May 14, 1935. A. L. THURAS 2,001,081

ACOUSTIC DEVICE

Filed May 10, 1933

FIG. 2

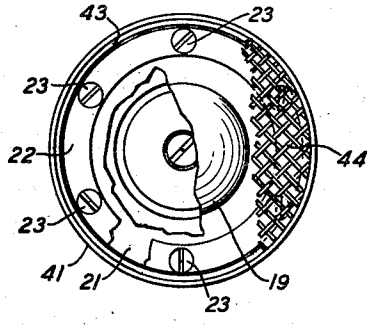


FIG. 3

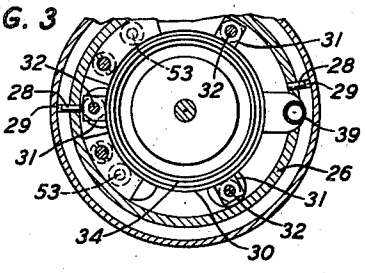


FIG. 1

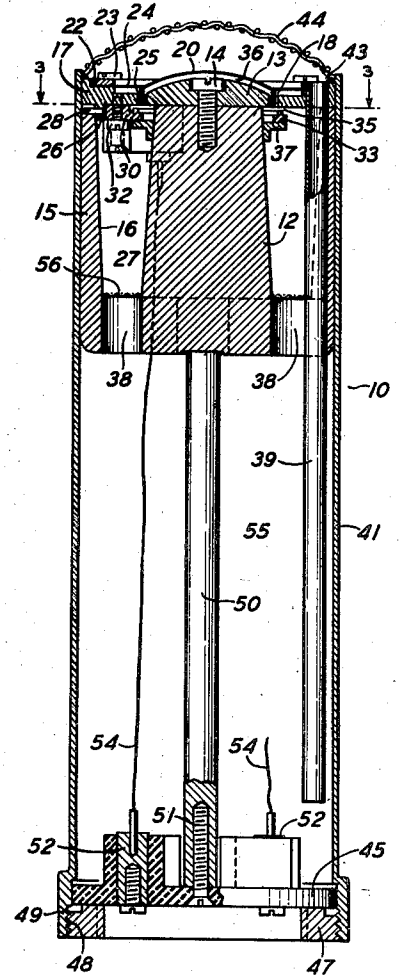
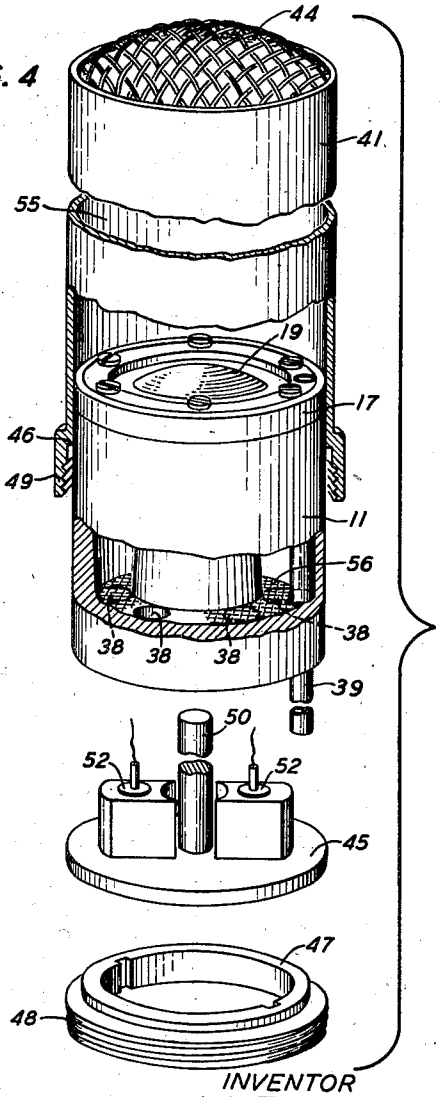


FIG. 4



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ACOUSTIC DEVICE

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Application May 10, 1933, Serial No. 670,291

3 Claims. (Cl. 179—115.5)

This invention relates to an acoustic device and more particularly to an electrodynamic or moving coil transmitter.

An object of this invention is to construct a small, compact, and efficient moving coil transmitter of uniform response that may be readily carried on the person.

A further object of the invention is to accurately center the coil of an electrodynamic device in the air-gap of the device.

A feature of this invention comprises an electrodynamic device in which a tubular casing open at each end houses the magnet structure, diaphragm and coil of the device, and a terminal carrying member, the terminal carrying member and the magnet being separated by a spacer member or rod, each functioning to close one open end of the casing and being slidably removable therefrom.

A further feature of the invention comprises a magnet structure having a central and an outer pole, the latter supporting an outer pole piece that carries a diaphragm to which a coil is attached. The outer pole piece has a flange or depending portion having pin members projecting therefrom to engage with slots in the magnet outer pole whereby the coil is centered in the air-gap defined by the outer and the center pole pieces.

A more complete understanding of this invention will be obtained from the detailed description which follows read with reference to the appended drawing, wherein:

Fig. 1 is an elevational sectional view of the acoustic device embodying this invention;

Fig. 2 is a plan view, partly broken away, of the device of Fig. 1;

Fig. 3 is a sectional view of the device of Fig. 1 along the line 3—3 thereof; and

Fig. 4 is an exploded view of the device of Fig. 1 partly broken away and partly in section.

