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O. READ

2,805,729

LOUDSPEAKER ENCLOSURE

Filed Sept. 15, 1953

2 Sheets-Sheet 1

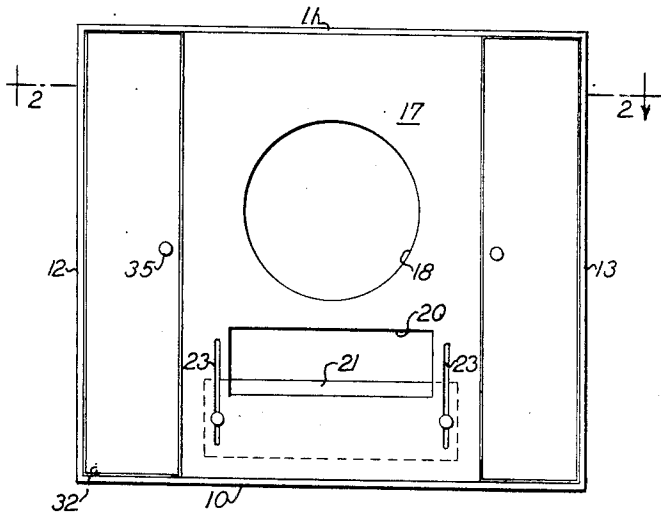


FIG. 1

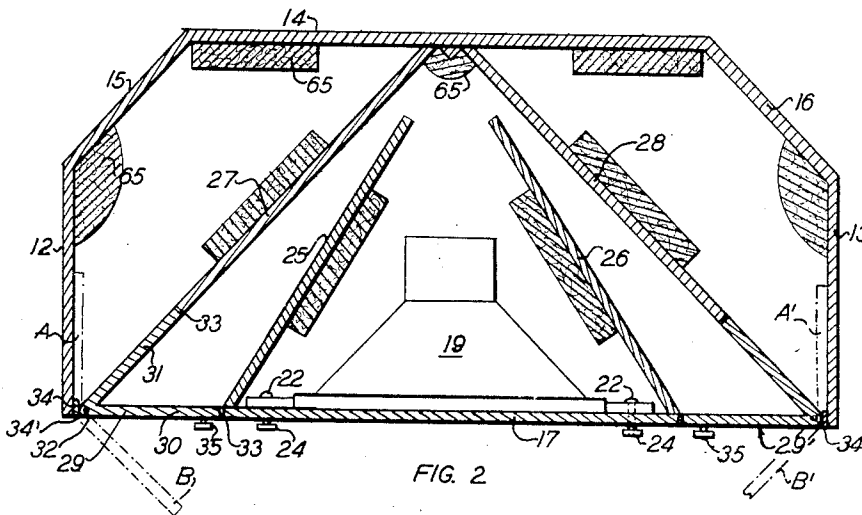


FIG. 2

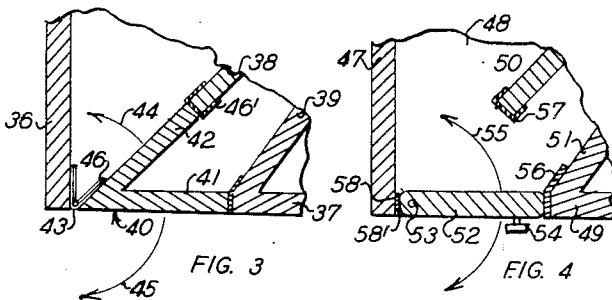


FIG. 3

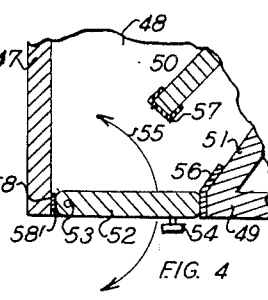


FIG. 4

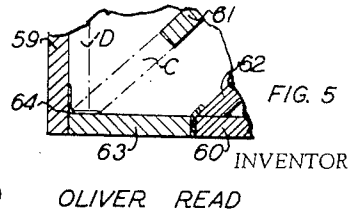


FIG. 5

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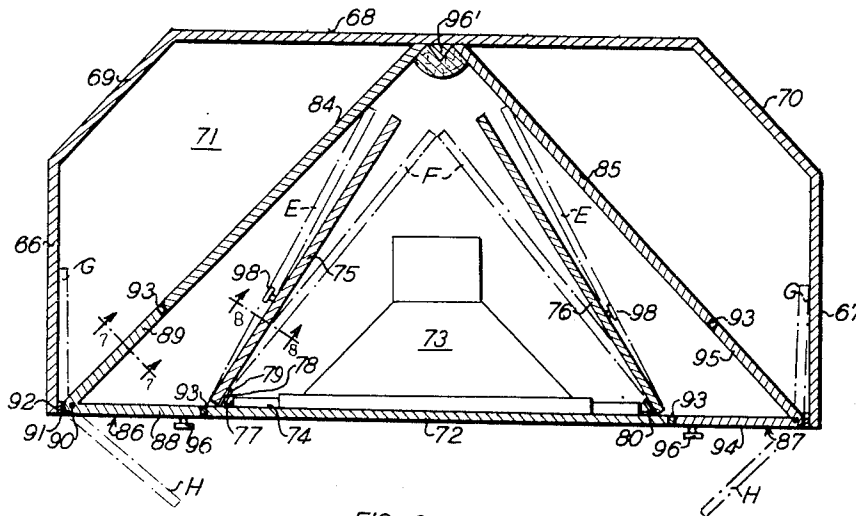
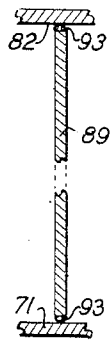
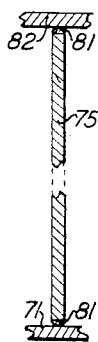
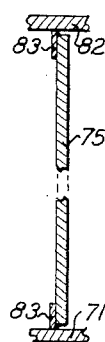
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2,805,729

LOUDSPEAKER ENCLOSURE

Oliver Read, Greenwich, Conn.

Application September 15, 1953, Serial No. 380,239

12 Claims. (Cl. 181—31)

The present invention relates to sound reproduction and more particularly to a loudspeaker enclosure used with a more or less conventional type of loudspeaker for high fidelity reproduction.

Heretofore sound reproduction equipment such as radios, phonographs, and the like have been provided with loudspeakers and a horn or loudspeaker enclosure for reproducing the sounds and it has been the desire of the manufacturers of these devices to obtain accurate sound reproduction of as high fidelity as possible. Although extensive research has been done, the production models of speaker enclosures have not been entirely satisfactory.

In homes of modest means where the cost of careful analysis by competent engineers and extensive experimentation is not practical quality sound reproduction has not been available. Due to different acoustic characteristics of different rooms in which sound reproduction equipment is used and also because of the limited available installation locations, a single loudspeaker enclosure has not produced the optimum results in all uses and the customer has had to be satisfied with less than the optimum quality of reproduction.

Engineers generally agree that the volume required for a 15-inch loudspeaker in an enclosed box should be at least 10 cubic feet for the infinite baffle type of loudspeaker enclosure. Such an enclosure might be objectionable from the amount of space required but if satisfactory sound reproduction can be accomplished in an enclosure of this type it would be acceptable to the general public. No assurance can be had that the large enclosure will produce satisfactory results under all conditions and this can only be determined by actual use in the location where the sound reproduction is to occur.

