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2,492,255

SEALED-COIL TYPE VIBRATORY MAGNET LOUDSPEAKER

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2 Sheets-Sheet 1

Fig. 1.

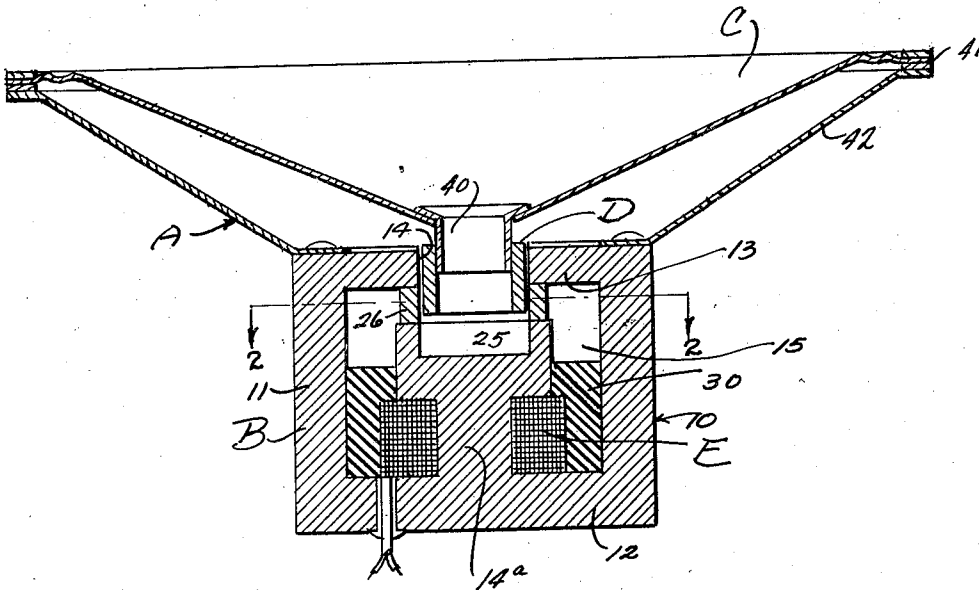
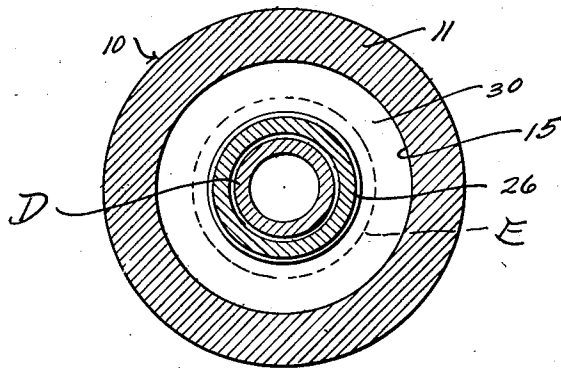


Fig. 2.



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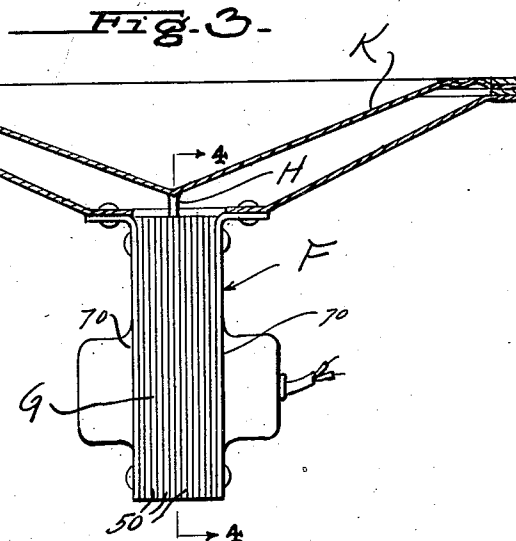
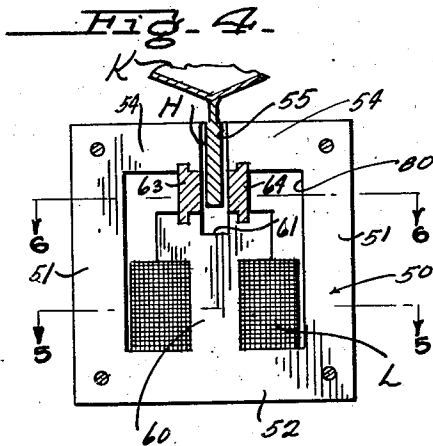
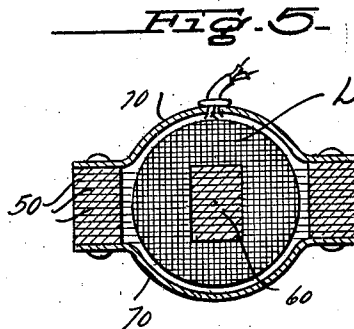
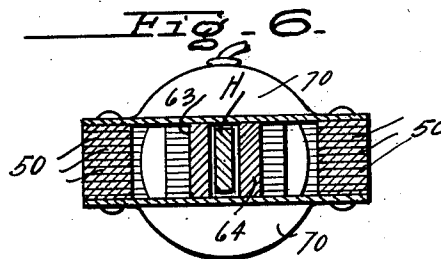
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SEALED-COIL TYPE VIBRATORY MAGNET
LOUDSPEAKER

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1 Claim. (Cl. 179—119)

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This invention relates to improvements in dynamic speakers.

