORNEY

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POLARIZED OPERATOR FOR TELEPHONE
RECEIVERS

John F. Dalton, Springfield, N. J., assignor to
Bell Telephone Laboratories, Incorporated, New
York, N. Y., a corporation of New York

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This invention relates to electroacoustic transducers and more particularly to ring armature type telephone receivers such as disclosed in the application Serial No. 755,397, filed June 18, 1947 of Robert E. Wirsching, now Patent 2,506,624, granted May 9, 1950.

One general object of this invention is to improve the construction of ring armature type transducers. More specifically objects of this invention are to facilitate the manufacture of such transducers, reduce the cost thereof, prevent displacement of the signal coil by mechanical shocks to which the devices may be or normally are subjected during use, and increase the ruggedness of telephone instruments, whereby the performance thereof will be substantially unaffected by such shocks.

In one illustrative embodiment of this invention, a telephone receiver comprises a cylindrical pole-piece, a cylindrical armature support or seat and a polarizing magnet in coaxial relation, the armature support or seat being between the magnet and pole-piece and spaced from the latter to form an annular trough in which a signal coil is positioned. The ring armature has its peripheral part seated upon the armature support or seat and its inner marginal portion in juxtaposition to the pole-piece tip.

In accordance with one feature of this invention, the pole-piece and armature support or seat are fabricated as a unitary element, insertable into the magnet. Specifically, the pole-piece is embedded in a body of insulating material of which the armature seat or support forms a part, by molding the body about parts of the pole-piece. This body serves also to mount the terminals for the signal coil. Also the outer surface of the armature support is made of such diameter as to fit within the magnet so that when the pole-piece insulating body unit is inserted into the magnet, the latter is positioned in coaxial relation with the pole-piece tip and armature seat. As a result, a symmetrical magnetic system is obtained in an expeditious manner and the proper relation of parts for optimum receiver performance is achieved.

In accordance with another feature of this invention, fastening elements or stops are provided for fixing the signal coil securely in place, thereby to prevent dislodgment of the coil and contact thereof with the armature. Specifically, in one construction, the fastening elements are in the form of hooks the shanks of which extend through apertures in a flange on the pole-piece and are bent against the flange to lock the coil in place.

The invention and the above-noted and other features thereof will be understood more clearly and fully from the following detailed description with reference to the accompanying drawing, in which:

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Fig. 1 is a diametral sectional view of a ring armature transducer illustrative of one embodiment of this invention;

Fig. 2 is a bottom view of the transducer with portions broken away to show details of construction;

Fig. 3 is a perspective view of one of the coil fastening elements;

Figs. 4, 5 and 6 are sectional views of the unitary pole-piece and armature support assembly taken along lines 4—4, 5—5 and 6—6 respectively of Fig. 2; and

Fig. 7 is a diametral sectional view of a ring armature transducer illustrative of another embodiment of this invention.

Referring now to the drawing, the telephone receiver illustrated in Fig. 1 comprises a circular body of moldable insulating material, such as a phenolic condensation product, including a central portion 10 having a frusto-conical inner surface 11 and a plurality of apertures 12 in its base. The body includes also an annular flange 13 and a cylindrical part of L section and having a seating surface 14 and a cylindrical wall 15 which is coaxial with the central portion 10. Embedded in the insulating body 10 is a pole-piece having a cylindrical portion 16 coaxial with the cylindrical wall 15 and an annular flange 17 seated upon the flange 13. In the manufacture of the receiver, the insulating body is molded onto the pole-piece to form a unitary structure therewith, the pole-piece being provided with spaced apertures or slots adjacent the junction of the parts 16 and 17 thereof, as illustrated in Figs. 1 and 6, to permit flow of the insulating material between opposite sides of the pole-piece parts during the molding process. The physical interrelation of the pole-piece and insulating body to constitute a rugged unitary structure is clearly illustrated in Figs. 4, 5 and 6.

Seated upon the flange 17 of the pole-piece is a permanent magnet which has a cylindrical portion 18 fitted on the cylindrical wall 15, and an annular portion 19 the inner margin of which is opposite and coaxial with the tip or pole face of the pole-piece part 16. The magnet is magnetized to produce poles of opposite polarity at its extremities, as indicated in Fig. 1.

A pair of metallic terminals 20 are affixed to the base of the insulating body as by rivets or eyelets 21, shown in Fig. 2, extending through countersunk apertures 22, shown in Fig. 5, in the central part 10 of the insulating body.

