Nov. 28, 1933. J. D. SEABERT 1,936,918

ACOUSTIC DEVICE

Filed May 31, 1930 2 Sheets-Sheet 1

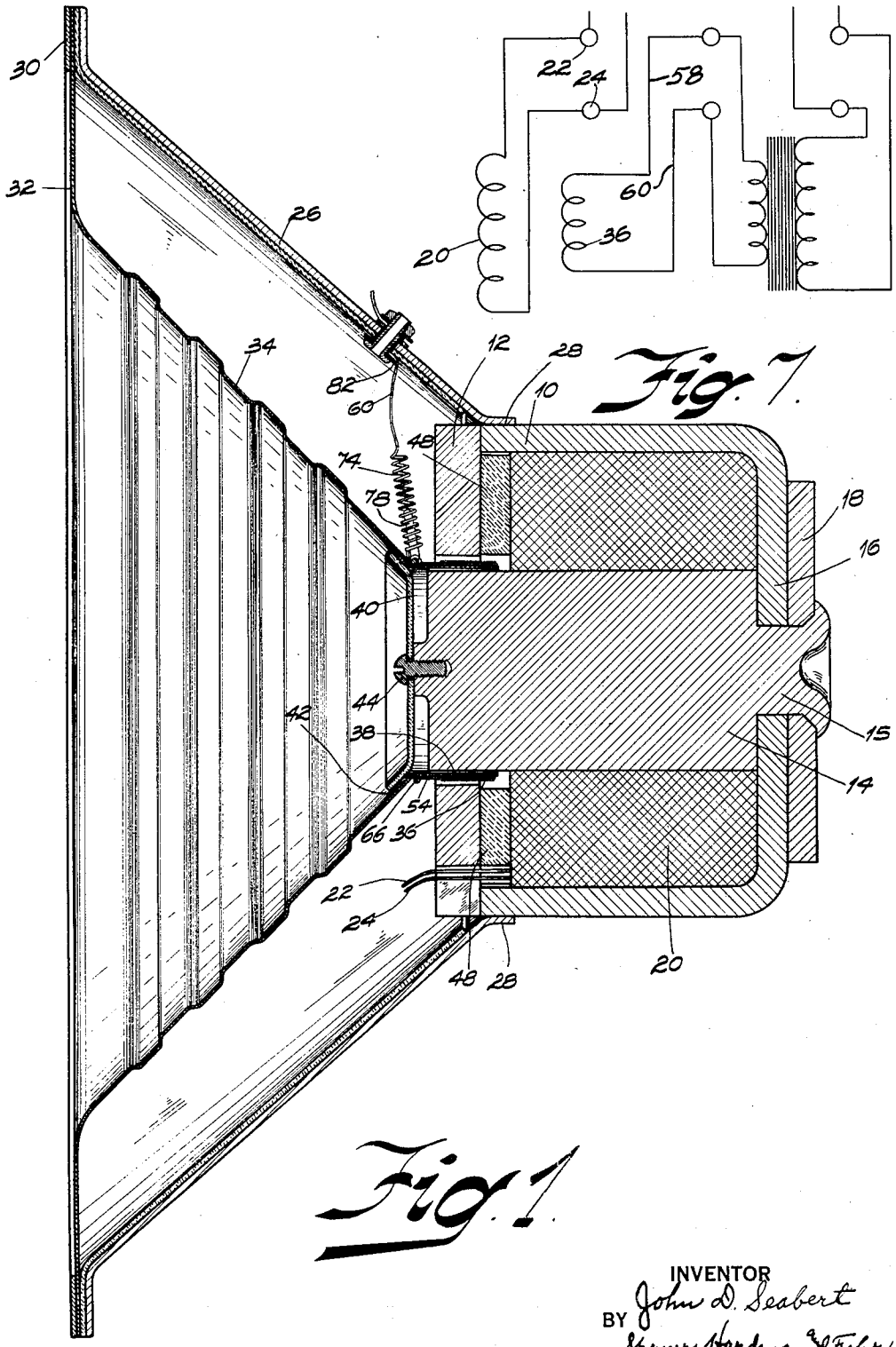


Fig. 7.

Fig. 1.

