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2,131,593

ACOUSTIC DEVICE

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FIG. 1

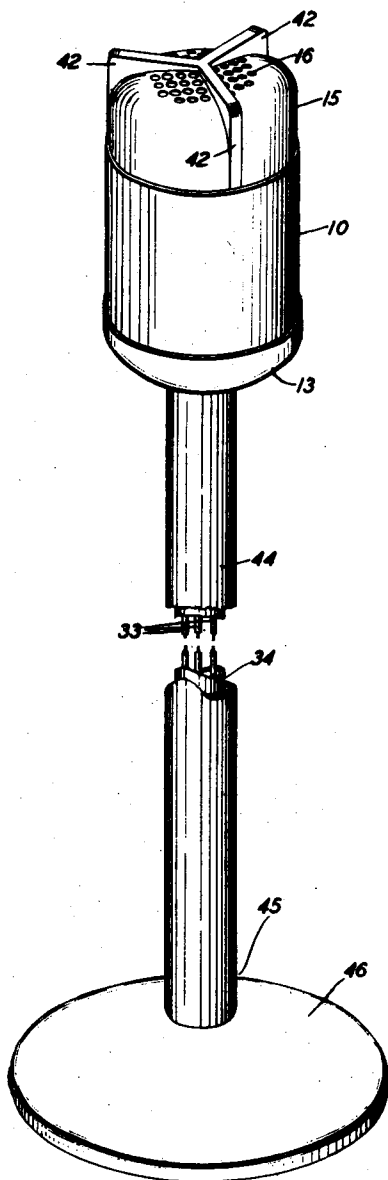


FIG. 3

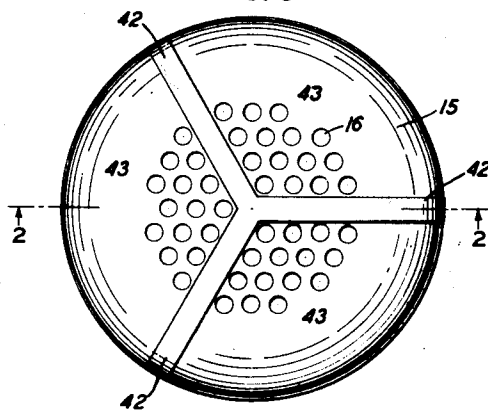
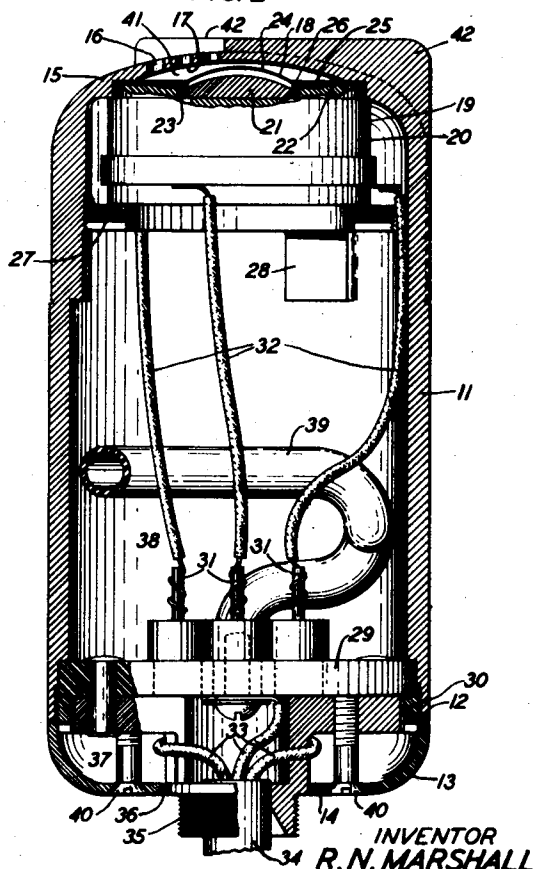


FIG. 2



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ACOUSTIC DEVICE

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7 Claims. (Cl. 181—0.5)

This invention relates to acoustic devices, and more particularly, to transmitters.