A diaphragm armature unit is supported by the insulating body, in cooperative relation with the pole-piece and magnet, the unit comprising an annular magnetic armature 23 seated at its periphery upon the top face or end of the cylindrical wall 15 and having its inner margin in juxtaposition to the tip of the pole-piece por-

tion 16. The unit comprises also a dished non-magnetic diaphragm 24 having its periphery affixed to the inner marginal part of the armature 23 and having spaced raised portions or protuberances 25 which serve to prevent sticking of the armature to the magnet part 19. In the manufacture of the device, the top face or end of the cylindrical wall 15 is ground so that its plane is spaced a prescribed distance from the plane of the pole-piece tip, whereby a preassigned nominal gap between the pole-piece tip and armature is realized.

Encompassing the pole-piece part 16 is a cylindrical signal coil 26 which is insulated from the pole-piece by an insulating sheet 27 and is seated upon the surface 14 of the insulating body. The ends of the coil may be connected to the rivets or eyelets 21. The coil is held in place against the surface 14 by a plurality, for example three, of locks 28. Each of the locks, which may be formed of sheet metal, comprises a flange 29 bearing against one end of the coil 26 and a shank extending through aligned apertures 30 and 31 in the insulating body and pole-piece flange 17, respectively, the shank having a reduced end portion 32 bent against the flange 17 as illustrated in Fig. 1. Thus, the signal coil 26 is clamped firmly in position and cannot become dislodged as a result of mechanical shocks to which the receiver may be subjected during use. In order to seal the apertures 30, 31 acoustically, a mass of cement 33 is placed over the outer end of each of the apertures 31.

A moistureproof membrane 34 overlies the concave face of the diaphragm and together with the magnet 18, 19 is held in place by a metallic cap 35 fitted over the magnet, the cap having a multiapertured central portion 36 opposite the membrane 34 and having its edge bent over the flange 13 as shown at 37.

It will be noted that the receiver may be assembled readily in a rugged, compact structure and with the armature, pole-piece and magnet in accurately preassigned relation. Specifically, by virtue of the grinding of the end of the cylindrical wall 15, the prescribed armature to pole-piece tip spacing or gap is realized when the armature is placed upon this wall end. Inasmuch as the magnet is fitted on the wall 15 and the latter is coaxial with the pole-piece part 16, and further inasmuch as the magnet is seated upon the flange 17, both accurate coaxiality of the magnet and pole-piece and a prescribed spacing of the magnet part 19 and pole-piece tip are attained when the magnet is slipped into place over the wall 15. The locks 28, which are positioned prior to the mounting of the magnet, firmly clamp the coil in position. Thus, not only is the construction of a single receiver facilitated, but also quantity manufacture of receivers having essentially the same, and optimum, operating characteristics is expedited.

Acoustic control of the diaphragm vibration may be effected by use of acoustic resistance material 38 extending over the apertures 12, this material together with the chamber between the diaphragm 24 and surface 11 defining an acoustic network effective to reduce the response peak due to resonance of the diaphragm and to enhance the response at other frequencies.

The embodiment of the invention illustrated in Fig. 7 as in many respects similar to that illus-

trated in Fig. 1 and described hereinabove. However, in the device shown in Fig. 7, the armature 23 is seated upon the edge of an inverted cup-shaped support 40, for example of metal, which is fitted within the magnet 18, 19 and seated upon the pole-piece flange 17. The coil fasteners or locks 28 extend through apertures in the base part of the support 40 and in the flange 17, and the reduced end 32 of each shank is bent against the flange 17, whereby the coil 26 is clamped against an insulating washer 41.

Although specific embodiments of this invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined in the appended claims.

What is claimed is:

1. An electroacoustic transducer comprising an insulating member including a cylindrical portion having a seating surface at one end and an outwardly extending flange adjacent the other end, a pole-piece embedded in said insulating member and including a flange overlying said first flange and having also a cylindrical part extending from said flange toward the plane of said surface, said cylindrical part being coaxial with and laterally spaced from said cylindrical portion and terminating in a pole face, a magnet having a cylindrical portion fitted about said first cylindrical portion and seated upon said pole-piece flange and having also an annular portion opposite said pole face, an annular armature seated upon said seating surface and extending therefrom into proximity to said pole face, said insulating member having a seating shoulder between said cylindrical portion of said member and said cylindrical part of said pole-piece, a signal coil seated on said shoulder, and fastening means engaging said pole-piece flange and fixing said coil against said shoulder.

2. An electroacoustic transducer in accordance with claim 1 wherein said fastening means comprises lock members each extending through apertures in said pole-piece flange and having opposite end flange portions bearing against said coil and said pole-piece flange, respectively.

JOHN F. DALTON.

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