INVENTOR
John D. Seabert
BY Spencer, Hardman & Fehr
His ATTORNEYS

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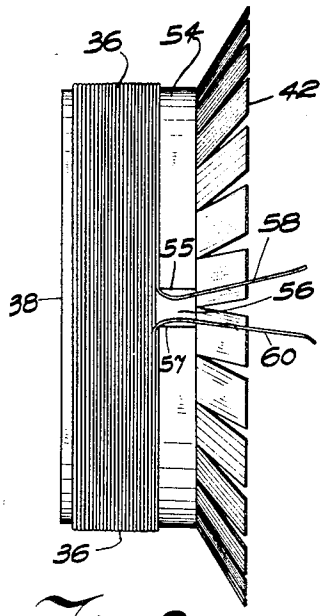


Fig. 2.

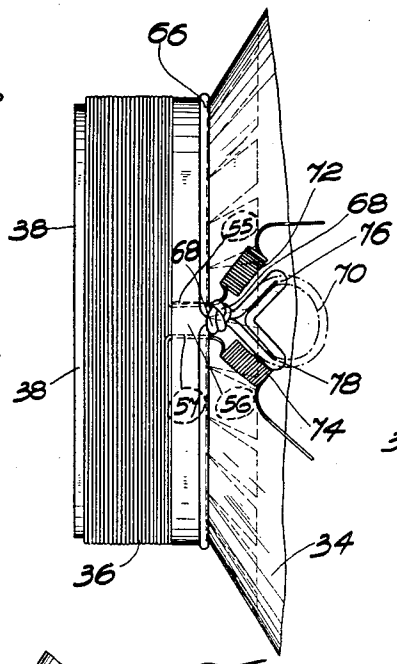


Fig. 3.

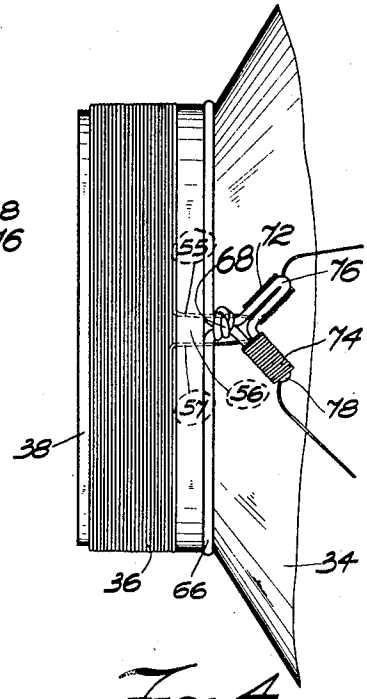


Fig. 4.

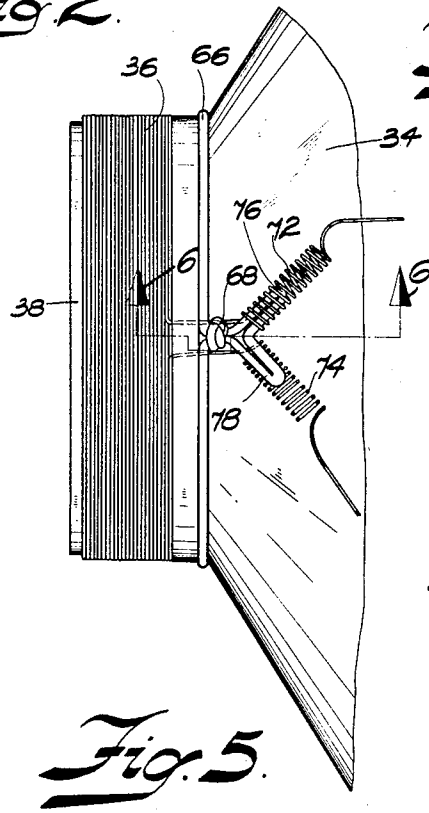


Fig. 5.

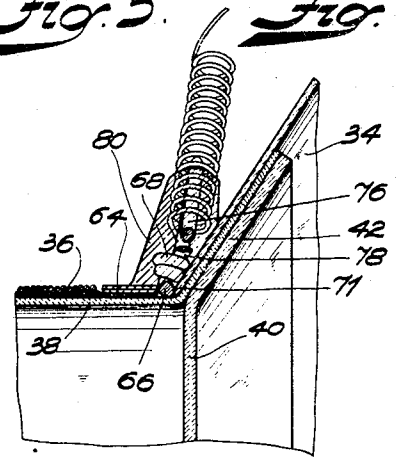


Fig. 6.

