

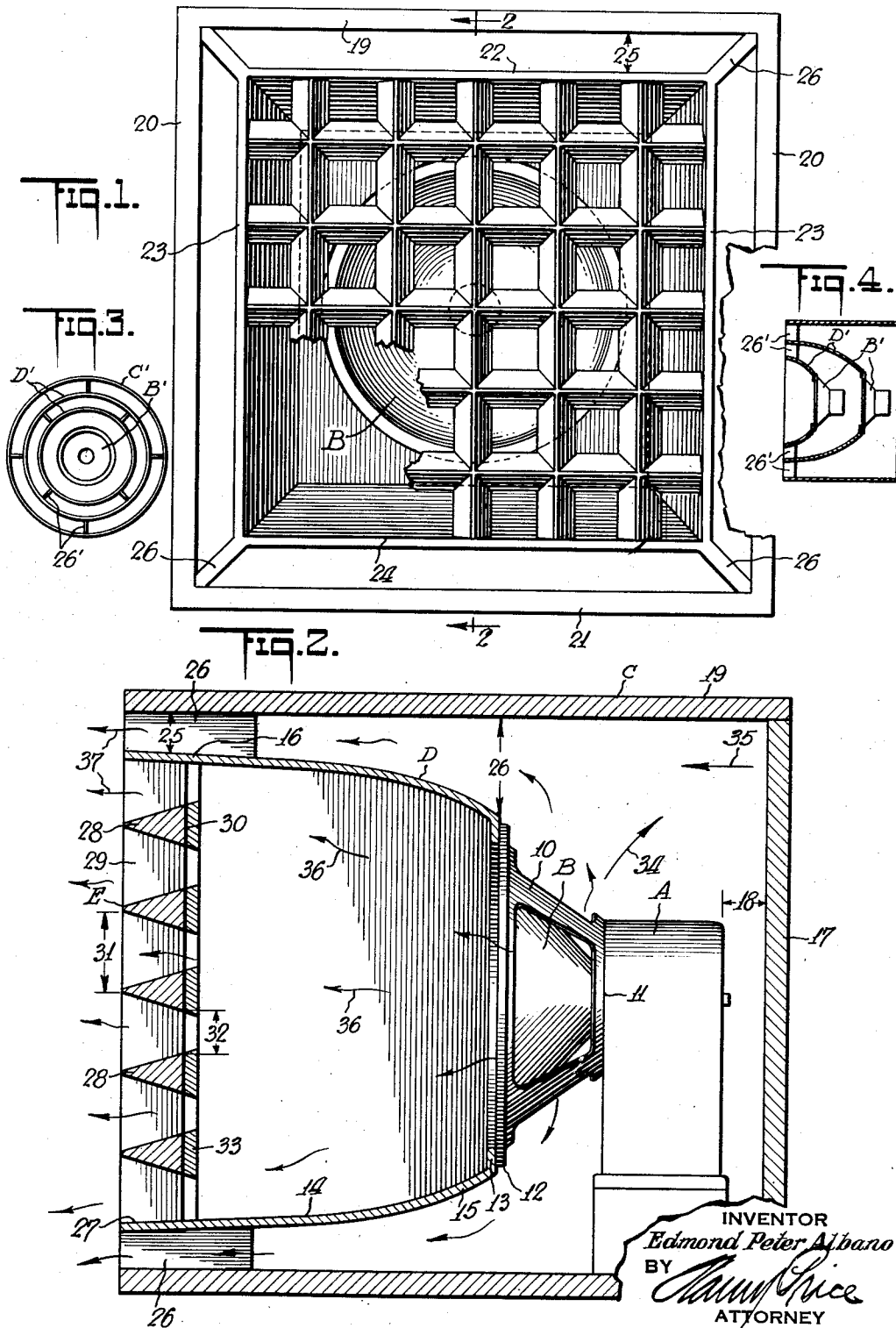
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SPEAKER UNIT

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SPEAKER UNIT

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5 Claims. (Cl. 181—31)

The present invention relates to a speaker unit and it particularly relates to a unit for amplifying and giving proper tonal qualities to reproduced sound waves.

