Dec. 5, 1967 S. D. WRAY 3,356,796

FIELD CASE ASSEMBLY FOR LOUDSPEAKER

Filed Aug. 11, 1964

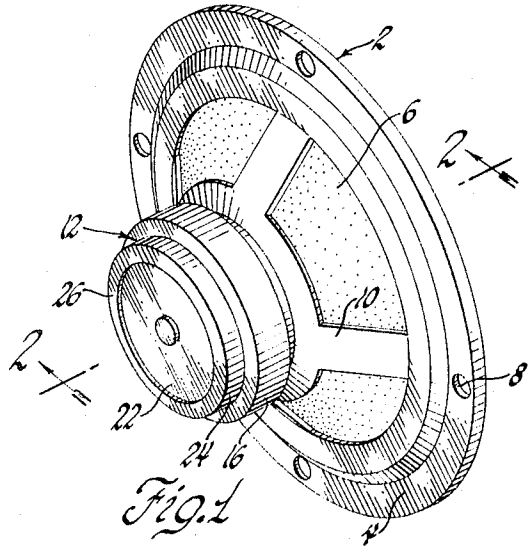


Fig. 1

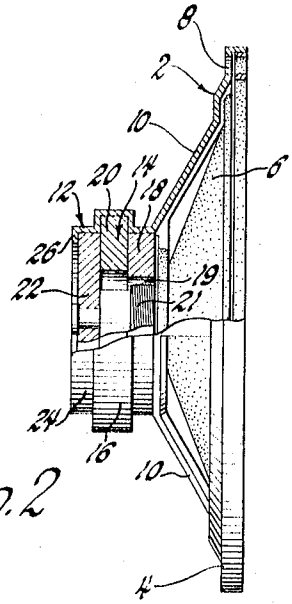


Fig. 2

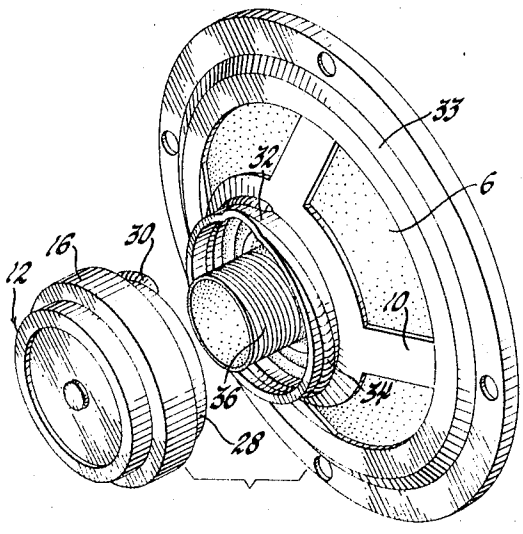


Fig. 4

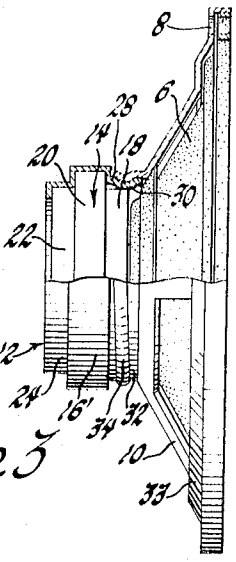


Fig. 5

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FIELD CASE ASSEMBLY FOR LOUDSPEAKER

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ABSTRACT OF THE DISCLOSURE

Loudspeaker assembly comprising a unitary field housing and speaker cone support, a field assembly tightly secured by and within the field housing and having an annular opening facing the speaker cone to receive a voice coil. In a second embodiment, the unitary structure is divided into two mutually engageable threaded portions.

Summary of the invention

This invention relates to loudspeaker construction and more specifically to supporting frame means for the driving field magnet and speaker diaphragm.

Speaker means for translating modulated electrical waves into sound waves consist generally of two major portions, the driving magnetic structure and the vibratable diaphragm. One of the popular forms of speaker is the permanent magnet cone speaker which is generally in current use. This form usually utilizes a permanent magnet formed of Alnico to produce a strong field in the gap adjacent a voice coil mounted on the small end of the speaker cone. Recently the use of ferrite magnets has become more popular and widespread. They provide either a stronger magnetic field for the same sized unit or permit the use of a smaller magnet to produce the same field strength. The cost is competitive.

It is an object in making the present invention to provide a novel basket-field case assembly for loudspeakers.

It is a further object in making the present invention to provide a simplified supporting frame structure for a ferrite magnet powered cone speaker assembly.

It is a still further object in making this invention to provide a novel supporting frame structure for a loudspeaker which can be easily formed and is of rugged construction.