An object of this invention is to improve the structure of transmitters, particularly of the electrodynamic or moving coil type.

A feature of the invention comprises protecting the diaphragm of a transmitter against damage or deformation likely to result from sudden or violent increases in pressure in front of the diaphragm.

Other and further features will be apparent from the description which follows hereinafter.

A preferred embodiment of the invention comprises a transmitter having a case, substantially cylindrical and open at each end. One open end is constituted by a multi-aperture portion of the case. Behind this open end is positioned a transmitter unit, preferably of the moving coil type having a diaphragm of a light-weight, high strength material, for example, of the order of .001 inch in thickness, although diaphragms as thin as .00025 inch may be used, and having a central stiffened dome-shaped portion and an outer annular flexible portion. Ribs, ridges or raised portions are provided on the outer surface of the multi-aperture end of the case, and, preferably, extend radially outwardly from the center of the case end, increasing in height with distance from the center and defining sector-shaped passages for the release of air pressure which may be produced at the case end by a sudden or violent movement of the hand, or an article or other member in its vicinity.

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

Fig. 1 is a perspective view of a transmitter embodying the invention and supported on a floor or desk stand;

Fig. 2 is a cross-sectional view of the transmitter of Fig. 1; and

Fig. 3 is a front view of the transmitter of Fig. 1.

The transmitter 10 comprises a hollow case or enclosure 11, substantially cylindrical in shape, open at each end. The open end 12 is closed by dish-shaped cover member 13 having a central opening 14. The other and rounded end 15 contains a plurality of sound wave passing apertures 16, the inner ends of the apertures being covered by a thin strip of fabric 17 to exclude dust or other particles from the inside of the case. The open end 15 is closed on the inside of the case by the diaphragm 18 of the trans-

mitter unit 19. The unit 19 is preferably of the electrodynamic or moving coil type comprising a magnet structure 20 including a central, circular pole member 21 and an outer plate pole member 22 defining an annular air-gap containing a coil 23 attached to and adapted for movement with the diaphragm. The diaphragm comprises a central stiffened dome-shaped portion 24 and an outer annular flexible portion 25, secured, for example, by cement or adhesive, at its peripheral portion to the plate pole, the coil 23 being fastened to the diaphragm at the junction 26 of its central and outer portions. The diaphragm is preferably of a light-weight, high strength material, for example, an aluminum alloy such as duralumin, about .001 inch or less in thickness. Diaphragms as thin as .00025 inch may be used.

The transmitter unit is maintained in position against the front end of the case by an externally threaded clamping ring 27 engaging with the threaded projections 28 on the inner surface of the case. A terminal and closure plate member 29, to which the cover member is fastened by screws 40, is secured in the open end 12 by a clamping ring 30 threadedly engaging the case. The terminals 31 to which the transmitter unit leads 32 are connected, are connected with an external electric circuit by the conductors 33 of a cord 34 that extends into the case through the hollow extension 35. This extension forms a narrow annular sound wave and air passage 36 with the cover member, connecting the chamber 37 formed by the cover member and member 29 with the atmosphere outside the case. This chamber is connected with the air chamber 38 through an aperture (not shown) in the member 29 and the elongated, restricted, tubular member 39 which may be of soft rubber. If desired, chamber 38 may be filled with loose cotton, wool or felt. Sound waves have access to the front of the diaphragm through the apertures 16, and to the rear of the diaphragm through the passage 36, air chamber 37, tubular member 39, air chamber 38, openings (not shown) in the magnet structure, and the air-gap.