In other installations an opening is provided in a closed cabinet to produce the bass reflex type of loudspeaker enclosure. Although some tuning can be accomplished in existing bass reflex type loudspeaker enclosures by moving a shutter over the opening, the results have not been sufficiently satisfactory for all installations for general acceptance.

The folded horn type of loudspeaker enclosure has been reasonably satisfactory in installations at the corner of a room but has not been entirely satisfactory in other locations.

As a result of the various types of loudspeaker enclosures in use, it has not been possible to obtain the best quality of sound reproduction, particularly in the low pitched sounds around and below 50 cycles. Also it has been necessary to test a number of different types of loudspeaker enclosures to obtain the most desirable quality for listener satisfaction at the time of installation of the equipment. Since it has not been practical to do this careful experimentation at each installation of sound reproduction equipment, results have not pleased all customers.

In reproducing low frequency vibration, "boominess" has frequently occurred and no practical means of eliminating this "boomy" sound has been found and conse-

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quently listeners have been accepting mediocre reproduction.

An object of the present invention is to overcome the difficulties encountered with existing equipment by the provision of a loudspeaker enclosure of a general utility which is adapted to be controlled for the desired listening pleasure of the user.

A further object of the present invention is to provide a sound reproduction unit for use with radios, phonographs, and the like for obtaining quality high fidelity reproduction of the sound.

Another object of the invention is to provide a loudspeaker enclosure for use with existing sound reproducing equipment and which loudspeaker enclosure may be adjusted to obtain the desired listener satisfaction of reproduced sound.

Another object of the invention is to provide a loudspeaker enclosure which may be readily changed from one type to another by simple adjustments which may be made by persons unskilled in the technical aspects of the problem.

