

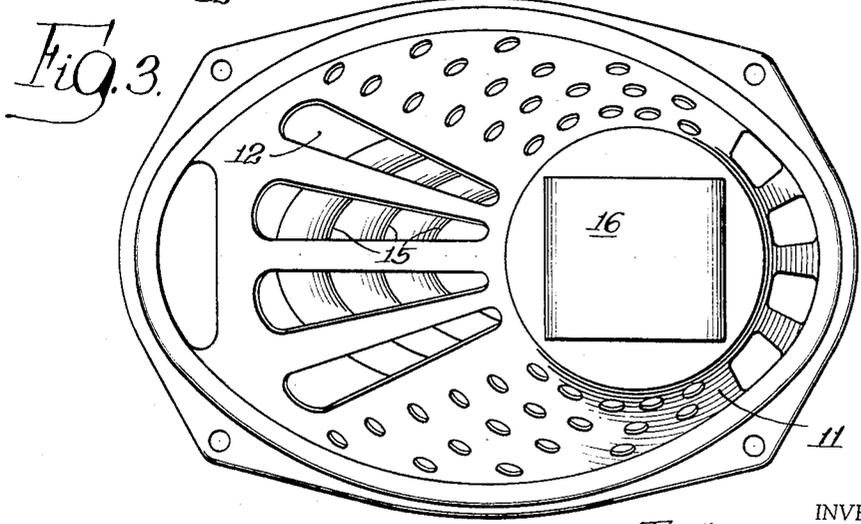
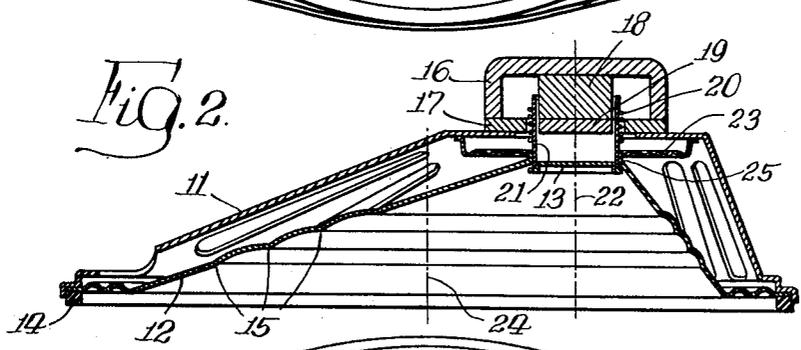
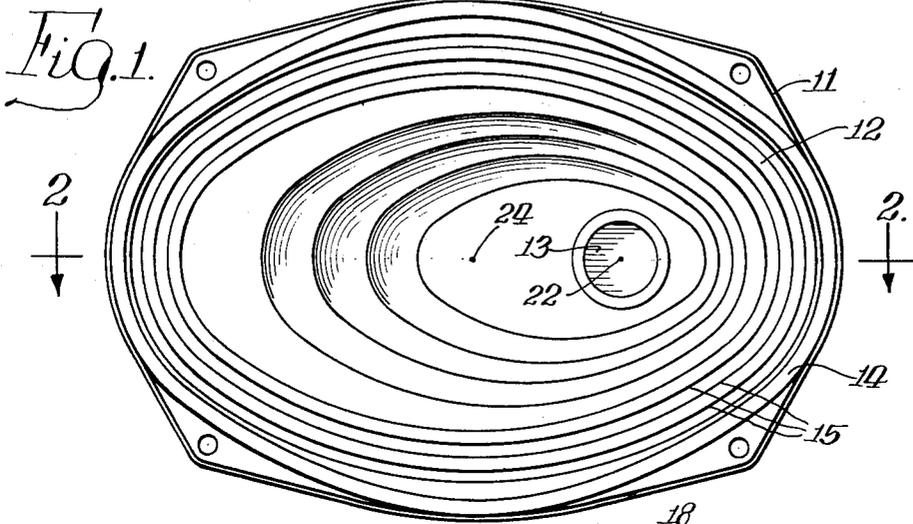
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3,180,945

LOUDSPEAKER

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3,180,945

**LOUDSPEAKER**

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 1 Claim. (Cl. 179—115)

This invention relates to a loudspeaker and more particularly to the construction of the cone of a loudspeaker.

It is an object of this invention to provide a new and improved loudspeaker having enhanced characteristics both acoustically and spatially.

There are many problems involved in designing sound systems which properly reproduce acoustical waves which are accurate representations of electrical signals.

One of the particular areas of difficulty is in the loudspeakers used in radios, television sets and in high fidelity phonographs. Many systems have been designed which attempt to solve these problems. One such system provides several speakers, some of which are large "woofer" type speakers and others are small "tweeter" type speakers. Other solutions have been to provide very expensive and complicated speaker baffles and speaker enclosures which accentuate certain of the sounds produced by the speaker and minimize others. Still a further solution has been the provision of complicated electrical cross-over circuits for splitting the sound signals between several speakers.