In a great many loud speaker constructions or amplifiers for radio sets, phonographs, loud speaker systems and so forth, the sound which issues from the loud speaker or amplifier horn is distorted due to an improper proportionment of the various sound and tonal qualities. Often the high notes will be unduly amplified with loss of the low notes, and frequently both the high and low notes will be lost and a sound will be obtained which will quite depart in quality and composition from the original sound which it is desired to reproduce.

This difficulty is particularly apparent in connection with the reproduction of sounds having considerable range, such as the human voice and symphony orchestras, although it also arises in a lesser degree with other sounds to be reproduced.

It is therefore among the objects of the present invention to provide an improved amplifier or speaker unit which will more faithfully reproduce sounds in their original tonal qualities and which will assure proper values in the composition of high, medium and low tones.

Another object is to provide an amplifier or speaking unit which is of broad application to radio sets, phonographs, loud speaker systems and so forth, which will enable superior quality reproduction without at the same time distorting or changing the composition or tonal qualities of the reproduced sound.

Other objects will be obvious or will appear during the course of the following specification.

In accomplishing these objects, it has been found most suitable to enclose the loud speaker or amplifier unit, preferably provided with a frustro-conical member and whether it be remotely controlled, or directly associated with a sound producing instrument in an air-tight well or box-like container, preferably of wood. The back of the reproducer is desirably positioned so that the tones or sounds projected from the back thereof will be permitted to strike the rear or bottom of the air-tight well or enclosure and the sides thereof and then be projected forwardly through the outside of the mouth of the well.

At the same time the sound from the front of the reproducer will also be projected forwardly through an expanding conduit, which may take the form of a modified cone or paraboloid,

through the central portion of the mouth of the well.

In some cases a grille or lattice of wood, formed by blocks, slats or strips of wood, may be positioned across the central portion of the mouth of the well.

In the drawing is shown one of the many possible embodiments according to the present invention, but to which the invention is by no means restricted, since many different modifications and alterations might be made, all within the scope of the present invention without departing from the spirit thereof.

In the drawing,

Fig. 1 is a front elevation of the speaker unit of the present invention with the grille partly broken away,

Fig. 2 is a cross sectional view upon the line 2—2 of Fig. 1,

Fig. 3 is a front view of an alternative embodiment without a grille upon a smaller scale as compared to Fig. 1.

Fig. 4 is a transverse sectional view upon the line 4—4 of Fig. 3.

Referring to Figs. 1 and 2, the invention comprises a sound-producing unit A, a conical speaker amplifier unit B, a box or well receiver C, a forward enclosing projector D, and a grille or lattice E.

As shown the box A may be wired to a remotely positioned radio set, phonograph or microphone which is receiving sounds to be reproduced either in the same or in different volume.

Instead of the unit A, as shown in Fig. 2, it is also possible to use phonographs, radio sets and other units for producing sound.

The conical speaker B is supported by the framework upon the face of the unit A and at its front side it has the attachment flange 12, which is connected to the lip portion 13 of the curved conical structure 14. The curvature of the structure 14 is maximum at the rear portion 15 and it assumes a frustro-conical shape at 16.

The well or receiving box C is provided with a back wall 17, preferably separated by a space from the unit A and it is also provided with the top wall 19, the side walls 20 and the bottom wall 21.

The unit D as indicated is also provided with a top wall 22, side walls 23 and a bottom wall 24, the walls 22, 23 and 24 preferably being spaced from the walls 19, 20 and 21. The spacing is maintained by the wall or spacer fins 26, which are rigidly attached to the side walls 22, 23 and 24 of the unit D.

It will be noted that the spacing 25 increases to a maximum 26 toward the rear of the unit A adjacent its point of attachment to the conical speaker element B.

