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M. L. PRICE
LOUD-SPEAKER

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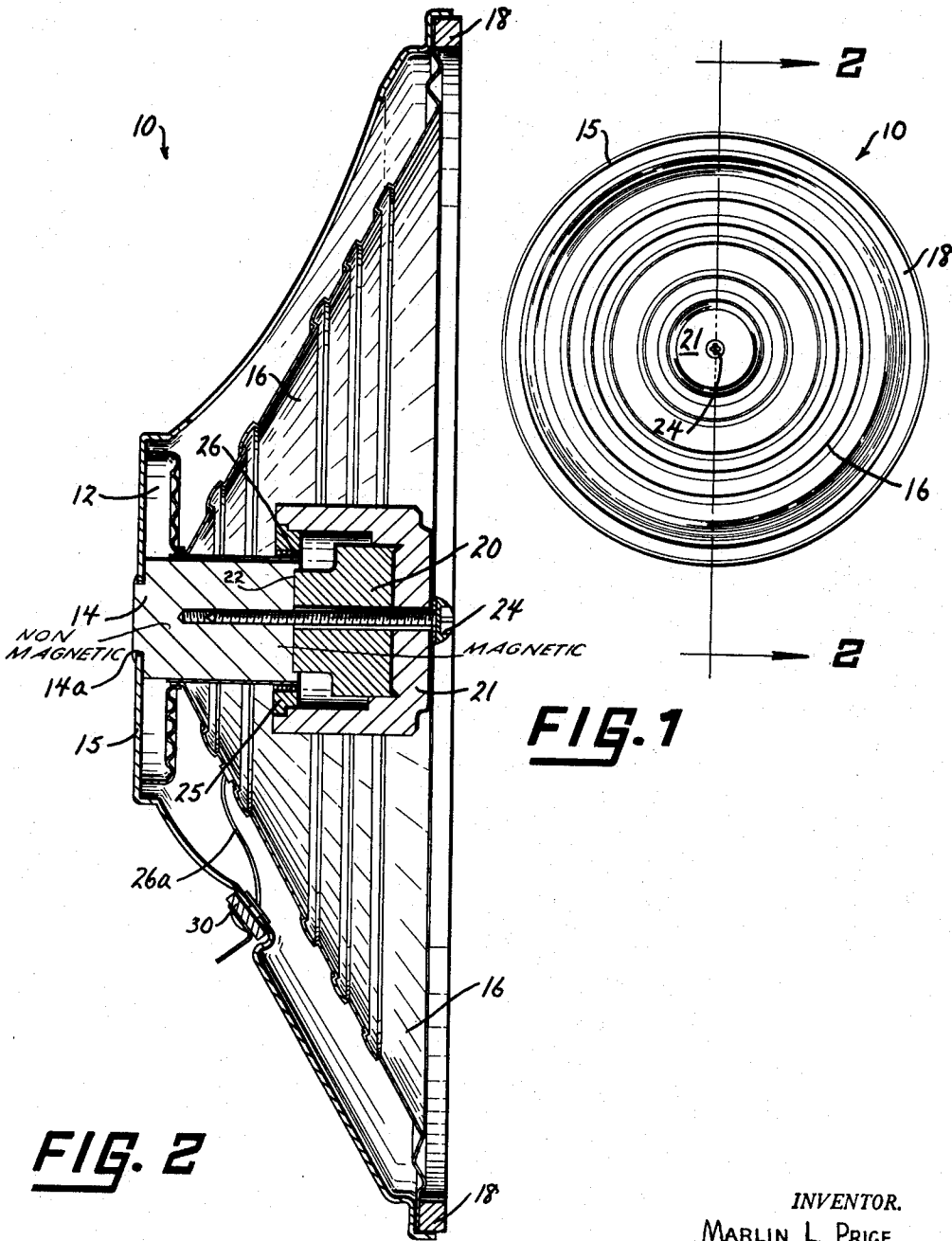


FIG. 2

FIG. 1

INVENTOR.
MARLIN L. PRICE

BY

Lockwood Woodland Smith & Weikant
Attorneys

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LOUD-SPEAKER

Marlin L. Price, Huntington, Ind., assignor to Utah Radio Products Corporation, Huntington, Ind., a corporation
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The present invention relates generally to a loud-speaker structure, and more particularly to a new and improved loud-speaker structure of the inverted permanent magnet type which utilizes a novel integral core tip and coupling piece.

