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C. BLIEBERGER.

SOUND AMPLIFYING AND REPRODUCING APPARATUS.

APPLICATION FILED MAY 2, 1921.

1,436,080.

Patented Nov. 21, 1922.

6 SHEETS—SHEET 1.

Fig. 1.

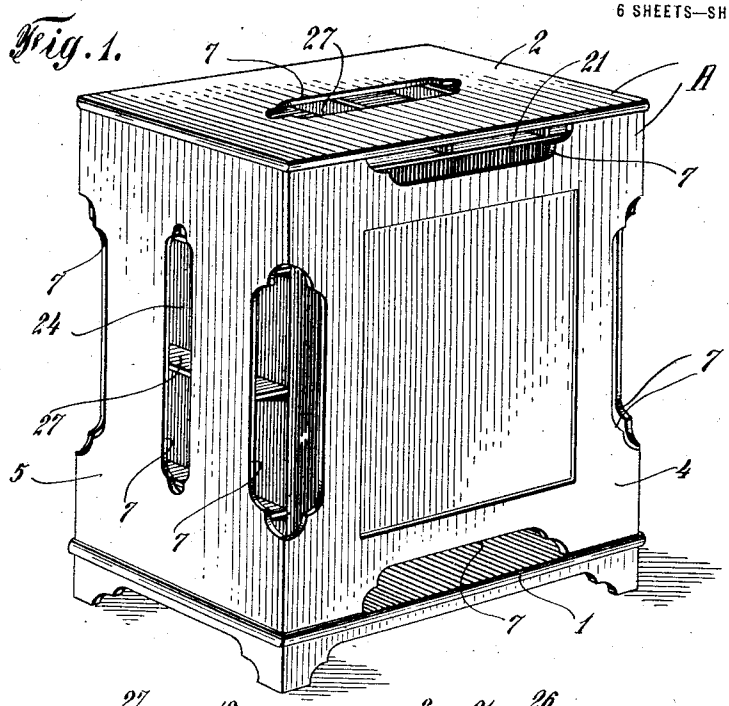
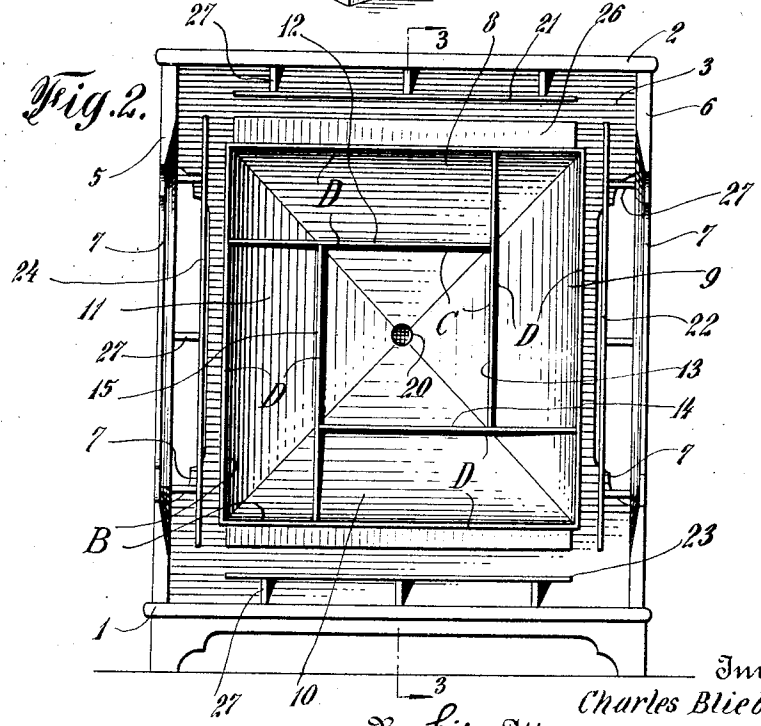


Fig. 2.



Inventor

Charles Blieberger

By his Attorney

A. Alexander Thomas

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Fig. 3.

