APPARATUS FOR CONSTRUCTING A SPEAKER ENCLOSURE

6 Claims, 3 Drawing Figs.

ABSTRACT: The invention relates to portable panels which, when mounted into a corner of a room in conjunction with the walls of the corner, substantially encloses a speaker that can be attached to one of the panels and provides the enclosure with a horn duct that makes possible a wide range of frequency response, especially in the lower range.
APPARATUS FOR CONSTRUCTING A SPEAKER ENCLOSURE

The enclosure of this invention comprises at least one but preferably two panels, both being of similar trapezoidal configurations. One panel serves as the front speaker panel that is positioned into the corner making a slight angle with the vertical axis. The lower bottom edge of this trapezoidal-shape panel rests on the floor of the room while the converging lateral edges of the panel are placed in abutment with the vertical walls of the room to form an enclosure for a speaker that may be mounted to the panel. The enclosure has an upper opening defined by the shorter upper edge of the front speaker panel and the two walls converging at the corner. The second trapezoidal panel, also making a slight angle with the vertical axis but in the opposite direction, has its narrower portion positioned through the upper opening into the enclosure until its diverging lateral edges abut the vertical walls and the front surface of the second panel engages the upper edge of the front speaker panel.

The invention is described and claimed in terms of the structure of the two panels which may be purchased disassembled; in terms of the final assembly when one or both panels are mounted in predetermined positions into a corner; and in terms of the sequential steps required for installing the two panels into a corner to effect the speaker enclosure of this invention.

BACKGROUND OF THE INVENTION

This invention relates to a portable speaker enclosure which comprises, preferably, two separate panels; one serves as the front speaker panel that has a speaker opening to which a speaker can be mounted and the other panel is used as a horn duct upon being properly positioned with respect to the front speaker panel. Both panels can be readily positioned in a predetermined relationship into a corner to effect a speaker enclosure including a horn duct in conjunction with the walls and floor defined by the vertical corner of a room for instance. In the prior art, speaker enclosures that fit into a corner of a room and/or that couple with the walls of the corner have been depicted.

In U.S. Pat. No. 2,310,245, the speaker enclosure is a boxlike structure that is positioned into a corner and is provided with openings defined by the side edges of the front panel and the vertical walls of the corner to form horn portions for the speaker assembly. Baffles supported by the speaker structure funnel the sound to the corner from which it is emitted through the side horn portions.

Similar but slightly simpler constructions are shown in U.S. Pat. Nos. 2,731,101 and 2,994,399 in which the speaker enclosures are provided with straight and curved sidewalls, respectively, which cooperate with the walls of a corner of a room to provide horn sections for the speaker at each side of the enclosure.

A completely self-contained speaker enclosure is depicted in U.S. Pat. No. 3,203,502 which has side and top horn sections formed by baffles positioned in and supported by the enclosure.

A folder speaker enclosure described in U.S. Pat. No. 3,032,137 may be sold as a knocked-down package but it comprises nine panels which, upon being assembled as described in the patent, does not couple the panels with the walls to define the horn portions.

The present invention results in a much lower cost enclosure which comprises at least one, but preferably, two portable panels that can be readily installed by anyone following simple instructions without any special tools. The two panels are not permanently connected to each other or even provided with special connecting devices which differentiates from all the speaker enclosures known in the art.

The present invention can be installed into a corner of a room in a predetermined relationship to define a speaker enclosure having a horn duct when placed in a cooperative relationship with the floor and converging vertical walls of a corner. The two panels are maintained in a fixed relationship to each other when positioned on the floor and against the walls of the corner.

SUMMARY OF THE INVENTION

The present invention relates to a simple enclosure comprising at least one, but preferably, two separate, low cost panels which are portable and can be readily installed in a predetermined relationship into a corner to form a speaker enclosure that has the capability of producing sounds through the entire range of audible frequencies with good balance and fidelity. The installation can be performed without any special skills and, therefore, the invention results in permitting enjoyment of a high-fidelity music system at a low price at any location at home or away from home, wherever a corner exists or can be constructed and sound-system components are available.

One panel becomes the front speaker panel which is of a trapezoidal configuration having its bottom edge longer than the upper edge and the second panel, which also has a trapezoidal shape, serves as the horn duct portion if a horn duct is desirable.