As is known, prior magnetic type loud-speakers each generally utilized a separable core tip and coupling piece, typically secured together by bolt means, for example. Such a relationship resulted in added assembly operations, as well as increased costs for the finished loud-speaker, due not only to the aforesaid added assembly time, but also to the required additional part.

Accordingly, and by virtue of the instant invention, the applicant has provided a new and novel loud-speaker structure having a magnetic circuit which includes an integral core tip and coupling piece, the latter affording efficient energy transfer during use, as well as ease and simplicity during the assembly operation. More specifically, the applicant has provided a new and novel coupling device for a permanent magnet type loud-speaker which is 100% iron at the end thereof adjacent the magnet of the loud-speaker and 100% brass or aluminum at the end thereof adjacent the basket of the loud-speaker, the latter serving as an insulator to thereby isolate the magnetic circuit from the metal basket.

In addition, the arrangement of the instant invention permits ready assembly of the loud-speaker, as, for example, through the pre-alignment of the cone, the voice coil and spider assembly with reference to the magnetic circuitry of the loud-speaker. Moreover, by reason of the inverted relationship of the loud-speaker, i.e. where the magnetic structure is disposed within the speaker basket, the finished unit has a minimum depth and may be mounted in areas heretofore found impossible for effective loud-speaker positioning.

Accordingly, the principal object of the present invention is to provide a new and novel inverted permanent magnet type loud-speaker structure.

Another object of the present invention is to provide a new and improved loud-speaker structure utilizing a novel integral core tip and coupling piece defined by a maximum disposition of iron at one end thereof and a maximum disposition of brass and/or aluminum at its opposite end.

A further and more general object of the present invention is to provide a new and novel permanent magnet type loud-speaker structure which permits the preassembly and the pre-alignment of its components, and which, at the same time, has an inverted relationship whereby the assembled speaker has a minimum depth, while at the same time maintaining effective electrical characteristics.

Other objects and a better understanding of the invention will become more apparent from the following description, taken in conjunction with the accompanying drawing, wherein

FIG. 1 is a view in front elevation showing a loud-speaker formed in accordance with the instant invention; and,

FIG. 2 is an enlarged view in vertical section, taken at line 2-2 of FIG. 1 of the invention and looking in a direction of the arrows, showing details of the applicant's novel loud-speaker structure.

For the purposes of promoting an understanding of the principles of the invention, reference will now be made

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to the embodiment illustrated in the drawing and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now to the figures, the applicant's new and novel loud-speaker structure 10 typically comprises a spider 12 through which a unitary or integral core tip and coupling piece 14 is disposed, the latter to be discussed in detail herebelow. A basket 15, typically made from metal, is positioned behind the spider 12 and is received in a groove 14a formed in the rear surface of the integral core tip and coupling piece 14. A cone 16 is conventionally disposed within the basket 15 by means of a gasket 18, in a manner commonly known in the trade.

A permanent magnet 20 is disposed at one end of the integral core tip and coupling piece 14, with a pot 21 being disposed about the aforesaid permanent magnet 20. The integral core tip and coupling piece 14, the permanent magnet 20 and the pot 21 are secured together in operative relationship by means of a nonmagnetic screw 24 which extends through cored openings in the permanent magnet 20 and the pot 21 into a threaded opening in the integral core tip and coupling piece 14. As should be evident from FIG. 2, the pot 21 has a washer 25 disposed about the inner periphery of the open end thereof, with a magnetic gap being provided between the pot 21 and the integral core tip and coupling piece 14. Magnet 20 has a base portion of relatively large diameter and a portion 22 of lesser diameter adjacent the magnetic gap, thereby to improve efficiency by reducing flux leakage without material reduction of total useful flux. A voice coil 26 is disposed in the magnetic gap and around the integral core tip and coupling piece 14, with leads 26a extending therefrom to a terminal board 30 positioned on the outer surface of the basket 15. It should be understood, of course, that the terminal board 30 provides the necessary means for connecting the loud-speaker 10 with an audio amplifier found in the overall sound reproduction system.