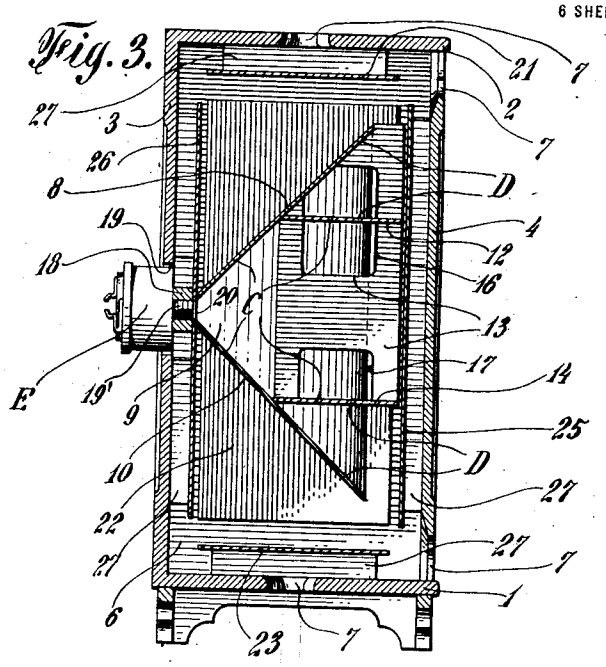

Fig. 4.

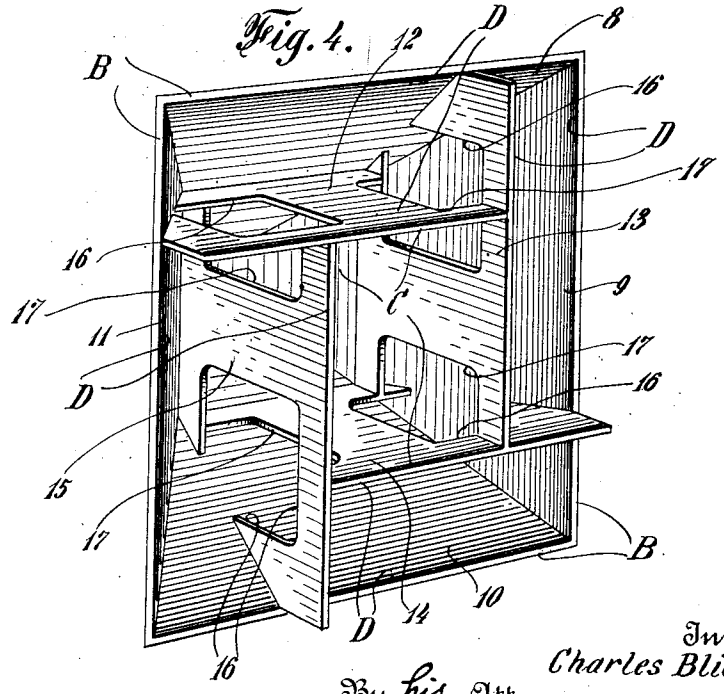

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Fig. 5.

