July 4, 1967 D. ARDEN 3,329,236

SPEAKER ENCLOSURE

Filed June 3, 1966

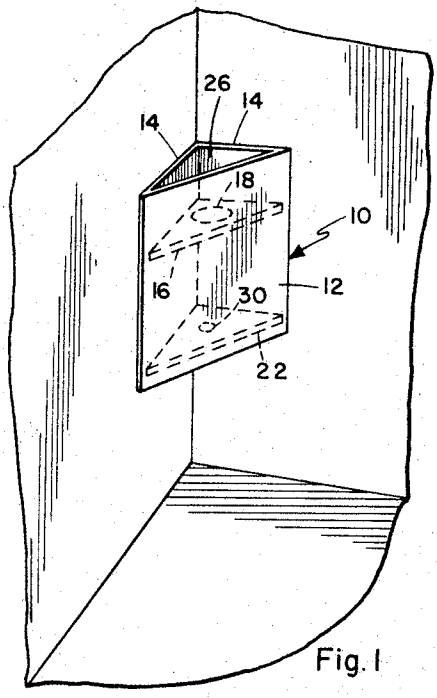


Fig. 1

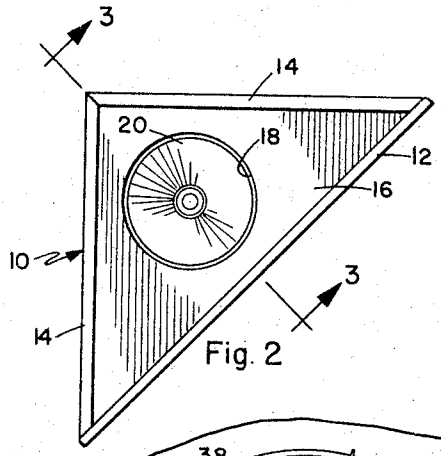


Fig. 2

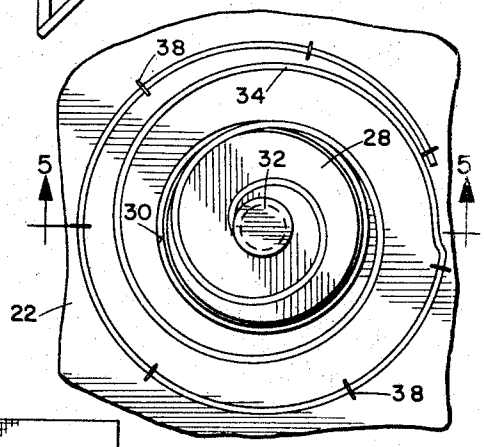


Fig. 4

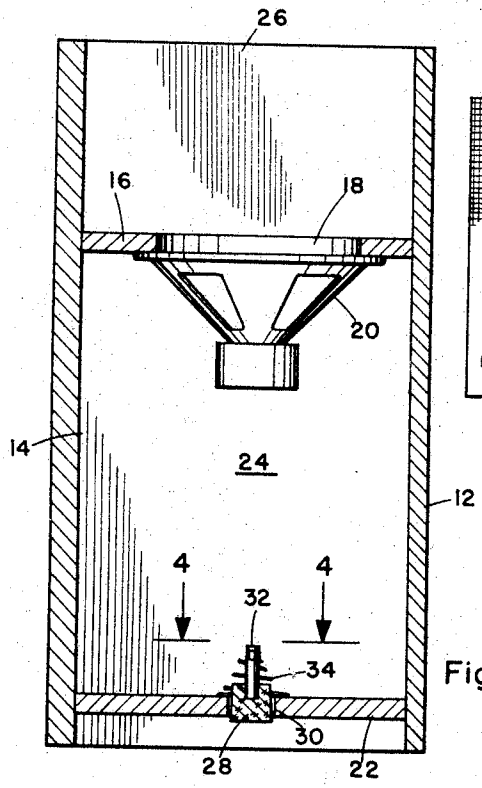


Fig. 3

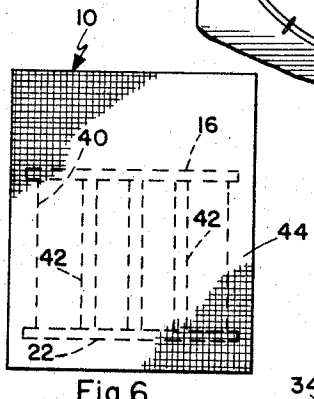


Fig. 6

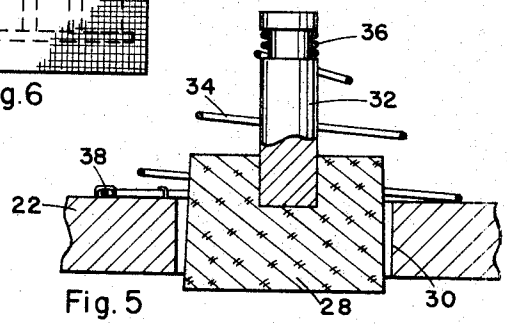


Fig. 5

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SPEAKER ENCLOSURE

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The present invention relates to loudspeakers and specifically to a speaker enclosure which provides wide angle distribution of sound over a wide range of frequencies.

