

March 8, 1938.

H. R. CLARKE

2,110,200

ACOUSTIC DEVICE

Filed Aug. 16, 1934

4 Sheets-Sheet 1

FIG. 1

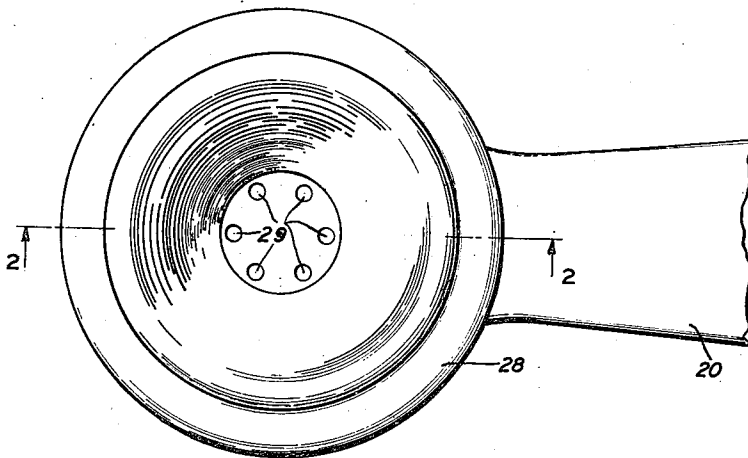


FIG. 3

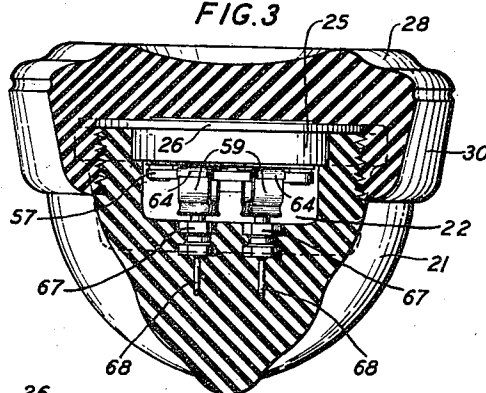
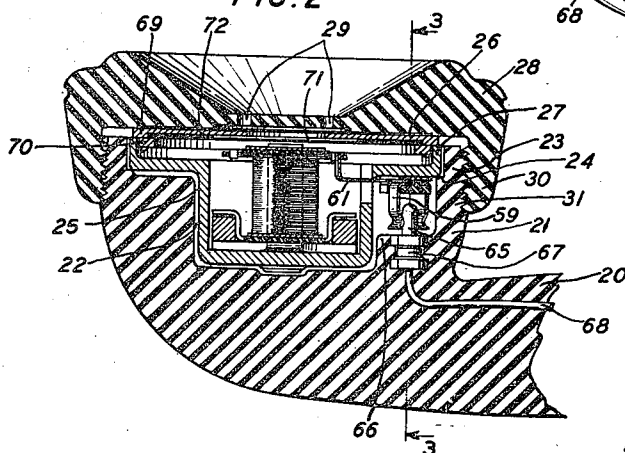