A transmitter such as has been described is particularly adapted for use in sound picture, public address and broadcast systems. It receives considerable handling in the course of its manufacture, and, subsequently, additional handling and abuse in use. It has been found that it frequently happens that the hand, or an article or other member, is suddenly or violently placed across the aperture end of the case. This

causes a sudden or violent forcing of air through the apertures 16 and into the chamber 41 on the front side of the diaphragm, and the building up of pressure on the diaphragm of a value sufficient to cause its central portion to be damaged or deformed, specifically, to buckle, rendering the transmitter inoperative or seriously affecting its response characteristic. To prevent or substantially to eliminate the possibility of this occurrence, the end 15 of the case is provided with raised portions, ridges or ribs 42, extending radially outwardly from the center, increasing in height with distance from the center of the case end, preferably three in number, spaced about 120 degrees apart and forming sector-shaped spaces 43 for the flow of air and the release of pressure should something be suddenly or violently placed across the diaphragm end of the case. The ribs are shown as an integral part of the case and strengthen the multi-aperture end thereof. It is obvious, however, that they may be formed separate from the case and attached thereto in any suitable manner. If desired, furthermore, the ribs may be burnished, polished or colored so as to provide a contrast to the outer surface of the case, and a novel ornamental effect.

The transmitter 10 may be supported at the upper end of the tubular standard 44 of a desk stand or a floor stand 45, the lower end of the standard 44 being coupled to a base member 46.

While this invention has been disclosed with reference to a preferred embodiment, it is to be understood that it is not limited thereto but by the scope of the appended claims only.

What is claimed is:

1. An acoustic device comprising a case, a diaphragm in said case, said case having a perforated portion in front of said diaphragm for the passage of sound waves thereto, and a plurality of ridges on said perforated portion extending radially outward from the center thereof, said ridges increasing in height with distance from said center.
2. An acoustic device comprising a case having an apertured portion for the passage of sound waves, a diaphragm in said case behind said portion and forming with the case a shallow chamber between the diaphragm and the inner end of the aperture, said diaphragm having a central dome-shaped portion about one mil in thickness, and ridges on the outer surface of the apertured portion, extending outwardly from the central portion thereof, defining pressure-release paths with the apertured portion for air when something is suddenly or violently placed across the apertured portion.

3. A microphone comprising a case, a diaphragm of the order of .001 inch or less in thickness in said case, said case having a perforated portion in front of said diaphragm for the passage of sound waves thereto, and raised portions on the outer side of said perforated portion defining sector-shaped spaces.

4. An acoustic device comprising a cylindrical case, a diaphragm mounted in said case adjacent one end, said diaphragm being dome-shaped with its convex side toward said end of the case, the thickness of said diaphragm being of the order of .001 inch, a closure member for said end of the case comprising a perforated portion spaced from said diaphragm and having a convex outer surface, and guard means comprising a plurality of radially spaced ribs, the inner portion of said ribs conforming to the curvature of said closure member and the outer surface of said ribs lying in a plane perpendicular to the axis of the cylindrical case, said ribs preventing the building up of a pressure harmful to said diaphragm such as might be caused by quickly or violently covering the perforations.

5. An acoustic device comprising a case, a very thin diaphragm mounted in said case, a portion of said case being perforated for the passage of sound waves, and a plurality of upstanding members on said case adjacent the perforated portion, said members and case defining a plurality of outwardly expanding channels for the quick dissipation of violent pressures due to the rapid approach of the hand to said perforated portion, which pressures might otherwise damage said thin diaphragm.

6. An acoustic transmitter comprising a casing, a diaphragm of the order of .001 inch in thickness mounted in said casing, the wall of said casing adjacent the diaphragm having perforations for the passage of sound waves, and means comprising a plurality of radially arranged ribs on said casing adjacent said perforations for defining with said casing a plurality of pressure release channels having increasing depth and width in the direction away from said perforations.

7. An acoustic transmitter comprising a casing, a very thin diaphragm mounted in the casing, said casing having a perforated portion for the passage of sound waves, and means for protecting said diaphragm from destructive pressure surges including means projecting from said perforated portion and defining a plurality of outwardly flaring pressure release passages.

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