5 The grille E, which may be omitted, is shown as closely fitted inside the mouth portion 27 of the unit D and it consists of a series of horizontal bars, strips or pieces of wood 28 and vertical bars or strips of wood 29. These wooden strips may
10 be tapered forwardly and have relatively wide rear portions 30 facing the unit B. If desired, the spacing at 32 may be varied by inserting filler grilles in the manner indicated at 33 in Fig. 2, and if desired, the grille E may be made of several
15 separable sections.

The box or well C and the conduit D may be made of a close fiber ply wood, for example of fir, beech, birch, hickory or walnut and such wood should have a non-porous structure and should
20 be conveniently covered with a synthetic or natural resin or cellulose compound varnish which will leave a thin adherent coating thereon substantially over .001 to .02". The wood should be devoid of openings.

25 In operation some of the tones will be propagated and reflected in the direction indicated by the arrows 34 and 35 against the back wall and rear of the side walls 19, 20 and 21 of the air-tight box C and will pass through the spacing
30 26 and 25 from the front of the speaker. Other tones will pass in the direction indicated by the arrows 36 through the conduit D. The sound 37 will be of unusual quality and characteristics, retaining to a large degree the valuable quali-
35 ties of the original sound. The whole scale of sounds will be most desirably mixed and blended. Both elements C and D should be air tight and devoid of openings or holes. The walls of the elements C and D may vary from 1/2 to 2"
40 in thickness.

In Figs. 3 and 4 (similarly functioning parts being indicated by the same numerals as in Figs. 1 and 2 primed), the air-tight well or box C' is very shallow and conduits D' diverge more sharply.
45 The grille is omitted.

It will be noted that there are two concentric inner horns D' each having its individual conical speaker element B'. The spacers 26' are staggered and the three conduits C' and D' are arranged concentrically.
50

In both embodiments, the conduits D may be regarded as inner horns and the boxes C as outer horns, each of which selectively conduct different types of tones and sounds. The sound is at
55 all times propagated through the mouth or front of the well and not through the sides thereof. Both of the boxes C and the conduits D are air tight and devoid of holes.

60 Concentric air tight wooden conduit constructions may be used, other than shown, and if desired, several conduits may be employed, each inside the other and spaced from each other to form central and annular sound conduits. Other
65 materials than wood which will not conduct sound may be employed.

The conduits or horns C and D may be circular, octagonal, elliptical, hexagonal or triangular instead of square.

70 Instead of wood the walls of the elements C and D may be of hollow metal sheet construction, the spaces between the walls being filled with sound deadening materials.

The present invention is of particular value
75 in that it makes use of the rearwardly directed

tones of the usual conical loud speaker which normally are discarded, since the front of the speaker is mounted upon a board or panel through which sound may not penetrate. These
5 rearwardly directed tones are reflected by the side and back walls of the outer conduit, box or well C and eventually pass outwardly through the outer portion of the mouth of the well or box.

It is apparent that the applicant has provided an inexpensive, readily available, easily utilized
10 casing for loud speaker units which is not only ornamental, but which also assures most satisfactory reproduction of sound.

An important feature of the present invention resides in the fact that the entire cross
15 sectional area of the box C or the central conduit D is available for the passage of the low and high notes in the direction indicated by the arrows 35, 36 and 37 in Fig. 2 and the entire
20 mouth portion, as shown in front view, is substantially available for the transmission and propagation of the sound waves which are transmitted from the front and back of the conical
member B.

It will be noted that the backtones of the conical member B pass through a space which tends
25 to decrease in cross sectional area, whereas the higher tones pass through a space which tends to increase in cross sectional area. It is a particular feature of the present invention that the
30 walls of the box C and the central conduit D are of nonabsorbent materials.