INVENTOR
BY John D. Seabert
Spencer, Hardman & Fahr
His ATTORNEYS

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UNITED STATES PATENT OFFICE

1,936,918

ACOUSTIC DEVICE

John D. Seabert, Dayton, Ohio, assignor, by mesne assignments, to Radio Corporation of America, New York, N. Y., a corporation of Delaware

Application May 31, 1930. Serial No. 457,703

19 Claims. (Cl. 179—115.5)

This invention relates to an acoustic device and more particularly to the mechanical construction and arrangement of parts therein.

An object of this invention is to improve upon the construction and arrangement of extending the leads from the speech coil to the terminal board.

Another object of this invention is to improve upon the housing of the magnetic frame. This has been accomplished by reinforcing the base of the cup shaped housing member.

Another object of this invention is to provide an acoustic device that is cheap, easily constructed and that lends itself to mass production. This has been accomplished inter alia by using formed metal parts either riveted or welded together and by reducing the number of parts.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a sectional view of an acoustic device.

Figs. 2, 3, 4 and 5 are detail fragmentary views of the speech coil and the diaphragm showing successive steps of production drawn to a larger scale than Fig. 1.

Fig. 6 is an enlarged sectional view taken on the line 6—6 of Fig. 5.

Fig. 7 shows a schematic wiring diagram of the speech coil and a portion of the external circuit.

As best seen in Fig. 1, the reference character 10 indicates the field housing having attached thereto, as by welding an annular pole piece 12 and a central pole piece 14 held in position by a reduced portion passing through an aperture in the base 16 and through an aperture in the reinforcing plate 18. The reduced portion 15, as shown in the particular modification, is riveted to the base 16 and the reinforcing plate 18. Instead of riveting the pole piece 14 to the frame 10 and the reinforcing plate 18 it could be welded thereto or secured in position by any suitable fastening means.

A magnetic coil 20 provided with terminals 22 and 24, connecting the coil 20 to either a source of direct current or to a source of rectified current for exciting the magnetic field circuit, links the center pole piece 14.

The flared edge 32 of a conical shaped diaphragm 34 is anchored to a housing 26 by an annulus 30. The housing 26 is spot welded or suitably attached at 28 to the cup shaped housing 10.

As best seen in Fig. 6, the conical diaphragm 34 carries a speech coil 36, wound upon a cylindrical support 38, cemented to or otherwise secured to the diaphragm 34. In order to properly center the cylindrical support 38 and the speech coil 36 with respect to the center pole piece 14 and the air gap between the pole piece 14 and the annular pole piece 12, a spider 40 is cemented to a flared portion 42 of the cylindrical support 38 and attached to the center pole piece 14 by a screw 44. The spider 40 permits axial movement of the speech coil and prevents radial movement thereof.

A soft cardboard packing member 48 prevents axial movement of the field coil 20. Member 48 is not in contact with the center pole piece 14, as there is provided a clearance between these members for the free and unrestricted movement of the speed coil.

A spacing member 54 has been interposed between the outer layer of the speech coil 36 and the flared portion 42 so as to properly hold the speech coil in position. This member 54 extends substantially around the entire periphery of the cylindrical support 38 with the exception of a gap 56 between the ends 55 and 57 that permits leads 58 and 60 to be placed in the gap. After the terminals 58 and 60 have been positioned in the gap 56 several layers of tissue paper 64, as best seen in Fig. 6, are wrapped around the spacing member 54 and cemented thereto so as to reinforce the spacing member and so as to hold the leads 58 and 60 in the position disclosed in Figs. 3, 4 and 5.

After this has been done a cord or twine 66, that has been knotted at 68 so as to form the loop 70, is placed between the spacing member 54 and the flared portion 42 and the inner edge 71 of the diaphragm 34 so as to reinforce all of these parts upon being tied or otherwise secured in position, preferably at a point, not shown, diametrically opposite from the knot 68.

After the cord 66 has been secured in position the helixes 72 and 74 are formed from the leads 58 and 60, integral with the speech coil 36, each of these leads receives each a branch 76 and 78 of the bifurcated loop 70, as best seen Fig. 4. The branches 76 and 78 may be pulled into position by a suitable hook, similar to a crochet hook. After the branches 76 and 78, which are substantially the same length as the length of the helixes 72 and 74, have been drawn into position the helixes 72 and 74 are elongated as disclosed in Fig.

5, so that substantially only half of each helix is supported by each a branch 76 or 78. The elongation of the helixes 72 and 74 also has a tendency to wrap the leads 58 and 60 closer and more firmly on the branches 76 and 78.