A further object of the invention is to provide a single loudspeaker enclosure which may have the sound reproducing characteristics of several different types of sound reproducing structures and in which the user may select the characteristics desired.

Another object of the invention is to provide a relatively inexpensive loudspeaker enclosure which may be readily constructed from available materials and which loudspeaker can perform the functions of the infinite baffle, bass reflex, or folded horn loudspeaker enclosure.

A further object is to provide suitable adjustments for a loudspeaker enclosure to accommodate for variables in location, use, and the like.

Briefly, the present invention relates to a cabinet type loudspeaker enclosure in which a cabinet having a top, bottom, sides, back, and a front is provided with a plurality of openings therein with a more or less conventional type of loudspeaker. A pair of partition walls converge from the front wall of the speaker toward the rear and terminate short of the rear while such converging walls are located on opposite sides of the loudspeaker. In one form of the invention these converging partitions may be hinged to vary the degree of convergence. A pair of partition walls extend from the rear of the cabinet forwardly outside of the converging walls and such second walls diverge forwardly toward the front of the cabinet. The front of the cabinet is provided with a central opening below the loudspeaker and an adjustable shutter controls the effective size of such opening. The front is also provided with openings at the sides thereof adjacent to the partition walls and a door is mounted on the cabinet at each of said side openings and such door serves as a continuation of the forwardly diverging partition walls to change the cabinet into a folded horn type enclosure. With the doors closing the side openings of the front and the shutter adjusted to at least partially open position, a bass reflex type loudspeaker enclosure is obtained. If the shutter and doors are completely closed, an infinite baffle type of loudspeaker enclosure is obtained. By using a V-type door different effective volumes of the bass reflex and infinite baffle enclosure can be obtained. Also by adjusting the hinged converging portions different effective cubic volumes can be had and the ratio of effective cross section of the folded horn can be adjusted as desired.

Further object and advantage of the invention will be apparent from the following description taken in conjunction with the drawing, wherein:

Fig. 1 is a front view of one form of loudspeaker enclosure showing the doors closed and the shutter in partially closed position;

Fig. 2, an enlarged section taken substantially on line 2—2 of Figure 1 showing the V-type door in one position and a preferred means for hinging the same.

Fig. 3, a fragmentary section of a modification of the left door construction showing an alternative means for hinging a V-type door;

Fig. 4, a fragmentary section of a modified door in which a single panel is used for obtaining the various effects;

Fig. 5, a fragmentary section of another form of single panel door with the hinge construction therefor;

Fig. 6, an enlarged sectional view similar to Fig. 2 or a modification in which the inner partition baffles are hinged for angular adjustment with respect to the front of the cabinet;

Fig. 7, a fragmentary section taken substantially on the line 7—7 of Fig. 6 showing one form of sealing means for the top and bottom edges of a door panel;

Fig. 8, a section taken substantially on line 8—8 of Fig. 6 showing the seal between hinged baffle partition and the top and bottom of the cabinet; and,

Fig. 9, a modified form of seal which may be used on the doors or the pivoted baffles.

Referring more particularly to the drawing wherein like reference numerals indicate like parts throughout, an all-purpose loudspeaker enclosure or cabinet includes a bottom panel 10, a top panel 11, side panels 12 and 13, a back panel 14, oblique corner panels 15 and 16 and a front panel 17. A circular opening 18 is formed in front panel 17 for registry with a conventional loudspeaker 19, which may be of the dynamic type and such loudspeaker may be secured to the front panel in any suitable manner.

The portion of the front panel 17 below the loudspeaker opening 18, is provided with a rectangular opening 20, and the effective size of such opening may be controlled by a shutter 21 of a size larger than the opening 20 and mounted on the inside of front panel 17 for vertical adjustment by means of bolts 22, passing through the shutter and slideably received in slots 23 formed in the panel 17. Suitable knobs 24 are in threaded engagement with the bolts 22 and secure the shutter 21 in any desired position of adjustment.

A pair of converging partition baffle wall members 25, 26 extending from the top to the bottom of the cabinet project rearwardly from the side edges of the front panel 17 terminating short of the rear panel of the cabinet with the loudspeaker 19 located therebetween.

A pair of diverging partition baffle wall members 27, 28, extending from the top to the bottom of the cabinet project forwardly from the rear of the cabinet to a region adjacent the side edges of the front panel and the sides of the cabinet. It will be noted that front panel 17 is of approximately less width than the spacing between side panels 12 and 13, thereby providing openings at each side edge of panel 17. The panels forming the cabinet and the baffles may be secured together by means of screws, glue or the like.