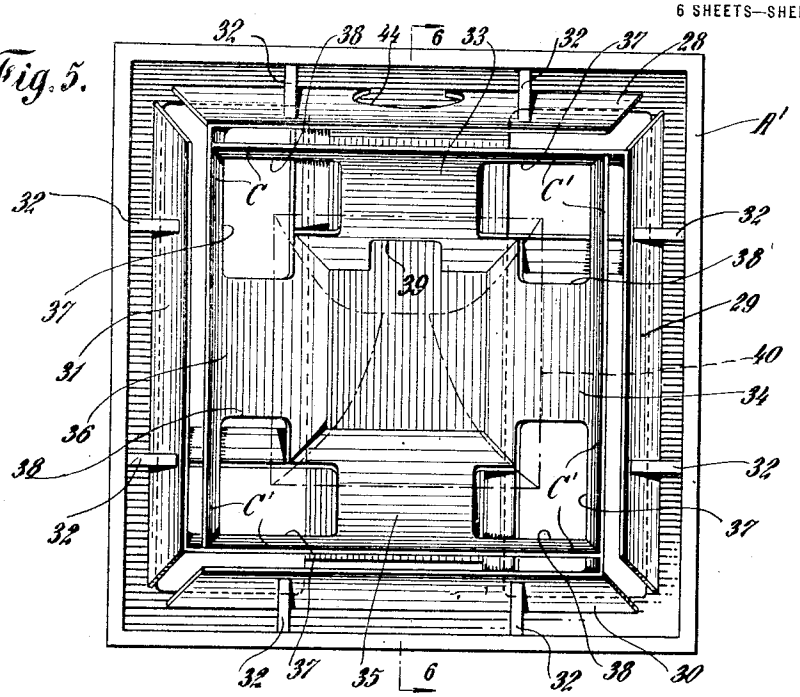
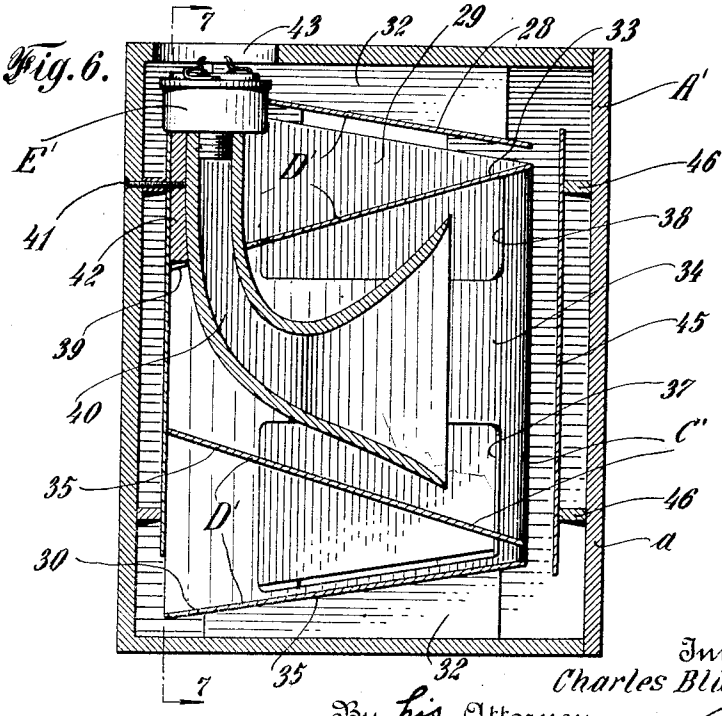


Fig. 6.



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6 SHEETS—SHEET 4.

Fig. 7.