The portion of the helix 72 in contact with the branch 76 and the portion of the helix 74 in contact with the branch 78 are now cemented by a reinforcing material 80 such as a good grade of cement or glue or the like, that has a tendency to reinforce or stiffen the branches near the end attached to the speech coil. The cord 66 circumscribing the coil support 38 is also cemented in position preferably by the same cement so as to rigidly hold the parts in position and so as to reinforce the entire structure.

The helixes 72 and 74 prevent crystallization of the leads 58 and 60 due to one end being secured at 82 or any other suitable terminal board and the other end vibrating with the speech coil. It can be readily seen that this is a structure easily constructed, requiring few parts, eliminating the pigtails now used in the construction of acoustic devices, eliminating the soldering of the pigtail to its lead and at the same time producing a reliable structure which will stand up under hard use and abuse.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. An acoustic device comprising an electromagnet, a diaphragm, a support for said diaphragm, a speech coil, a speech coil supporting member, said member holding the diaphragm and the speech coil in a relative fixed position, a flexible support carried by said member and a reinforcing member cooperating with the flexible support in supporting the terminals of the speech coil.

2. An acoustic device comprising a magnetic field, a sound responsive diaphragm, a speech coil, a supporting member for said speech coil said supporting member being fixedly attached to said diaphragm, a support for the terminals of said speech coil, said terminals being formed into a helix adjacent to the supporting member, said support engaging part of the helix so as to support the end of the helix adjacent to the speech coil, the other end of the helix being free to move thereby preventing failure of the terminals caused by the vibration of the speech coil.

3. In an acoustic device, a speech coil having a terminal formed into a helix near the speech coil, a support for the end of the helix adjacent to the speech coil, said support permitting the other end of the helix to flex, the helical portion absorbing the vibrations of the coil so as to prevent breakage of the terminals.

4. A device according to claim 3 in which the support for the helix includes a flexible cord passing into the end of the helix.

5. A device according to claim 3 in which the support for the helix includes a flexible fibrous member cemented to the helix.

6. A device according to claim 3 in which the support for the helix includes a flexible loop passing into the end of the helix.

7. A device according to claim 3 in which the support for the helix includes a flexible loop cemented to the end of the helix.

8. A device according to claim 3 in which the support for the helix includes a reinforced flexible loop passing into the helix.

9. In an acoustic device, a speech coil having a pair of terminals, each of said terminals being formed into a helix, a support for one end of each helix, said support engaging one end of each of the helixes so that the opposite end is free to flex, the helical portion absorbing the vibrations of the speech coil so as to prevent breakage of the terminals.

10. A device according to claim 9 in which said support includes a bifurcated member, each branch of said bifurcated member engaging a helix.

11. A device according to claim 9 in which said support includes a bifurcated member, each branch of said bifurcated member passing into a helix.

12. A device according to claim 9 in which said support includes a branched loop, each branch of said loop passing into a helix.

13. A device according to claim 9 in which said support includes a bifurcated flexible member and a reinforcing means for said flexible member.

14. A device according to claim 9 in which said support includes a branched flexible loop, each branch of said loop passing into a helix, and a reinforcing member for said bifurcated member.

15. A device according to claim 9 in which said support includes a bifurcated loop, each branch of said loop engaging a helix and a reinforcing member for cementing said branches to said helix.

16. In an acoustic device, a speech coil having a pair of terminals, each of said terminals being formed into a helix adjacent to the speech coil, a cylindrical member for supporting said speech coil, and a support for the helixes, said support fixing one end of each of said helixes to said cylindrical member so that the vibrations of the movable coil are absorbed by said helixes so as to prevent breakage of said leads.

17. A device according to claim 16 in which said support includes a branched loop carried by said cylindrical member, each of the branches of said loop engaging an end of said helixes.

18. In an acoustic device, a speech coil having a terminal lead, said lead being formed into a helix at or near the speech coil, flexible means attached to the coil to support the adjacent end of said helix, and means securing one end of the helix to the flexible means so as to localize flexing of the lead in the remote portion of the said helix.

19. In an electrical apparatus having a movable coil, and a support for said coil, the combination comprising, a terminal lead joining the coil and carried by the support, said lead being formed into a helix, flexible means carried by the support and engaging part of the helix so as to support it from one end, and means for localizing flexing of the lead in the remote end of the helix upon movement of said coil.

JOHN D. SEABERT.