It is a well known practice to install a loudspeaker in the corner of a room so that sound is reflected from the surfaces of the walls which form the corner. The sound is distributed evenly over a wide angle and improves the coverage of some types of speaker enclosures which tend to be somewhat directional.

The speaker enclosure disclosed herein, while adapted for mounting in a corner, has a corner baffle arrangement incorporated into its basic structure and will provide the desirable effect at any convenient location. Mounting the enclosure in a corner enhances the effect further. A wide range of frequency response, particularly bass response, is made possible by utilizing a pressure damping device, such as described in my U.S. Patent No. 3,159,719 entitled Speaker Enclosure. This damping device allows the enclosure to be small and compact, compared to other types of comparable bass response, and is particularly adaptable to the present enclosure.

The novel structure of the enclosure is illustrated in the drawing, in which:

FIGURE 1 is a perspective view of the enclosure mounted in a corner;

FIGURE 2 is an enlarged top plan view of the enclosure;

FIGURE 3 is a sectional view taken on line 3—3 of FIGURE 2;

FIGURE 4 is an enlarged fragmentary view taken in the direction of arrows 4—4 in FIGURE 3;

FIGURE 5 is a sectional view taken on line 5—5 of FIGURE 4; and

FIGURE 6 is a front elevation view of the enclosure, on a reduced scale, showing an alternative panel structure. Similar characters of reference indicate similar or identical elements and portions throughout the specification and throughout the views of the drawing.

The speaker enclosure, generally indicated at **10**, is shown as a triangular box structure having a front panel **12** and side panels **14**, which latter joint at right angles to fit into a corner of two walls, as in FIGURE 1. Spaced down from the upper end of the enclosure is an upper panel **16** fixed transversely across the enclosure and having an opening **18**, below which is mounted a speaker **20**. A short distance up from the lower end of enclosure **10** is a lower panel **22** also fixed transversely in the enclosure, the space between the upper and lower panels comprising the speaker chamber **24**. The portions of front panel **12** and side panels **14** extending above the upper panel **16** constitute a corner baffle **26**, from which sound is reflected in all directions.

The enclosure **10** is preferably mounted in a corner as shown and spaced two or three feet above the floor, depending on the size of the enclosure and the height of the ceiling, it being noted that if the installation is too close to the ceiling, the enclosure **10** can be inverted. However, due to the incorporation of the corner baffle the enclosure can be used elsewhere, such as hung on a pole, or even mounted on legs to stand on the floor.

In order to minimize the size of the enclosure yet retain good bass response a damping plug **28** is fitted into an opening **30** in lower panel **22**. The plug is substantially cylindrical and of lightweight material such as cork, which is treated by paraffin, or similar sealer to prevent absorption of moisture or drying out. Plug **28** is a close fit in opening **30** and is mounted to move axially in the opening. A post **32** is fixed axially in the plug and extends into chamber **24**. Secured to the lower panel **22** around opening **30** is a spiral conical spring **34** having an upper end coil **36** which fits tightly around and secures the post **32**, the lower end of the spring being held by staples **38**, or the like. The spiral configuration of the spring prevents contact between adjacent coils and avoids undesirable resonance in the spring. Plug **28** is thus resiliently supported for limited axial motion within opening **30** and does not completely expose the opening at any time.

As described in the above mentioned U.S. patent, low bass notes of reasonable volume cause a large motion or excursion of the speaker cone. In a closed chamber this would compress the trapped air, which would resist the cone motion and thus subdue the sound output. With a large enclosure the compression is distributed through a large volume of air and the effect is not so pronounced, but in a small enclosure bass response is greatly reduced. The resiliently mounted plug acts as a piston driven by the changing air pressure in chamber **24** and relieves the compression caused by large speaker cone excursion. Compression is thus damped out and bass response is not subdued, distortion being minimized and a flat response ensured.

As an alternative, or in addition to the damping plug the enclosure may be constructed in the manner shown in FIGURE 6. The portion of the front panel between upper and lower panels **16** and **22** is cut out to provide an opening **40** having spaced bars **42**, which may be cut from the panel or inserted as separate elements. The panel is then covered by heavy fabric **44**, such as canvas, duck cloth, or the like, secured around the edges in any suitable manner. To prevent undesirable leakage of air from the speaker chamber the fabric **44** is sealed by a coating of filler material, such as aircraft dope, lacquer, or the like. The sealed fabric acts as a nonporous membrane and has sufficient flexibility to absorb excess pressure built up inside the enclosure. If the enclosure is to be free standing, or mounted with all sides exposed, the side panels can be treated in a similar manner if necessary.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawings are to be considered as merely illustrative rather than limiting.

I claim:

1. A speaker enclosure, comprising:

a box-like structure having a front panel and side panels;

an upper panel and a lower panel fixed transversely in spaced relation in said structure and enclosing a chamber therebetween;

said upper panel having a speaker opening therein;

said front and side panels extending beyond said upper panel and forming a sound reflecting baffle;

pressure relieving means in said enclosure comprising an opening in said lower panel, a spiral spring secured to said lower panel co-axially of said opening, and a plug carried by said spring for limited axial motion within said opening in response to variation of pressure within said chamber.

2. A speaker enclosure according to claim **1**, wherein said plug has a center post fixed therein and said spring has an upper end coil holding said post axial in said opening while permitting excursion of the plug.

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