The openings at each side edge of panel 17 may be closed by the V-type doors 29 and 29'. The door 29 includes a front door panel 30 and a rear door panel 31, fixed together to form a dihedral angle therebetween, and such dihedral angle is designed so that door panel 30 closes the opening between the adjacent side edge of front panel 17 and the adjacent front end of side panel 12. The rear door panel 31 closes the opening between the forward edge of baffle partition wall 27 and the forward end of side wall 12. The V-type door 29 is pivotally mounted on an axis 32 by means of pins projecting inwardly from the bottom and top panels 10 and 11 into the V-type door 29, or by other suitable pivot means. The door 29' is similar to door 29 but made to fit the right side of the cabinet. To obtain the desired sound tightness between the door 29 and the adjacent panels and baffles, strips of felt 33 or similar material may be glued or otherwise fastened to the side edges of the panel 17 and to the for-

ward edge of baffle partition walls 27, 28 and also to the top and bottom panels 11 and 10 respectively and the thickness of such strips will be such as to produce the desired results around the door. The edge of the door 29 adjacent side wall 12 is made tight by means of a narrow strip of felt 34 which is fixed to the inside of the forward end of side panel 12 and cooperates with a curved portion 34' of the door for maintaining the proper seal. The frictional contact of the felt strip 34 with the curved portion 34' of door 29 also serves as a means for maintaining the door in its adjusted position. A suitable knob or handle 35 is provided for obtaining the desired adjusted condition of the door 29.

The door 29 may be swung from the full line position 15 shown in Fig. 2 in a counterclockwise direction to position A shown in dotted lines so that the door panel 30 becomes an extension of partition baffle wall 27 thereby producing the folded horn type loudspeaker enclosure. It will be apparent that the right door 29' is similarly 20 constructed for equivalent adjustments, but the motion would be in the opposite direction to that of door 29.

The dotted line position shown at A of the V-type door 29 results in the door panel 30 being in alignment with baffle partition wall 27 thereby providing the folded horn type speaker enclosure and a corresponding position for door 29' is shown at A'. The doors 29 and 29' may be moved to the dotted line positions shown at B and B' and in that position the entire space within the cabinet is in intercommunication and results in the maximum effective 30 cubic volume of the loudspeaker enclosure. When the doors are in the positions B and B', and the shutter 21 is closed a cabinet of the infinite baffle type is obtained and with doors 29, 29' in the positions B and B' and shutter 21 open the bass reflex cabinet type of enclosure is ob- 35 tained with maximum cabinet cubic volume.

With doors 29, 29' in full line position an infinite baffle type enclosure of an effective volume within diverging portion walls 27, 28 is obtained if shutter 21 is closed. With shutter 21 open and doors 29 and 29' in full line 40 position reflex baffle type enclosure of reduced cubic content is obtained.

The folded horn arrangement with the doors in the positions A and A' is particularly desirable in corner locations and the oblique corner walls 15 and 16 permit a 45 speaker enclosure to be located in the corner of a room without projecting excessively into the room and the sides of the room form, in effect, a continuation of the horn.

Although it has been found especially effective to use the doors 29 and 29' in the positions shown in full lines, and dotted lines A, A' and B, B', it is within the invention 50 to adjust the doors to intermediate positions as well as positions in which the doors are opened to the maximum. The adjustment of the doors can be made in accordance with the subjective listener satisfaction characteristics of the person using the equipment. It is therefore contemplated that various adjustments can be made as desired and one door may be arranged in one position and another door in a different position if desired.

Referring to Fig. 3, a side panel 36, a front panel 37 and partition baffle walls 38 and 39 correspond to elements 12, 17, 27 and 25 of the first embodiment and door 40 may be of the V-type having panels 41 and 42 arranged to form a dihedral therebetween is mounted by means of a hinge 43 for pivotal movement in both directions as shown by arrows 44 and 45. The hinge 43 may be of the piano type and the small space formed between the barrels of the hinge plates thereof may be sealed by a suitable tape 46 overlying the hinge. Sufficient fullness of the tape at the location of the hinge pin may be provided to permit the necessary swinging movement of the door 40. 70 The tape may be made of flexible resilient material if desired to stretch over the hinge pin when the door is opened to its outermost position.

Gaskets or felt sealing strips or the like may be provided between the abutting edges of the doors and the adjacent edges of the front panel. The top and bottom

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panels as well as the free edge of the partition baffle wall 38 may be provided with a suitable sealing strip similar to "weatherstripping." If desired the felt strip may be folded around the end of the partition baffle wall 38 as shown at 46' for additionally securing the felt strip in proper position. The strip may be secured by glue and/or other fastening means such as nails, screws or the like, and the sidling strip may be applied to the top and bottom and outer edge of each door.