The primary object of this invention is the provision of a loudspeaker which can safely be used in areas where there is likelihood of explosions occurring, due to sparking.

A further object of this invention is the provision of an explosion proof loud speaker construction wherein the voice coil is hermetically sealed so that in the event of breakage thereof no exposed sparks will occur. In this connection the device is particularly well adapted for use in areas where some explosive is stored or highly volatile matter suspended in the air, such as in connection with ammunition plants, gas manufacturing plants, oil refineries, and in areas where highly volatile explosive dust particles are present.

Other objects and advantages of the invention will be apparent from the following detailed description.

In the accompanying drawings, forming a part of this specification, and wherein for the purpose of illustration are shown two typical forms of the invention—

Figure 1 is a cross sectional view thru the first form of the improved electro-dynamic loud speaker.

Figure 2 is a cross sectional view taken substantially on the line 2—2 of Figure 1.

Figure 3 is a side elevation, partly in cross section, of the second form of loud speaker.

Figure 4 is a cross sectional view taken substantially on the line 4—4 of Figure 3.

Figures 5 and 6 are cross sectional views taken substantially on their respective lines in Figure 4 of the drawings.

In the drawings, wherein similar characters designate corresponding parts thruout the several views, the letter A may generally designate the first form of loud speaker. It comprises an improved magnetic structure B having a diaphragm C vibrantly mounted thereon with which is associated a permanent magnet D within the magnetic field created by the current in the voice coil E.

The structure B preferably consists of a cylindrical-shaped soft iron casing 10 including a cylindrical side wall structure 11; bottom wall structure 12 and annular top wall flange 13 defining an opening 14 adapted to receive therein the permanent magnet D. The housing structure 10 within the compartment 15 is provided with a core 14a upon which the voice coil E is wound in accordance with the impedance desired. The core 14a is enlarged at its upper end, defining an

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upwardly facing socket or recess 25. An annular ring 26 of brass or some non-magnetic material seals the compartment 15 between the top of the core and the bottom surface of the annular wall 13 and assists in guiding the permanent magnet within the passageway therein; the opening 14 and the socket 25 wherein the permanent magnet D is mounted for movement. With this arrangement the compartment 15 is hermetically sealed and the winding E may be further sealed by means of some special sealing compound 30.

The permanent magnet D is preferably of some relatively thin tubular, high grade permanent magnetic material, such as Alnico and it is closely spaced within the socket to reduce the air gap to a minimum.

The diaphragm C is of any approved type including a central piece 40 upon which the permanent magnet is secured in any desired manner; the peripheral structure 41 of the diaphragm having connecting arms 42 which are mounted upon the casing 10 in any approved manner so as to permit the diaphragm to properly vibrate.

The casing 10 may be of soft iron, powdered iron or any other suitable magnetic material.

In the form F shown in Figure 3 the magnetic structure G is differently constructed than in the first form. I prefer to provide a plurality of soft iron laminations 50 of any desired number which in assembled relation define side walls 51; a bottom wall 52 a top inwardly extending wall flange 54 having a socket 55 for receiving the permanent magnet H attached to the diaphragm K. The laminations furthermore have extensions to provide a core portion 60 receiving the voice coil or winding L thereon. The core portion has top lateral extensions and defines at 61 a continuation of the socket 55. Spaced guidance pieces 63 and 64 are secured between the wall portions 54 and the top core 60.

The casing structure 70 consists of brass or some other non-magnetic material. It completely covers the opposite sides of the laminated magnetic structure. The plates of which it is formed have extensions to enclose the coil L. These closure plates may be secured with the laminations by riveting or in any other approved manner. The closure plates together with the laminations of the permanent magnet and the guidance pieces 63 and 64 define a compartment 80 in which the voice coil L is hermetically sealed, so that there can be no liability of explosion of free gas or suspended matter in the event the coil breaks and a spark occurs.

It is to be particularly noted that no windings are associated with the vibrating diaphragm.

From the foregoing it is obvious that a loud speaker has been provided which will operate with safety in areas where an explosion is likely to occur, due to free sparking, of a defective coil or wire break. This is brought about by the use of a permanent magnet, as such, operating within the magnetic field of a stationary voice coil.

I do not wish to be limited to any particular type of winding, since the impedance and power rating of the loud speaker will determine the extent and nature of the winding.

Various changes in the shape, size and arrangement of parts may be made to the form of invention herein shown and described without departing from the spirit of the invention or the scope of the claim.

I claim:

A device for interconversion of electrical oscillations and mechanical vibrations for operation in hazardous locations comprising a housing structure of magnetic material having a compartment therein and a core portion connected as a part thereof and extending into the compartment, said housing including a top wall having an opening therein, a voice coil associated with said core within said compartment, a member of non-magnetic material located between said top wall and said core, out of contact with said coil and

surrounding the opening in said top wall and hermetically sealing off said compartment, and a member of magnetic material located wholly externally of said compartment and located within the opening of said top wall in position to be acted upon by the magnetic field created by current flowing in said voice coil whereby change in the strength of the magnetic field will result in axial displacement of said member of magnetic material.

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