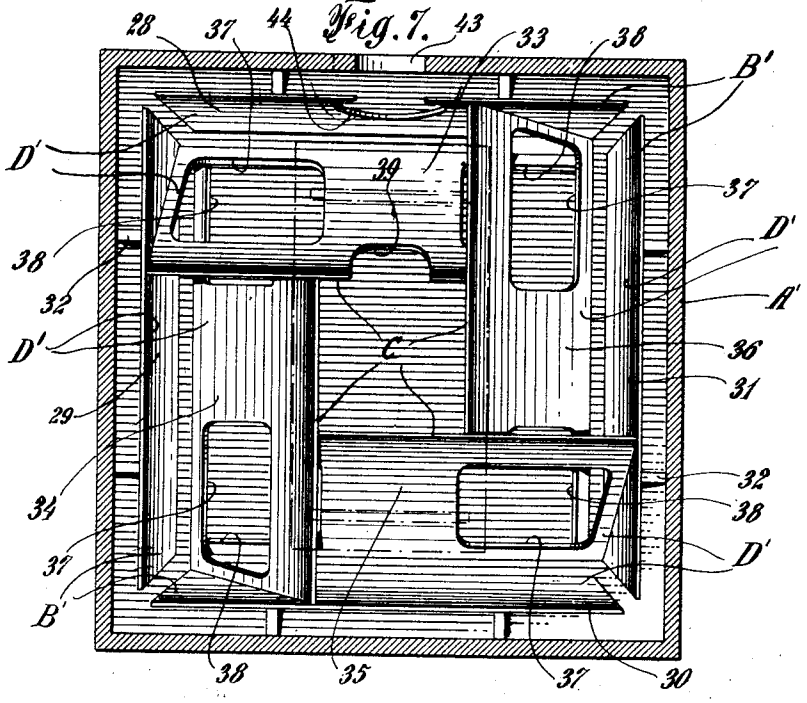
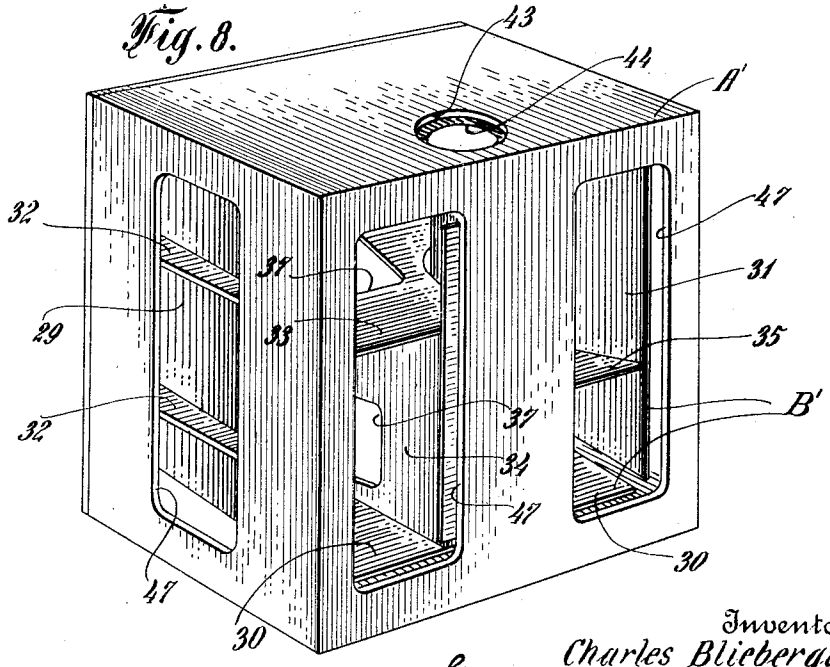


Fig. 8.



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6 SHEETS—SHEET 5.

Fig. 9.