Another modification of the invention is shown in Fig. 4 in which a side panel 47, a bottom panel 48, a front panel 49, partition baffle walls 50 and 51 are arranged in a similar relation to the corresponding elements of the other modifications and a door 52 made of a single panel is pivotally mounted by means of pins or a rod 53 extending from the top and bottom panels into the door 52. The door 52 may be provided with a handle 54 for moving such door from one position to another to obtain the desired adjustment and sound characteristics by movement in either direction as indicated by arrow 55. For obtaining the desired tightness of the door margins with the adjacent panels and baffle walls, suitable felt strips such as that shown at 56 may be provided for sealing the space between panel 49 and the door panel 52 and such felt strip 56 may extend onto the partition baffle wall 51 thereby sealing the joint between baffle 51 and panel 49. A suitable strip of felt 57 may be provided around the end of the partition baffle wall 50 and it will be noted that the door panel 52 swings about pivot 53 and the adjacent edges of panel 49 and baffle 50 are so located as to snugly cooperate for the proper degree of sealed joint therebetween. A narrow strip of felt or other suitable packing material 58 is secured to the side wall 47 and engages the arcuate rounded edge portion 58' of the door 52 and such strip material serves to maintain the door 52 in any of its adjusted positions and also provides the necessary tightness between the edge portion 58' of the door 52 with the side of the cabinet. In this modification the door 52 may be swung to form a continuation of partition baffle wall 50 or may be swung to a position within the cabinet alongside of sidewall 47 and obviously the door could be opened to extend outwardly of the cabinet as desired. It will therefore be seen that in this modification of the invention a single door of simple construction provides means to obtain the several forms of loudspeaker enclosure by a simple adjustment.

A side panel 59 (Fig. 5), front panel 60 and partition baffle walls 61 and 62 are arranged similar to the corresponding elements of the other figures and a door 63 hinged at 64 is movable from the full line position to the one dotted line position C in alignment with baffle wall 61 and also movable to another dotted line position D adjacent to the side panel 59 and such door 63 being pivotally mounted to the side wall by means of a piano type hinge 64 or the like. In this modification suitable sealing means may be provided at the edges and top and bottom of the door at each position as in the other modifications and it will be evident that the sealing strips may be of any suitable material which will produce the necessary tightness and in many cases the piano hinge 64 will provide sufficient seal between the door 63 and the side panel 59, but, if desired, a strip of flexible material may be placed over the hinge and provided with sufficient fullness to permit movement of the door 63.

Although the dimensions may be varied, it has been found that a loudspeaker enclosure of a height of 36", a depth of 17½", and a width of 38½" has been extremely satisfactory for use with a 15" loudspeaker. The outer walls of the cabinet are made of ¾" plywood with the baffle partitions made of ⅝" plywood. A suitable design for an 8" loudspeaker cabinet enclosure is made to approximately half dimensions throughout with a 7" diameter cutout in the front panel for the speaker and such cabinet may be made of ½" pine plywood. It will be evident that the dimensions may be varied and the

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material from which the cabinet is made can be selected from many available materials while obtaining many of the advantages of the present invention.

Strips or blocks of suitable sound insulating material such as "Kimsul" insulation 65 may be arranged at random throughout the inside of the cabinet walls to prevent standing waves within the cabinet. Two inch "Kimsul" insulation is shown at the apex of the horn within the cabinet directly back of the speaker and the insulation is applied as necessary.

Braces (not shown) such as one inch by two inch strips may be added at random angles within the cabinet to offset tendencies toward objectionable cabinet resonance.

Referring to Figures 6 to 8, inclusive, the cabinet enclosure may include sidewalls 66 and 67, a back wall 68, oblique corner walls 69, 70 and a bottom wall 71, a top wall 82, and a front panel 72. The front panel is provided with the usual loudspeaker opening as well as the shutter opening and a loudspeaker 73 is mounted thereon as well as a shutter 74 which may be similar to shutter 21 and similarly adjustable.