FIG. 2



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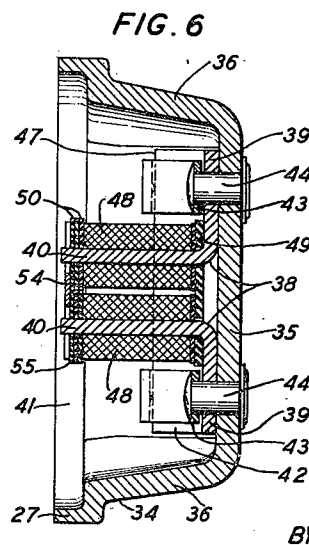
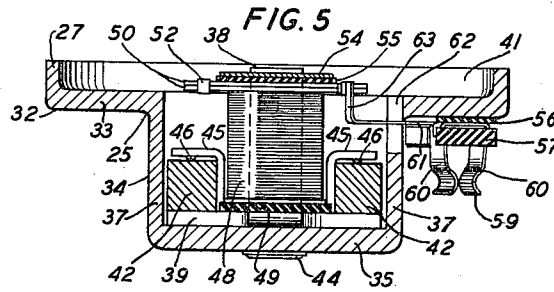
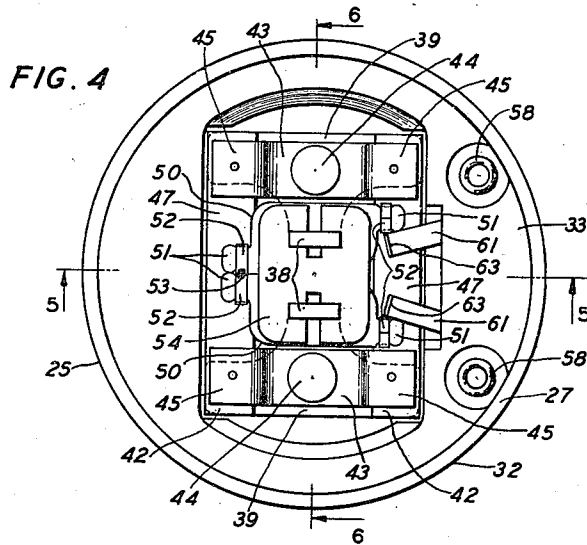
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FIG. 7

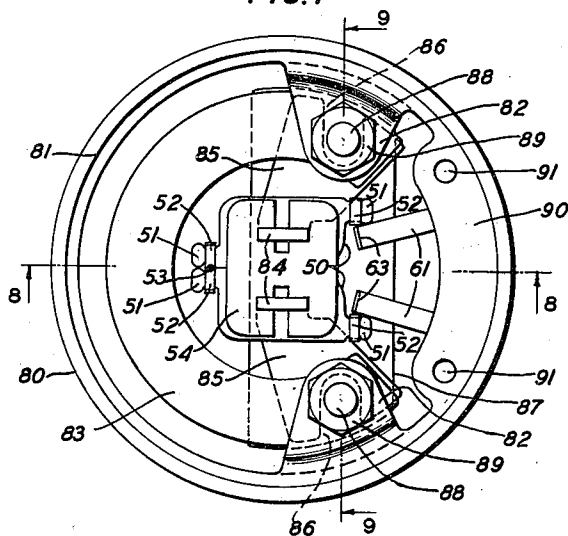


FIG. 8

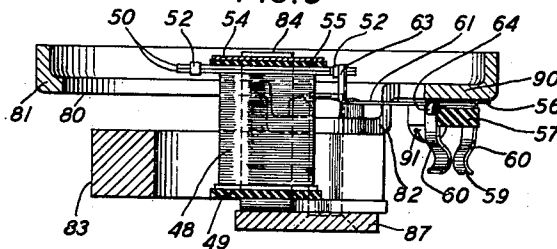
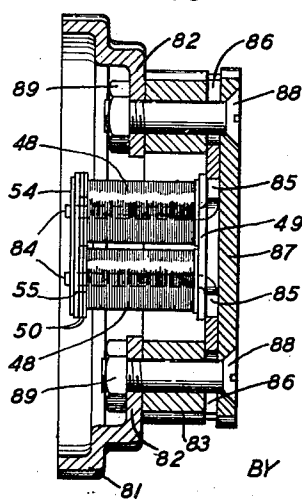