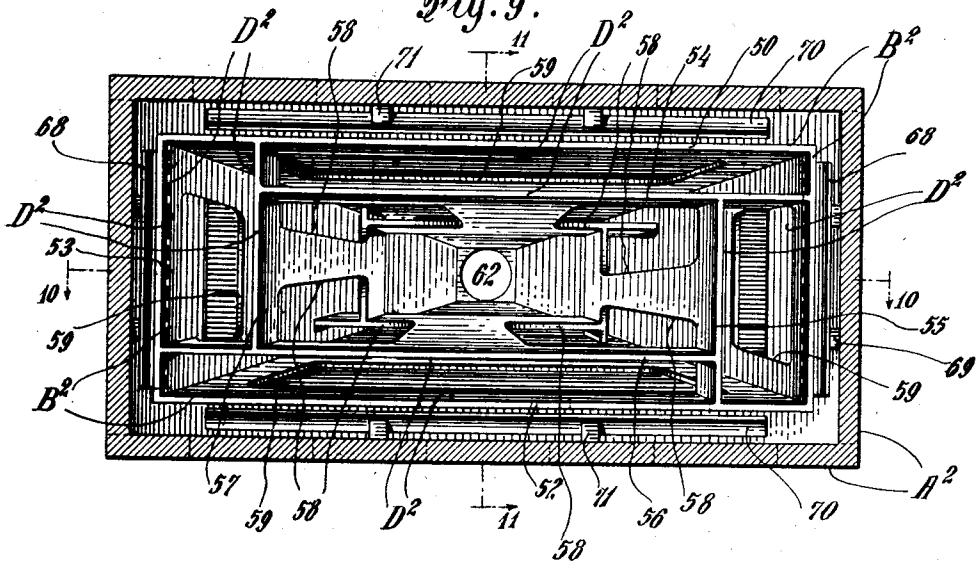
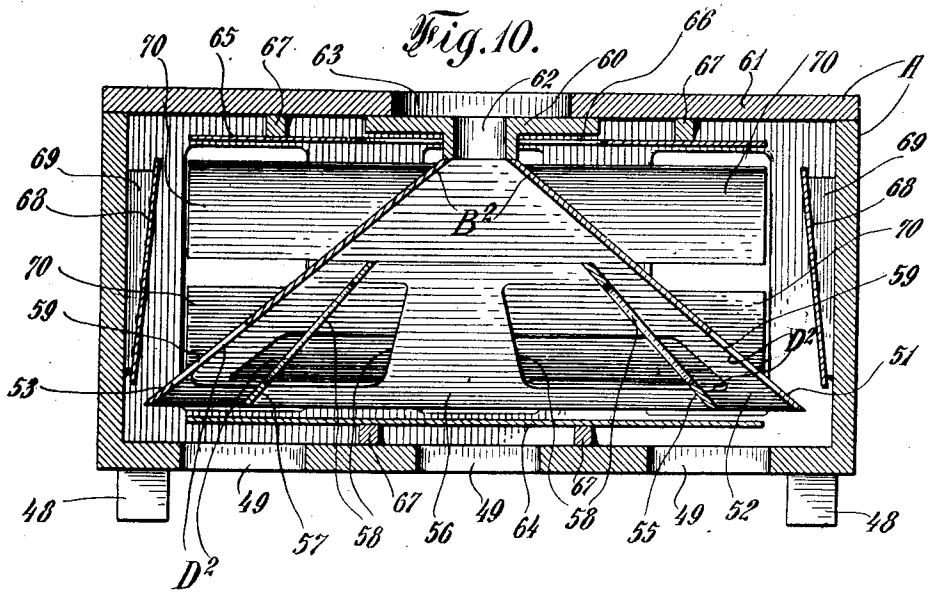


Fig. 10.



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6 SHEETS—SHEET 6.

Fig. 11.

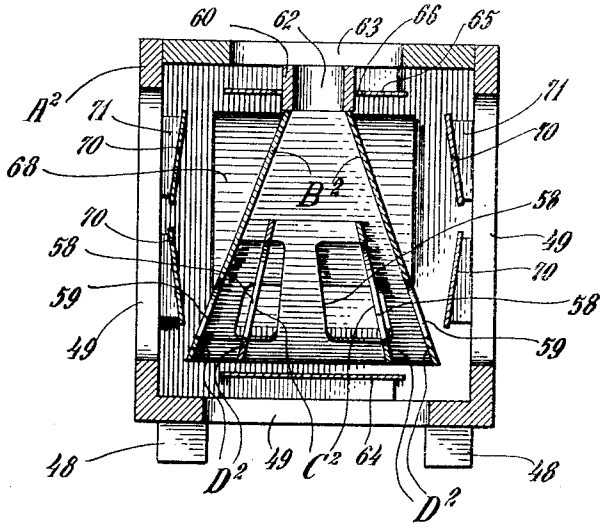
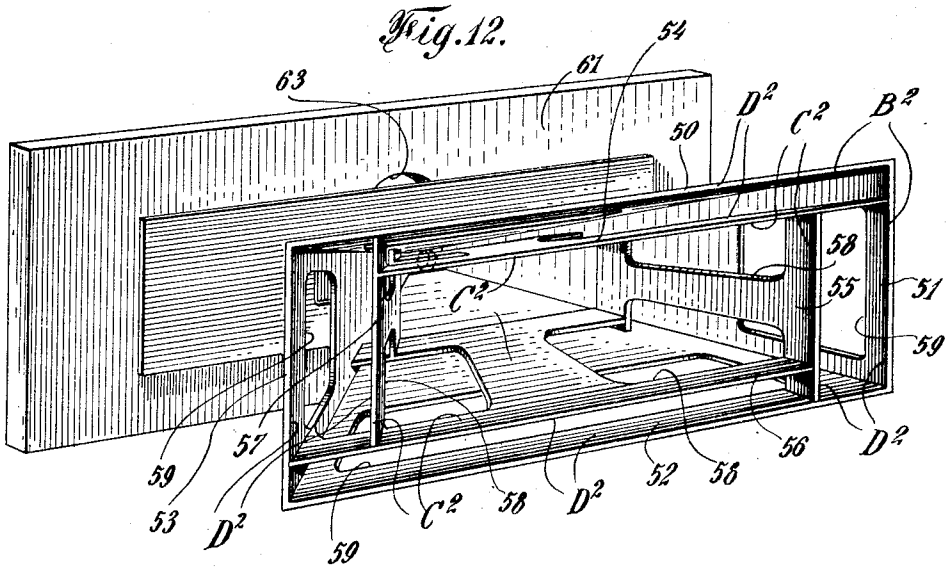