With these and other objects in view which will become apparent as the specification proceeds, my invention will be best understood by reference to the following specification and claims and the illustrations in the accompanying drawings, in which:

FIGURE 1 is a perspective view of a speaker construction embodying my invention;

FIG. 2 is a side elevation, parts being broken away and shown in section taken on line 2—2 of FIG. 1;

FIG. 3 is a view similar to FIG. 2 of a modified form of my invention; and,

FIG. 4 is a perspective view showing parts in spaced relation of the modification shown in FIG. 3.

Referring now more particularly to the drawings, as previously stated the present design includes the use of ferrite magnets as the driving force for the speaker and in the modification shown in FIGS. 1 and 2 the supporting frame or basket-field case assembly for the speaker is unitary. This one piece structure generally shown at **2** includes a flanged central rim portion **4** adapted to support the outer rim of a speaker cone **6** which is provided with a series of holes **8** peripherally spaced through which bolts may be inserted for clamping the speaker to a supporting housing. Integral radial arms **10** extend inwardly from the inner surface of the rim portion **4** to a central substantially cylindrical housing **12** which is the main support for the ferrite magnetic driver core **14**.

This cylindrical housing is not of the same diameter throughout its axial length but includes a central portion **16** of greater diameter which acts as a clamping section to keep the ferrite core member against axial movement.

The magnet structure per se is formed of a top plate section**18** having an annular groove **19** for the voice coil, a central magnet portion **20** and a bottom plate section **22** which are secured together prior to their assembly into the housing. The cylindrical housing portion is originally formed with the smaller portion **24** of the same diameter as portion **16** and with the rear or bottom face open to allow the insertion of the assembled magnet structure **20** from the rear or bottom face. After the magnet assembly has been inserted into the housing or casing the whole structure is placed in a position to have strong magnetic fields applied which forces crimp in the reduced section **24** closely around the magnet and fold the edge **26** over the back. This may be done through the use of apparatus known as a Magnaform machine. After the magnet assembly **14** has been inserted in the housing **12**, the housing is placed in the Magnaform machine and current applied and the open end of the metal housing is folded tightly against the magnet structure to make the whole one unitary part. Thereafter the cone diaphragm **6** may be assembled with the voice coil **21** in proper relation to the annulus **19** provided therefor in the magnetic assembly. It will thus be seen that this construction provides a simple and rugged assembly of parts which will withstand a considerable amount of vibration such as must be endured by parts for automotive use and further that there are no extra or loose parts used to assemble the magnet to the field case, this being accomplished by the forming of the metal closely around the field by strong magnetic fields.

In the modification shown in FIGS. 3 and 4 the field case with its magnet is assembled as one unit in the same manner and the basket and cone are assembled as a separate unit, the two parts being secured together by a coarse threaded section or edge which can be screwed together. As in the form of invention shown in FIG. 1 the magnet assembly **14** consisting of the magnet **20** and a top and bottom plate **18** and **22**, respectively, is first secured together and then inserted in the same cylindrical shaped casing **16'** as in the first instance. This cylindrical casing has its open end magnetically formed around the magnet assembly but in this instance the upper or top throat instead of being integral with the basket portion is a separate cylindrical collar **28** having a coarse threaded ridge **30** thereon. In like manner the lower or smaller end of the basket **33** is formed into a similar collar section **32** which has a spiral ridge **34** acting as a coarse mating thread within which the first spiral thread **30** on the collar **28** may be inserted and screwed together to fasten the two parts in juxtaposition. Thus the magnet assembly can be formed on a Magnaform machine tightly inside of the casing and the basket section **33** assembled together with the speaker cone **6** and the voice coil **36** and then the two parts screwed together much in the same manner as the cover on a canning jar to secure them. This form of my invention has the added advantage that if either the magnet assembly and casing or the cone or voice coil develop defects and have to be discarded, it can be detached from the other half of the assembly and a new one replaced with substantially little difficulty whereas in the first instance the whole unit must be discarded.

It will be seen from the above that I have provided a very simple, rugged and easily assembled loudspeaker construction.

What is claimed is:

1. A transducer for converting electrical to mechanical waves comprising a permanent magnet assembly having an annular opening in one face, a vibratable diaphragm, a driving coil secured to the diaphragm and extending from one side thereof, a metallic supporting frame having a cylindrical portion of proper size for accommodating the permanent magnet assembly with one end open for the insertion thereof which is capable of being deformed around the end of the permanent magnet assembly to tightly clamp it in place without the use of any other means, said vibratable diaphragm being supported in the opposite end of the metallic supporting frame with the driving coil facing the permanent magnet assembly which has the annular opening in the side to accommodate said driving coil.

2. A transducer as defined in claim 1 in which the metallic supporting frame is a unitary part.

3. A transducer as defined in claim 1 in which the metallic supporting frame consists of two parts having detachable means for securing the parts together to form a single assembly.

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