The front panel extends from the bottom 71 to the top wall 82 (Figs. 7 to 9) but the side edges of the front wall 72 terminate short of the front end of the side walls 66 and 67, providing openings therebetween. Partition baffle walls 75, 76 extend from the bottom wall of the cabinet to the top wall and partition baffle 75 is hingedly mounted at its forward edge by means of a piano type hinge 77 secured to the front panel 72 and to the partition baffle 75. Interposed between partition baffle 75 and the hinge plate 78 of hinge 77 is a strip of sealing material 79 such as felt or the like which has an edge abutting the front panel 72 to provide an airtight joint while permitting swinging movement of the partition baffle 75 from a position shown in dotted lines at E to a position shown in dotted lines at F and it will be understood that the strip of felt or equivalent material has sufficient resiliency to maintain the proper tightness of seal for these various positions. The partition baffle 76 is similarly hinged at 80 and provided with the same or equivalent type of seal to permit swinging movement of such partition panel 76 between the dotted line positions E and F and it may be possible to adjust the partition baffles 75 and 76 in different angular positions if desired. Referring to Figure 8 the partition baffle 75 is provided with a rounded felt seal 81 at the top and bottom edges for engagement with the top wall 82 and the bottom wall 71 of the cabinet and the rounded sealing strips 81 may be made of felt or equivalent suitable material to give the proper tightness.

In Figure 9 a modified seal for a baffle 75 includes strips of felt or equivalent material 83 which may be secured to a side surface of the hinged partition 75 by any suitable means and such strips tightly press against the bottom wall 71 and the top wall 82 to provide the desired airtightness and also serving to maintain the hinged partition in its adjusted position. It will be evident that partition 76 is similarly provided with sealing strips to obtain the desired tightness as well as to maintain the partition in its adjusted position.

Extending from the rear wall 68 are diverging partition baffle walls 84 and 85 which extend from the bottom wall 71 to the top wall 82 and toward the front end of the side walls 66 and 67 and terminating short of such side walls. These partition walls 84 and 85 are joined with tight joints at the rear wall and top and bottom walls by suitable means.

V-type doors 86 and 87 are pivotally mounted at the left and right sides of the cabinet to close the openings at the side edges of the front panel. V-type door 86 includes a front panel 88 and a rear panel 89 which are joined together to form a dihedral angle and are pivotally mounted by means of a pin or shaft 90 projecting from the top and bottom of the door and the portion of the door 91 adjacent the pivot 90 is rounded in an arc about

the pivot 90 for sealing engagement with a narrow strip 92 of felt or other suitable sealing material secured to the side wall 66 for maintaining an airtight joint between the portion 91 of the door and the front end of the side wall 66. A strip of seal material 93 is mounted on the free edge of each door panel 88 and 89 and also at the top and bottom edges of each door panel thereby providing a seal between the front panel 72, partition baffle wall 84, bottom wall 81, and top wall 82 of the cabinet.

It will be evident that V-type doors 86 and 87 may be moved to the dotted line positions G and H as well as any intermediate position and may be swung outwardly beyond the position H if desired to completely open the cabinet loudspeaker enclosure.

V-type door 87 also includes a front panel 94 and a rear panel 95 and has similar types of sealing strips along the edges thereof and such door may be swung to various positions as desired by means of knob 96.

The hinged partition baffle walls 75 and 76 may each be adjusted to its dotted line position F thereby providing a small enclosure confining the rear of the speaker therebetween and with the shutter 74 closed an infinite-baffle type loudspeaker cabinet of small cubic volume is obtained and with the partition baffles still in their position F with the shutter open a bass-reflex type cabinet of small cubic volume is obtained.

A triangular block 96', which may be formed by sawing a 2" x 2" strip diagonally is mounted on the rear wall 68 between the fixed baffle partition walls 84 and 85 and a one inch layer of "Kimsul" or equivalent sound insulation is secured around the projecting portion of the triangular block. It will be understood that the triangular block extends from the bottom to the top of the cabinet.

Assuming V-type doors 86 and 87 are in the dotted line position G, a folded-horn type of loudspeaker enclosure is obtained and the pivoted partition baffle walls 75 and 76 may be adjusted to various intermediate positions between positions E or F by means of knobs 98 and such adjustment can be made until the desired acoustical properties have been obtained. By properly adjusting the partition baffle walls 75 and 76 the objectionable "boomy" sound obtained at low frequencies with some types of loudspeakers can be appreciably reduced or entirely avoided.

It will also be evident that the effective cross section of the folded horn may be adjusted by the swinging movements of the partition baffle walls 75 and 76 and the structure may closely approximate the true exponential form of horn. Also the size of the throat of the horn may be adjusted to obtain desired results.

It will be evident that suitable sound insulating material may be applied to the inner surfaces of the cabinet similar to that shown in Figure 2 but such insulation is omitted in Figure 6 to simplify the drawing.