Many other changes could be effected in the particular features of speaker unit designed, and
35 in methods of operation set forth, and in specific details thereof, without substantially departing from the invention intended to be defined in the claims, the specific description herein merely serving to illustrate certain elements
40 by which, in one embodiment, the spirit of the invention may be effectuated.

What is claimed is:

1. A speaker unit comprising an outside conduit of substantial length, having a wall closing
45 one end thereof, the other end being open, an inside conduit of substantial length but shorter than said outside conduit, exteriorly spaced around its entire periphery from said outside conduit so as to leave a passageway completely en-
50 circling said inside conduit, said inside conduit extending from adjacent said wall to and being also open at the open end of said outside conduit, a conical speaker element positioned so as
55 to diverge toward said open end, closing off the inside end of said inside conduit and having its periphery attached to the inside end of said inside conduit, said inside conduit conducting the tones from the front of the conical element to
60 said open end and said encircling passageway conducting the tones from the back of the conical element to said open end, and fin members extending across said encircling passageway longitudinally of said conduits to support said inside
65 conduit from said outside conduit, said inside and outside conduits being constructed of a non-absorbent wood material, and said inside conduit diverging from its end adjacent said wall to its open end, to cause said encircling passageway to converge toward the open end, and a wooden
70 grille covering the open end of said inside conduit.

2. A speaker unit comprising an outside conduit of substantial length, having a wall closing
one end thereof, the other end being open, an

inside conduit of substantial length but shorter than said outside conduit, exteriorly spaced around its entire periphery from said outside conduit so as to leave a passageway completely encircling said inside conduit, said inside conduit extending from adjacent said wall to and being also open at the open end of said outside conduit, a conical speaker element positioned so as to diverge toward said open end, closing off the inside end of said inside conduit and having its periphery attached to the inside end of said inside conduit, said inside conduit conducting the tones from the front of the conical element to said open end and said encircling passageway conducting the tones from the back of the conical element to said open end, said outside conduit taking the form of an open end box with straight sides and said inside conduit taking the form of a frustrum pyramid with curved sides, with the base of the pyramid being positioned at said open end.

3. A speaker unit comprising an outside conduit of substantial length, having a wall closing one end thereof, the other end being open, an inside conduit of substantial length but shorter than said outside conduit, exteriorly spaced around its entire periphery from said outside conduit so as to leave a passageway completely encircling said inside conduit, said inside conduit extending from adjacent said wall to and being also open at the open end of said outside conduit, a conical speaker element positioned so as to diverge toward said open end, closing off the inside end of said inside conduit and having its periphery attached to the inside end of said inside conduit, said inside conduit conducting the tones from the front of the conical element to said open end and said encircling passageway conducting the tones from the back of the conical element to said open end, said inside and out-

side conduits being formed of a non-absorbent wood material.

4. A speaker unit comprising an outside conduit of substantial length, having a wall closing one end thereof, the other end being open, an inside conduit of substantial length but shorter than said outside conduit, exteriorly spaced around its entire periphery from said outside conduit so as to leave a passageway completely encircling said inside conduit, said inside conduit extending from adjacent said wall to and being also open at the open end of said outside conduit, a conical speaker element positioned so as to diverge toward said open end, closing off the inside end of said inside conduit and having its periphery attached to the inside end of said inside conduit, said inside conduit conducting the tones from the front of the conical element to said open end and said encircling passageway conducting the tones from the back of the conical element to said open end.

5. A speaker unit comprising an outside conduit of substantial length, having a wall closing one end thereof, the other end being open, an inside conduit of substantial length but shorter than said outside conduit, exteriorly spaced around its entire periphery from said outside conduit so as to leave a passageway completely encircling said inside conduit, said inside conduit extending from adjacent said wall to the open end of said outside conduit, a conical speaker element positioned to close off one end of said inside conduit and having its periphery attached to said end of said inside conduit, said inside conduit conducting the tones from one side of the conical element to said open end and said encircling passageway also conducting the tones from one side of the conical element to said open end.

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