There is shown by the drawing an acoustic device, designated generally as 10, comprising a microphone or transmitter unit, designated generally as 11, of the electrodynamic or moving coil type. The transmitter unit comprises a magnet having a center pole 12 including a dome-shaped pole piece or cap member 13 secured to its upper end by suitable means, such as the screw 14, and an outer, cylindrical pole 15 whose inner surface 16 tapers outwardly. An annular outer pole piece 17 is supported by the outer pole and defines with the member 13 an annular air-gap 18. The member 17 carries or supports a diaphragm 19. This diaphragm, which is preferably of a light weight high-strength material, such as duralumin, comprises a central stiffened, dome-shaped portion 20; an outer peripheral portion 21, which is secured against the outer pole piece by a clamping ring 22 and suitable fastening means, such as screws 23; and an intermediate flexible portion 24. A coil 25, preferably of the edge wound type, is attached to the diaphragm at the junction of the portions 20 and 24 and is supported in and adapted for movement in the air-gap 18.

The outer pole piece is provided with a depending flange portion 26 extending into the magnet cavity 27, its outer surface being tapered reversely with respect to the inner surface 16 of the outer pole so as to make a snug and sliding fit therewith. Extending radially from the flange 26 and substantially at right angles to it, are pin members 28 which are spaced apart at less than 180°. These pins engage with or rest in similarly spaced, radially extending slots 29 in the magnet outer pole. This flange and pin arrangement insures proper initial centering of the coil in the air-gap and proper and accurate recentering thereof if for any reason the outer pole piece should be temporarily detached from the magnet.

A ring or plate member 30 having radially extending arms 31 is secured to the under surface of the outer pole piece, being fastened thereto by screw members 32. The member 30 has a machined portion 33 provided with a ridge 34 spaced from and forming with the under surface of the outer pole piece, a restricted, annular slot 35 through which, when the diaphragm is vibrating in response to sound wave impulses, air may flow between the magnet chamber or cavity 27 and the chamber 36 between the diaphragm and magnet structure. A sealing member 37 frictionally held on the center pole prevents air movement other than through the slot 35. The base of the magnet is provided with a plurality of drillings, apertures, or passages 38 through one of which extends an elongated tubular member 39 which is supported from the plate pole, having an opening to the atmosphere adjacent the peripheral portion of the diaphragm.

The transmitter unit 11 is positioned in one opened end of a tubular, cylindrical case or housing 41. It is slidably insertable through the lower end of the case and is prevented from sliding out at the upper end by an internal flange 43 against which rests the peripheral portion of the outer pole piece. The upper end

of the case 41 is covered by a dome-shaped protective screen 44, preferably of wire gauze, of such a mesh, however, that will not impede the passage of sound waves to the diaphragm.

A terminal carrying member or disc 45, preferably of insulating material, is positioned in the lower end of the case, and, at its periphery, bears against the seating surface 46. It is maintained in position by a lock ring or member 47 externally threaded at 48 for engagement with the internally threaded end portion 49 of the case. The terminal member and the transmitter unit are spaced apart by a spacer member in the form of a rod 50, preferably of non-magnetic material, which may be secured to the terminal member, for instance, by the screw 51, and which bears against the central portion of the base of the magnet. The transmitter unit is thereby maintained against movement at the upper end of the case. The terminals 52 for connecting the acoustic device to an external electrical circuit are connected to the coil terminals 53 on the plate pole by suitable conductors 54.

The chambers 36 and 27 are connected, as described hereinabove, through the slot 35. The chamber 27 communicates with the chamber 55 of the case through the magnet passages 38, and the chamber 55 communicates with the atmosphere through the tubular member 39. A damping element 56, in the form of a cloth annulus, is fastened to the magnet over the passages and prevents undesirable resonance of the chambers connected through the passages.

This acoustic device, which is shown much enlarged in the drawing, is adapted to be conveniently carried in the jacket pocket of a user or on the lapel of his coat, being supported, for instance, by a clip (not shown) attached to the case and adapted to engage with the user's clothing. The device is small, compact, readily assembled and disassembled, efficient, and of substantially uniform response over the frequency range to be translated.

Although this invention has been disclosed with reference to a specific embodiment, it is to be understood, of course, that it is capable of modification without departing from the spirit of the invention, the scope of which is to be considered as limited only by the appended claims.

What is claimed is:

1. An acoustic device comprising a magnet having a central pole piece, an outer pole having a rim portion containing two radial slots located on different diameters, an outer pole piece carried by the outer pole and forming an air-gap with the central pole piece, a diaphragm supported by said outer pole piece, and a coil attached to said diaphragm and adapted to be positioned in said air-gap, said outer pole piece having two members extending radially therefrom for engagement with said slots to center said coil in said air-gap.

2. An acoustic device comprising a magnet having a central pole, an outer pole having a rim portion containing two radial slots spaced apart at less than 180°, an outer pole piece carried by said outer pole and forming an air-gap with the central pole, a diaphragm supported by said outer pole piece, a coil attached to said diaphragm, said outer pole piece having a depending flange, and radially extending members on said flange for engagement with the slots whereby said coil is centered in the air-gap.

3. An acoustic device comprising a magnet having a central pole piece, an outer pole having a rim portion containing two radial slots located on different diameters, the inner surface of said pole piece tapering outwardly, an outer pole piece carried by said outer pole and forming an air-gap with the central pole, a diaphragm supported by said outer pole piece, a coil attached to said diaphragm and adapted to be positioned in said air-gap, said outer pole piece having a depending flange portion whose outer surface tapers reversely with respect to the inner surface of said outer pole and which fits within the rim portion of the outer pole, and members extending radially from said flange portion and resting in said radial slots.

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