The front speaker panel has a speaker opening to which a speaker or transducer can be fitted. The front speaker panel is positioned into a corner of a room so as to extend diagonally across the corner and at a slight angle with the vertical plane. The bottom edge, which is longer than the upper edge, rests on the floor and has its two ends or corners touching the walls. The diverging lateral edges of the front speaker panel abut the vertical walls of the room. The front speaker panel, when positioned into the corner as described, forms an enclosure in conjunction with the floor and vertical walls of the corner with the upper edge and the corner defining an opening into which the narrower portion of the second panel is slipped at a slight angle with the vertical axis until its diverging lateral edges abut the vertical walls and the front surface thereof engages the upper edge of the front speaker panel to form a horn duct for the speaker enclosure. The front speaker panel and the second panel are firmly supported by the floor and the walls to establish a rigid structure.

Sound waves emanating from the rear of the speaker mounted in the speaker opening of the front speaker panel are transmitted through the horn duct portion formed by the second panel and the corner of the room.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded frontal view of the front speaker panel and the second panel shown in predetermined positions ready for assembly. FIG. 2 is a perspective view of the two panels positioned in their predetermined relationship into a corner of a room to provide the corner speaker enclosure of the present invention. FIG. 3 is a transverse sectional view taken substantially along line 3-3 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 can be seen a front speaker panel 11 which is of an isosceles trapezoidal configuration. The panel 11 has a horizontal bottom edge 12 and an upper edge 13 that is generally extending parallel to and is shorter than the bottom edge 12. Lateral edges 14, 15 are converging as they extend in a generally upward, vertical direction from bottom corners 16 to the upper corners 17 of the panel 11. The front speaker panel 11 is provided with a circular opening 18 intermediate its four edges which is shown covered with a panel 21 in FIG. 2. A loud speaker or transducer 21 may be mounted to the periphery of the opening 18 so that the main body of the speaker or transducer 21 extends along an axis normal to the plane of the panel 11 as best seen in FIG. 3.

A second panel 22, which is used as a horn duct portion only, is also of an isosceles trapezoidal configuration similar to the front speaker panel 11. The second panel 22 has two horizontally extending edges, and upper edge 23 and a bottom edge 24. As depicted in the exploded view of FIG. 1 in which
the second panel 22 is seen in a position ready for assembly, the bottom edge 20 is shorter than the upper edge 23. Lateral edges 25, 26 of the second panel 22 are converging as they extend from the upper corners 27 in a generally downward, vertical direction to the lower corners 28 of the panel 22.

The front speaker panel 11 may be provided with a slip-proof channel 29 that laps over the bottom edge 12 as shown in FIG. 1. The channel 21 can be manufactured from a plastic or rubber material. The front speaker panel 11 and the second panel 22 can be manually assembled to form a speaker enclosure 31 with a corner 32 of a room consisting of two converging vertical wall panels 33, 34 and a horizontal floor panel 35 as best seen in FIGS. 2 and 3 or any three panels or boards assembled to define a corner.

The front speaker panel 11 is placed into the corner 32 so as to make a slight angle with the vertical plane and leaning towards the corner as best seen in FIG. 3. The bottom edge 12 rests on the floor panel 35 and extends diagonally across the corner 32 as seen in FIGS. 2 and 3. Each of the bottom corners 16 touch the vertical wall panels 33, 34 and each of the lateral edges 14, 15 abut along their entire lengths the surfaces of each of the converging vertical wall panels 33, 34. The enclosure 31 formed by the front speaker panel 11 and the corner 32 of the room is closed on all sides except at the top where the upper panel 36 results as defined by the upper edge 13 and the converging wall panels 33, 34. The speaker 21 attached to the periphery of the speaker opening 18 is located inside the enclosure 31 as best seen in FIG. 3. A speaker cable 37 connects the speaker 21 to an amplifier (not shown) remote from the enclosure 31. A simple speaker enclosure 31 is obtained using the front speaker panel 11 only, but to effect a horn duct for the enclosure 31 so as to improve the sound distribution, the second panel 22 is desirable.

The second panel 22 is inserted into the upper opening 36 so that the bottom edge 24 extends into the enclosure 31 and is located above the opening 18. The second panel 22 is inserted downwardly through the opening 36 while being angled towards the corner 32 until each of the diverging lateral edges 25, 26 along their entire lengths abut the surfaces of each of the converging vertical wall panels 33, 34 and the front surface of the panel 22 engages the upper edge 13 of the front speaker panel 11 as best seen in FIGS. 2 and 3.