Referring again to the novel integral core tip and coupling piece 14 which forms an important feature of the instant invention, such coupling device is a sintered part formed by infiltrating brass or aluminum with pure iron in the sintering process, resulting in a coupling piece which is substantially 100% iron at its end adjacent to the permanent magnet 20, and substantially 100% brass or aluminum at its end adjacent to the metal basket 15. Such material disposition is important, in that the optimum amount of iron at the end of the integral core tip and coupling piece 14 adjacent the magnet 20 becomes part of the magnetic circuit, and affords efficient energy transfer characteristics during the use of the loud-speaker. On the other hand, the optimum amount of brass or aluminum at the opposite end of the integral core tip and coupling piece 14 serves as an insulator, thereby isolating the magnetic circuit from the metal basket 15.

The instant loud-speaker structure 10 is susceptible to ease in the assembly thereof, particularly inasmuch as the number of components has been reduced with the use of the new and novel integral core tip and coupling piece 14, thereby resulting in a faster assembly operation. In addition, the novel relation of components of the loud-speaker permits free movement of the voice coil 26 through the magnetic gap without the necessity of specialized production line fixtures to insure centering of the

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permanent magnet 20 and the pot 21. The actual assembling is typically accomplished by first aligning the metal parts, i.e. the basket 15 and the integral core tip and coupling piece 14; pre-aligning the cone 16, the voice coil 26 and the spider 12, and placing such structure on the integral core tip and coupling piece 14; and, then assembling the magnetic circuitry, principally defined by the magnet 20 and the pot 21, through screw means 24.

From the preceding, it should be apparent that the applicant has provided a new and improved permanent magnet type loud-speaker structure utilizing a novel integral core tip and coupling piece which affords efficient energy characteristics during the use of the loud-speaker and which, at the same time, permits effective loud-speaker assembly. Moreover, being an inverted type speaker, a versatility factor is present for excellent usage thereof in various speaker applications.

The aforescribed loud-speaker structure is, of course, susceptible to changes within the spirit of the invention as, for example, changes of dimensioning as well as a configuration of the various parts forming the assembled structure. The above description, therefore, should be considered illustrative and not as limiting the scope of the following claims.

I claim:

1. In an inverted loud-speaker structure, a basket having a central portion with an aperture therein, an integral cylindrical core tip and coupling piece, a permanent magnet and a pot, said basket, said integral core tip and coupling piece, said permanent magnet and said pot being secured together, and said integral core tip and coupling piece being a sintered part having one end of magnetic material engaging a portion of said permanent magnet and an opposite end of non-magnetic material projecting through said aperture and engaging the front and rear

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faces of said central portion around said aperture to secure said integral core tip and coupling piece to said basket, said pot having an open end portion disposed radially outwardly from said one end of said integral core tip and coupling piece to provide a magnetic gap between said pot and said integral piece, said permanent magnet having a base portion of relatively large diameter, and the said portion of said magnet which engages said integral core tip and coupling piece being of a diameter smaller than said base portion and smaller than said one end of said integral core tip and coupling piece to minimize flux leakage, and a voice coil located radially outwardly of said integral piece and radially inwardly of said pot end in the magnetic gap.

2. In a loud speaker structure, a basket, a magnetic circuit including a magnet and a pot, and a unitary core tip and coupling piece disposed between said basket and said magnet, said unitary core tip and coupling piece being a sintered part and wherein said unitary core tip and coupling piece at an end proximate said magnet is substantially 100% magnetic material and wherein said unitary core tip and coupling piece at an end proximate said basket is substantially 100% non-magnetic material.

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