FIG. 9



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FIG. 10

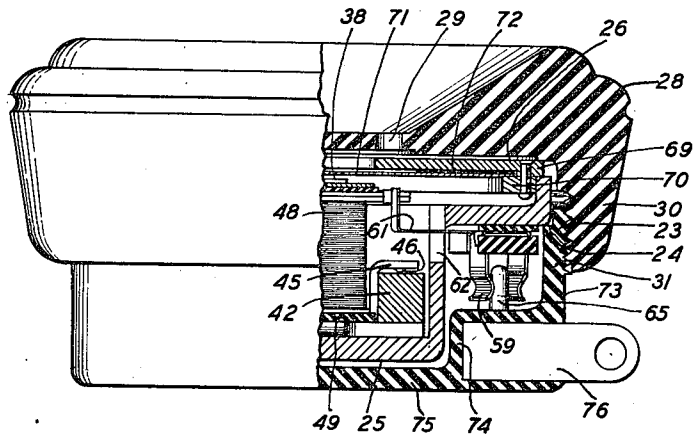
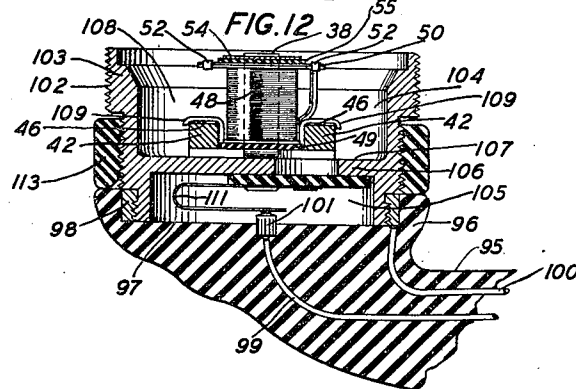
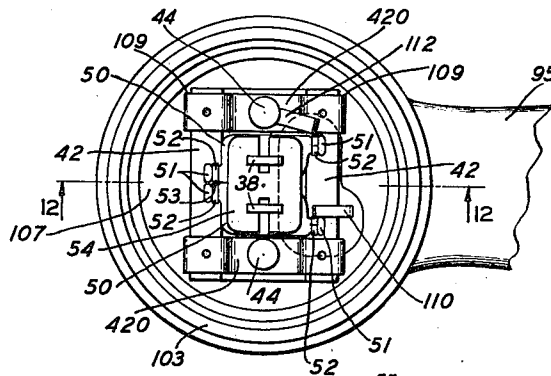


FIG. 11



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UNITED STATES PATENT OFFICE

2,110,200

ACOUSTIC DEVICE

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Application August 16, 1934, Serial No. 740,045

1 Claim. (Cl. 179—114)

This invention relates to acoustic device, and, more particularly, to telephone receivers.

An object of this invention is to simplify the structure and to facilitate the assembly of a telephone receiver.

Another object is to improve the terminal arrangement for telephone receivers, particularly those of the unit or unitary assembly type.

A feature of this invention comprises a frame member or casing for a receiver having a rim portion and a bridge portion of smaller dimensions than the rim so as to provide space on the rim for terminal members for the receiver energizing winding.

Another feature comprises a unitary receiver assembly including magnets held in position by clamping members provided with raised portions or bosses for engagement with the magnets.

A further feature comprises a unitary receiver assembly including terminal clips adapted for engagement with contact studs or pins projecting from the wall of a receptacle for the assembly.

Still other and further features will be apparent from the description which follows herein-after.

A more complete understanding of this invention will be obtained from the detailed description which follows, taken in conjunction with the appended drawings, wherein:

Fig. 1 is a plan view of the receiver end of a hand telephone or handset;

Fig. 2 is a sectional view of the handset fragment shown in Fig. 1, along the line 2—2 thereof;

Fig. 3 is a broken away view of the handset receiver of Figs. 1 and 2 to show details of the terminal arrangement therefor;

Fig. 4 is a plan view on an enlarged scale of the unitary receiver assembly embodied in the device of Fig. 1;

Fig. 5 is a sectional view of the device of Fig. 4, along the line 4—4 thereof;

Fig. 6 is a sectional view of the device of Fig. 4, along the line 6—6 thereof;

Fig. 7 is a plan view on an enlarged scale of another unitary receiver assembly that may be embodied in the receiver end of the handset of Fig. 1;

Fig. 8 is a sectional view of the device of Fig. 7, along the line 8—8 thereof;

Fig. 9 is a sectional view of the device of Fig. 7, along the line 9—9 thereof;

Fig. 10 is an elevational view of a watch case type receiver, partly broken away and partly in section, embodying the receiver unit of Figs. 3-5;

Fig. 11 is a plan view of the receiver end of

another hand telephone or handset with the diaphragm and earpiece removed; and

Fig. 12 is a sectional view of the device of Fig. 11, along the line 12—12 thereof.