Although the dimensions may be varied the pivoted partition baffles 75 and 76 are shown as being 17¾" instead of 16½" for the modification shown in Figure 2 and satisfactory results have been obtained with structures of these dimensions.

The relationship of the two partition baffle walls 75 and 76 to the stationary baffle walls of the folded horn result in a form of acoustical low-pass filter. In addition, a change of horn-flare acts in some degree to simulate an exponential horn.

When adjustable partition baffle walls 75 and 76 are widely spread to almost engage the two stationary baffle walls 84 and 85, the effective taper of the horn flares become greater. It has been found desirable to have both adjustable baffle walls similarly positioned.

When adjustable baffle walls 75 and 76 are nearly touching at their rear ends or are nearly closed the sound path and the cavity within the area will be greatly changed from the widely spaced position of the rear ends of the

adjustable partition baffle walls. In effect, adjustable baffle walls 75 and 76 provide a variable cavity formed by such baffles in the various positions.

It will be apparent that loudspeakers may be used individually or in multiple. Thus a low frequency loudspeaker, a mid-range speaker, and a high frequency speaker may be used in reproducing sound to obtain a desired effect.

A description of one form of the invention, written by the applicant, will appear in "Radio & Television News" for October, 1953 on pages 67, 176 and 177 and a copy thereof accompanies this application.

It will be obvious to those skilled in this art that various changes may be made in the invention, without departing from the spirit and scope thereof, and therefore the invention is not limited by that which is shown in the drawing and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. A unit for sound reproduction comprising a cabinet of sufficiently large dimensions and open on the front for obtaining the desired fidelity of reproduction, a central panel on the front, a loudspeaker mounted on the central panel, a pair of converging baffle members extending from the front rearwardly and terminating short of the rear of the cabinet and confining the loudspeaker therebetween, the central front panel being provided with an opening, a shutter for said opening and means for adjusting the size of said opening, a pair of diverging baffles extending from the rear of said cabinet forwardly and terminating short of the front of said cabinet and adjacent the side edges of said front panel, said front panel and the sides of said cabinet defining openings, a door pivotally mounted on each side of said cabinet at the outer edge of each of said openings so that each door may close the adjacent opening between the front panel and the side of the cabinet, said doors being swingable to positions forming extensions of the adjacent baffle.

2. A loudspeaker enclosure for selective use as an infinite baffle cabinet, a folded horn cabinet or a bass reflex cabinet comprising a cabinet of sufficient size to serve for each use, said cabinet including a rear wall and top and bottom walls and being open at the front, a central panel closing the front and leaving an opening at each side thereof, a loud speaker mounted in said central panel, a pair of walls extending from the top to the bottom of the cabinet and converging from the front toward the rear and secured at their distant edges on the side edges of said front panel and enclosing said loud speaker, said converging walls extending from the top to the bottom of the cabinet, a pair of walls located outwardly of said converging walls and diverging toward the front and secured to the rear wall of said cabinet and projecting forwardly toward the openings formed between said front panel and the sides of said cabinet, a closure means mounted on said cabinet adjacent each opening, said closure means serving to entirely close the cabinet from the exterior and alternatively to limit the effective size of the cabinet to the space between said diverging walls and alternatively to be moved to render the entire cabinet open to the exterior whereby said loudspeaker enclosure may be controlled to obtain the desired characteristics.

3. A sound reproduction structure comprising a closed cabinet of sufficiently large dimensions for obtaining the desired quality of reproduction and having a front including a front panel with a central opening, and an opening at each side, a loudspeaker mounted on the front panel, a first pair of partition members extending from the top to the bottom and converging from the front rearwardly and terminating short of the rear of the cabinet and confining the loudspeaker therebetween, a shutter for said central opening in the front, and means for adjusting the shutter to control the size of said opening, a second pair of partitions extending from the top to the bottom and from the rear of said cabinet and diverging forwardly

and terminating short of the front of said cabinet and adjacent the side openings, a door movably mounted on said cabinet at the outer edge of each of said side-openings so that the door may close the adjacent opening between the front and the side of the cabinet, each door being movable to a position forming an extension of the adjacent diverging partition extending from the rear of said cabinet.

4. A loudspeaker enclosure for selective use as an infinite baffle cabinet, a folded horn cabinet, a bass reflex cabinet or the like, comprising a cabinet of sufficient size to serve for each use, said cabinet including a rear wall and top and bottom walls and a front panel and being open in part at least at the front, a loudspeaker mounted in the front, a pair of converging walls secured at their distant edges to said front panel enclosing said loudspeaker and extending the major height of the cabinet and terminating short of the rear, a pair of diverging walls located outwardly of said converging walls and secured to the rear wall of said cabinet and projecting forwardly toward the open portion of said front, closure means mounted on said cabinet adjacent each open portion, said closure means serving to entirely close the cabinet from the exterior and alternatively to limit the effective size of the cabinet to the space between said diverging walls, said closure means being movable to various positions of adjustment.