The problems of sound reproduction include, among others, the back pressure developed in closed systems, the inability of small speakers to properly produce low-frequency notes and difficulties encountered in large diameter speakers in producing high-frequency notes. Additionally, speakers have resonant points which emphasize certain signals supplied to them and de-emphasize others.

It is therefore an object of this invention to provide a loudspeaker with improved resonant characteristics.

It is a more specific object of this invention to provide a loudspeaker with improved low and high frequency response characteristics.

It is still a further object of this invention to produce a loudspeaker having smaller physical dimensions which has the operating characteristics of both a small and a large speaker. Thus, the loudspeaker of the present invention is capable of being installed in a relatively small space by reason of the fact that it may be constructed in somewhat of a wedge shape.

An additional object of this invention is to provide a speaker which will produce sound waves with a high degree of fidelity corresponding to the electrical signal impulses supplied to it without providing expensive speaker enclosures.

Accordingly, one feature of this invention is to provide a dynamic loudspeaker including a support member, an electro-mechanical transducer mounted on said support member and a movable cone having a configuration defined by a surface connecting a circle having a first axis located at the center and normal to the plane of said circle and an ellipse having a second axis located at the intersection of the major and minor diameters and normal to the plane of said ellipse, the planes being spaced from each other and the axes spaced from and parallel to each other. Means are further included for joining the cone to the transducer and the support member for producing sound waves in response to actuation by the transducer.

Another feature of this invention is to provide a loudspeaker with a cone having a surface configuration defined by that portion of a conical surface contained between a pair of parallel planes intersecting the longitudinal axes of said conical surface at an acute angle.

Still a further feature is to provide an elliptical off-centered cone having its larger end elliptical in shape and its smaller end circular in shape, the end portions substantially parallel to each other, portions of said cone having relatively steep slopes and portions having relatively shallow slopes, said circular end off center with respect to the center of the elliptical end.

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings wherein:

FIGURE 1 is a front view of a speaker incorporating the invention;

FIGURE 2 is a sectional view of the speaker of FIGURE 1 along section lines 2—2; and

FIGURE 3 is a rear view of the speaker of FIGURE 1.

Referring now more specifically to FIGURE 1, therein is shown a basket or housing 11, supporting the peripheral edge of a cone 12 provided with a dust cap 13. The dust cap 13 is mounted over a voice coil (more clearly shown in FIGURE 2). A gasket 14 rigidly holds the peripheral edge of cone 12 to the basket 11. A series of corrugations represented by lines 15 are provided to stiffen the cone for movement under the urging of the voice coil along an axis substantially perpendicular to the plane of the FIGURE 1.

As best seen in FIGURE 2, a magnetic yoke 16 is mounted on a top plate 17 forming an integral part of the basket 11. A magnet 18 and a pole piece 19 are securely mounted on the magnetic yoke 16 and are spaced from the top plate 17. A voice coil 20 on a cylindrical support 21 is mounted between the top plate and the pole piece for longitudinal motion along an axis 22.

The voice coil 20 is provided with a pair of terminals (not shown) for coupling it to an electrical signal reproducing system. The support member 21 is mounted on the suspension member or spider 23 for proper spacing of the voice coil with respect to the basket 11.

An additional axis 24 indicated in FIGURE 2 as a line and in FIGURE 1 as a dot represents an axis normal to the plane of the elliptical end portion and is normal to the intersection of the major and minor diameters of the elliptical end portion. In the embodiment shown, the elliptical end portion is that portion affixed to the basket and the circular end portion that joined to the voice coil.

As shown in FIGURE 3, the basket 11 is provided with a series of cutout portions for the proper baffling and support of the cone and voice coil assembly.

In operation, when electrical signals are provided by reproducing means current flows through voice coil 20 and reaction of the magnetic fields causes longitudinal motion of the voice coil and support 21. The circular end 25 of the cone attached to support member 21 moves with the voice coil and acoustical sound waves are generated by the surface of the cone. The corrugations prevent sectional node vibration at lower frequencies.

The portion of the cone having the shallow slope is comparable to a large diameter speaker and reproduces the low frequency notes efficiently. The portions of the cone having steep slopes generate the higher frequency sound waves well and are comparable to a speaker of small dimensions. Therefore, a loudspeaker has been provided which has the capabilities of producing with great accuracy sound waves of both high and low frequencies. Thus, where space or economic limitations do not permit the use of multiple units or extensive baffling, a speaker has been provided which to a large extent accomplishes the same results.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without depart-

ing from the spirit and scope of the invention as defined in the appended claim.

I claim:

A loudspeaker comprising: a basket having an elliptical end portion and a circular end portion; a transducer for producing mechanical motion in response to received electrical signals mounted on said circular end portion of said housing; a cone having a surface configuration defined by that portion of a conical surface confined between a pair of parallel planes intersecting the longitudinal axis of said conical surface at an acute angle; and means joining the cone to said transducer and said basket.

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