The acoustic device of Figs. 1-6 comprises a handle or hand grip portion 20 of molded insulating material having an enlarged, integral end portion or case 21 defining a recess 22 and having an open end defined by a rim or annular portion 23. The rim is provided with an annular ledge or shoulder 24 engaged by a peripheral portion of the unitary receiver assembly or receiver unit, designated generally 25. A damped diaphragm unit 26 is supported on the rim portion 27 of the unit 25, and with the latter, is clamped within the case 21 by a receiver cap or earpiece 28, provided with a plurality of spaced sound wave passages or apertures 29, and having a peripheral flange portion 30 interiorly threaded for engagement with the exteriorly threaded portion 31 of the case 21.

The receiver unit 25 comprises a frame, shell, casing or recessed support 32, for instance, of die-cast aluminum or of molded insulating material, such as a phenol condensation product, having a peripheral annular or rim portion 27, a substantially annular, planar shelf portion 33, and a central, substantially rectangular portion 34. The portion 34 comprises a bridge portion 35, of less diameter than the frame 32, sloping end wall members 36, and vertical side wall portions 37. The bridge portion supports a pair of pole pieces 38, preferably of silicon steel and of substantially T-shape, the cross-bars 39 being adjacent the bridge, and the tails 40 being bent to extend upwardly toward the open end 41 of the frame and substantially perpendicular to the bridge. A pair of straight, imperforate, permanent bar magnets 42, preferably of cobalt steel, are positioned on opposite sides of the pole pieces, resting on and magnetically connecting the oppositely disposed extremities of the cross-bars 39. The magnets and pole pieces are securely fastened to the bridge by a pair of clamping plates, strips or members 43 and rivets 44. The clamping members are preferably of non-magnetic material, such as brass, and have a substantially U-shape, their horizontal, outwardly extending arm portions 45 being provided with bosses 46 that bear against the upper surfaces 47 of the bar magnets. The rivets extend through aligned apertures in the bridge and pole pieces.

The receiver energizing winding comprises coils 48, spaced from the horizontal portions of the pole pieces by a washer 49 of insulating material

and each having a pair of spoolheads 50 of insulating material that have lug portions 51 at diagonally opposite corners. The ends of each coil are wound around the lugs on its respective spoolheads, soldered, and then the metallic strips or bands 52 are clinched therearound. Electrical connection between the coils is made through the adjacent clinching bands which are fastened together by a drop of solder 53. The coils are maintained in position and the pole piece portions 40 properly spaced by locking plate 54, an insulating washer 55 being inserted between it and the spoolheads. This locking plate is provided in accordance with the teachings of C. H. Franks Patent 1,841,469, issued January 19, 1932.

A pair of elongated strips or washers 56, 57, of insulating material are secured at their ends, for instance, by the rivets 58, to frame portion 33 on the side of the magnet pole piece assembly having the spaced apart spoolhead lug portions. A pair of substantially U-shaped, metallic members or clips 59 having radially resilient arm portions 60, and the enlarged ends of the relatively thin, flexible terminal strips 61, are clamped between the upper strip 56 and the relatively thick lower strip 57. The strips 61 extend through the aperture 62 in the frame 32, and have upwardly extending end portions 63 secured, as by soldering, to the clinching bands on the spaced apart spoolhead lug portions. The clamped ends of strips 61 are provided with downwardly extending portions 64 that fit against the arms of the clips 59.

The receiver unit is adapted to be inserted in the case 21 of the handset handle 20, to be supported on the ledge 24, and to have the clips 59 engage with the terminal studs or pins 65 projecting from the case shoulder portion 60. The pins 65 are preferably molded in the handle, their lower enlarged portions 67 having electrically connected thereto the conductors 68, molded in the handle in accordance with the teachings of W. C. Kiesel Patent 1,425,977, issued August 15, 1922.