5. Sound reproduction equipment comprising a cabinet having enclosing walls and an open front, a wall panel closing at least a portion of said front, a loudspeaker mounted on said panel, baffles projecting from some of the walls of said cabinet inwardly of such walls and normally terminating short of other walls of said cabinet to provide communicating spaces, means for selectively changing the effective volume of said cabinet by providing continuations of some of said baffles of said cabinet to said other walls thereby separating the space within said cabinet and changing the acoustic properties thereof.

6. Sound reproduction equipment comprising a closed cabinet having a loudspeaker therein with an opening for the loudspeaker, baffle means of limited extent within said cabinet extending from the interior thereof to a location adjacent an outer wall, at least one door mounted in said cabinet adapted for movement from a position adjacent said baffle means forming a continuation of said baffle means and movable to a position spaced therefrom.

7. A sound reproducing structure comprising a cabinet having an opening therein, a door mounted on said cabinet for closing said opening, said door being pivoted within its outline for swinging movement from open to closed position, and a sealing gasket means mounted on one of said door and cabinet for sealing the edges of said door when in closed position, at least a portion of said gasket means adjacent the pivot also serving as a friction latch for maintaining the door in selected positions.

8. A loudspeaker enclosure comprising a cabinet having a bottom, top, sides, and back, and being open on the front, a panel mounted on the front for receiving a loudspeaker therein, said front panel terminating short of the side walls to provide openings adjacent each side wall, a partition baffle wall hingedly mounted on each side edge of said front panel for swinging movement whereby each baffle may be moved toward or from the other, a pair of diverging baffle walls extending from the rear wall outwardly of said swingable partition baffle walls, said diverging baffle walls projecting toward the front edge of said side walls thereby forming a loudspeaker enclosure which may be adjusted to obtain desired sound reproduction effects.

9. A sound reproduction enclosure comprising a top

and bottom, diverging baffle wall partitions extending from the top to the bottom, a front panel mounted intermediate the outer edges of said diverging baffle walls, means for supporting a loudspeaker in said panel, a pair of converging baffle wall partitions hingedly mounted on the side edges of said front panel and extending toward the apex of said diverging walls, said converging walls being adjustable toward and away from each other and against the adjacent diverging baffle wall.

10. A sound reproduction enclosure comprising a top and bottom, diverging baffle wall partitions extending from the top to the bottom, a front panel mounted intermediate the outer edges of said diverging baffle walls, means for supporting a loudspeaker in said panel, a pair of converging baffle wall partitions hingedly mounted on the side edges of said front panel and extending toward the apex of said diverging walls, said converging walls being adjustable toward and away from each other and against the adjacent diverging baffle wall, a triangular prism mounted in the apex of said diverging partition baffle walls with the apex of the prism extending toward said front panel, and sound insulating material around said prism for preventing undesired tones from being emitted from the enclosure.

11. A loudspeaker enclosure comprising a structure having a top, a bottom, a back, sides and open at the front, a panel at least partially closing the front and providing openings adjacent each side edge of said front panel, said front panel being provided with an opening in which a loudspeaker may be mounted, baffle partitions located on each side of the speaker and flaring outwardly from the back to the front, movable partitions inwardly of said stationary partitions and generally flaring from the rear toward the front with the rear ends movable toward and from each other whereby the effective size of the throat formed between said rear ends of the movable partitions may be varied and the cross sectional area between said movable and stationary baffle partitions can be controlled to obtain the desired sound effects.

12. A loudspeaker enclosure for selective use as an infinite baffle cabinet, a folded horn cabinet, a bass reflex cabinet or the like, comprising a cabinet of sufficient size to serve for each use, said cabinet including top and bottom walls and being open in part at least at the front, a front panel at least partially closing said front, a loudspeaker mounted in the front panel, a pair of converging walls secured at their distant edges to said front panel enclosing said loudspeaker and extending the major height of the cabinet and terminating short of the rear, a pair of diverging walls located outwardly of said converging walls and secured to the rear wall of said cabinet and projecting forwardly toward the open portion of said front, closure means mounted on said cabinet adjacent each open portion, said closure means serving to entirely close the cabinet from the exterior and alternatively to limit the effective size of the cabinet to the space between said diverging walls, said closure means being movable to various positions of adjustment.

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