The second panel 22, now wedged into the corner 32, forms an integral extension for the speaker enclosure 31. A small lower opening or aperture 38 is defined by the bottom edge 24 and the converging vertical wall panels 33, 34. The second panel 22 and the wall panels 33, 34 form a horn duct that progressively increases in cross-sectional area from the aperture 38 towards an upper discharging end 39 defined by the upper edge 23 of the second panel 22 and the converging vertical wall panels 33, 34 as seen in FIG. 3.

It can be readily understood from the description of the preferred embodiment that a sturdy speaker enclosure 31 having a horn duct therefrom are obtained by the specific placement of the front speaker panel 11 and the second panel 22 into the corner 32 of the room.

The two panels 11, 22 can be readily separated by one person by lifting the second panel 22 from its supported position and then removing the front speaker panel 11. Both panels 11, 22 are easily transferable to any new location or may be stored until required. For example, when a special performance is scheduled in any hall, the two portable panels can be transported to the site and set up in a couple of minutes without any special tools and hooked up to an amplifier.

The assembled position as seen in FIGS. 2 and 3 to effect the speaker enclosure with horn duct of this invention will provide an effective sound distribution system. Sound emanates from the rear of the speaker 21 and is reversed in phase by means of the small opening or aperture 38. The sound is then coupled to the air through the horn duct defined by the trapezoidal second panel 22 and the converging vertical wall panels 33, 34. The horn duct, which substantially increases in cross-sectional area from the aperture 38 to the discharging end 39, creates a folded horn of large proportions. This separates the tonal voices of instrumental and vocal ensembles. Transient overtones are also effectively captured by the horn. Percussive instruments such as harps, guitars, and drums by means of the long column of air set in motion.

Additional speakers could be employed by providing more speaker openings in the front speaker panel 11 or mounting tweeters coextensively with the speaker 21. The speaker enclosure 31 is effectively enclosed by the abutment of the lateral edges 14, 15 and the bottom edge 12 of the front speaker panel 11 with the converging wall panels 33, 34 of the corner and the floor panel 35 respectively. Thus, essentially, all sound is emitted from the front speaker opening 18 and horn duct only.

The invention disclosed will have many modifications which will be apparent to those skilled in the art and a view of the teachings of this specification. It is intended that all modifications which fall within the true spirit and scope of this invention be included within the scope of the appended claims.

1. A portable speaker enclosure for installation into a corner defined by two walls and a floor, said enclosure comprising a speaker panel and a horn duct panel, said speaker panel having tapered sides and being angularly positioned in said corner with the bottom edge thereof resting on said floor and the tapered sides thereof abutting said walls, said horn duct panel having its sides tapered at an angular relationship to each other so that, upon being slid downwardly while being maintained in engagement with the upper edge of said speaker panel, said horn duct panel fits snugly into the corner with the tapered sides thereof abutting the walls to define, together with said speaker panel, a unitary speaker enclosure.

2. A portable speaker enclosure with a horn duct portion for installation into a corner defined by two vertical wall panels and a horizontal floor panel, said enclosure comprising a speaker panel with a speaker opening and a horn duct panel, said speaker panel having tapered sides and one horizontally extending edge longer than the other horizontally extending edge, said speaker panel being angularly positioned into said corner so that said tapered sides are in abutment with the wall panels and said longer horizontally extending edge is resting on said floor panel thereby defining an upper opening between said wall panels and said other shorter horizontally extending edge, said horn duct panel having tapered sides at an angular relationship to each other so that, upon being slid downwardly at an angle into said upper opening while being maintained in engagement with said other shorter, horizontally extending edge of said speaker panel, said horn duct panel fits snugly into said corner with the tapered sides along their entire lengths in abutment with the vertical wall panels to define, together with said speaker panel, a unitary speaker enclosure having a horn duct at the upper side and closed off on the other three sides.

3. The speaker enclosure of claim 2 and which is further characterized in that a speaker is mounted in said speaker opening of said speaker panel so as to be positioned within said enclosure.

4. The speaker enclosure of claim 2 and which is further characterized in that said speaker panel and said horn duct panel are of an isosceles trapezoidal configuration.

5. The speaker enclosure of claim 3 and which is further characterized in that the lower portion of said horn duct panel terminates behind said speaker to define an aperture between the bottom edge of said horn duct panel and said wall panels to provide for a reversal in phase for the sound emanating from the rear of said speaker.

6. The portable speaker enclosure of claim 2 and which is further characterized in that said slipproof means is attached to said one longer horizontally extending edge of said speaker panel.