The diaphragm unit 26 comprises a pair of annular plates 69, 70, of different diameters, preferably riveted together, and enclosing a circular, planar diaphragm 71 and a plurality of superposed, accordion pleated, bakelized paper, damping washers 72.

The receiver unit described hereinbefore is compact, rugged, easily and quickly assembled, and readily insertable and removable from its case. The mounting of the terminal clips on the shelf portion of the frame permits of the provision in a handset or in a watch case receiver casing of a much shallower recess for the receiver than has been possible heretofore.

Fig. 10 illustrates the incorporation of the hereinbefore described receiver unit in a watch case type receiver, designated generally 73, the terminal studs (one only being shown) 65 being mounted in a shoulder portion 74 of the case 75. Member 76 is a stay member for a stay cord of a conductor.

The unitary receiver assembly or receiver unit, designated generally 80, of Figs. 7 to 9, is in many details similar to that of Figs. 1-6, like parts being like reference numerals. The unit 80, however, comprises an annular frame member 81, of non-magnetic material and substantially L-shaped in cross-section, having a pair of inwardly directed, oppositely disposed lug portions or projections 82.

The magnet structure comprises a substantially C-shaped permanent magnet 83, preferably of cobalt steel, and a pair of substantially L-shaped pole pieces 84, preferably of silicon steel, the horizontal portions 85 of which are substantially trapezoidal in shape and provided with slots 86 extending inwardly from the edges. The permanent magnet and pole pieces depend from the frame 81, and are clamped between the lugs 82 and a rectangular plate 87 of non-magnetic material, the parts being secured by screws 88 and clamping nuts 89. The frame member is provided with an arcuate shelf portion 90, on the under-surface of which are supported the insulating strips 56 and 57 and the terminal clips 59, screws 91 securing the strips to the shelf.

Figs. 11 and 12 disclose the receiver end of a hand telephone or handset with the diaphragm and earpiece removed, comprising a handle 95 of insulating material having an enlarged end portion 96 having a recess 97 defined by an interiorly threaded metallic ring 98 embedded in the handle. The handle contains, also, conductors 99 and 100, the former terminating at a knurled insert 101, disposed centrally of the recess, and the latter at the ring 98. A receiver unit designated generally 102, is supported on the portion 96 and comprises an externally threaded metallic shell 103, for instance, of a die-cast aluminum, divided into two chambers 104 and 105 by a partition or wall portion 106.

Within the chamber 104 and supported on the upper surface 107 of the partition 106, is a magnet structure and energizing coil assembly 108, similar in most details to that of the receiver unit 25, like parts bearing like reference numerals. The clamping members 420, however, are provided, preferably, with downwardly extending end portions 109 to insure that the bar magnets remain in position on the pole pieces 38. Terminal member 110 connects one clinching band 52 and the contact spring 111 that contacts with the insert 101 and terminal member 112 connects the other clinching band 52 to the magnet structure and through the latter to the shell 103. Member 113 is a lock ring of insulating material.

While this invention has been disclosed with reference to several specific embodiments thereof, it is to be understood that modifications therein are possible without departing from the scope of the invention, which is to be considered as limited, therefore, by the appended claim only.

What is claimed is:

A telephone receiver unit comprising a circular frame member having a centrally disposed depending bridge portion with planar portions extending laterally of the bridge portion, the frame member having a peripheral flange portion, a pair of L-shaped pole pieces supported by said bridge portion, an energizing winding on each of said pole pieces, a pair of straight bar permanent magnets supported on the horizontal portions of the pole pieces, U-shaped clamping members secured to said bridge portion and to said pole-pieces and having outwardly extending portions bearing on the ends of said magnets to force them against said pole-pieces, a pair of terminal members carried on the underside of one of said planar portions, and flat flexible strips connecting an end of each of said windings with said terminal members.

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