Fig. 12.



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By his Attorney
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Patented Nov. 21, 1922. 1,436,080

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UNITED STATES PATENT OFFICE.

CHARLES BLIEBERGER, OF NEW YORK, N. Y.

SOUND AMPLIFYING AND REPRODUCING APPARATUS.

Application filed May 2, 1921. Serial No. 466,032.

To all whom it may concern:

Be it known that I, CHARLES BLIEBERGER, a citizen of the United States, and a resident of New York, county and State of New York, have invented new and useful Improvements in Sound Amplifying and Reproducing Apparatus, of which the following is a full, clear, and exact specification.

My invention relates generally to apparatus for amplifying and reproducing sounds caused by a vibratory diaphragm, as in a phonograph, telephone, and other acoustic devices. The object of my invention is to produce an apparatus of compact proportions and capable of reproducing sounds with a marked degree of amplification, clearness and naturalness.

It has heretofore been the practice to amplify the sound vibrations of diaphragms (whether caused mechanically as in talking machines, or electrically as in telephone receivers) by conducting the sound waves through a horn or megaphone. However, the sound thus amplified has an unnatural quality and lacks distinctness; it may be described as "choky".

The apparatus of my present invention overcomes the foregoing and other defects in prior devices. Briefly stated, my new amplifier and reproducer consists of a box or cabinet provided with a substantially pyramidal sound-receiving compartment surrounded by a number of sound-distributing or developing compartments also substantially pyramidal in shape or outline and freely communicating with the sound-receiving compartment. The sound-distributing compartments are freely open to the outer air through openings in the box. The arrangement of these pyramidal compartments is such that a box of comparatively small dimensions possesses great amplifying power; while at the same time giving out clear and natural tones.

The sounds to be reproduced and amplified are led into the sound-receiving compartment, from which the sound waves spread freely into the pyramidal sound-distributing compartments, whence they pass into the outer air. This spreading or distributing of the sound waves within the box amplifies the vibrations of a diaphragm in such a way that the sounds issuing from the box can be distinctly heard throughout the room in which the apparatus may be situated. The voice of a person or the tones of a musical instrument are reproduced with remarkable clearness and fidelity, as I have demonstrated by actual trial.

Owing to its small size, my new amplifying and reproducing box can be placed upon, or form part of, a phonograph cabinet, leaving ample room in the lower portion of the cabinet for the storage of records. From a commercial standpoint, this is a desirable advantage. The compactness of my device renders it particularly applicable to telephone receivers. My invention may be embodied in a small box which, occupying but little space, can be placed almost anywhere in a room or hung on a wall, and it will convey to the listener's ear, with clarity and naturalness, the amplified vibrations of the diaphragm attached to the box.

My invention may also be employed for receiving sounds from outside the box and transmitting them through the various pyramidal compartments to a diaphragm, the resultant vibrations of which may be used for any desired purpose. In this operation of my invention the sound waves are concentrated by the surrounding compartments into the receiving compartment to act upon the diaphragm in a most effective manner.

For the sake of explaining the principle of my invention, I will now describe in detail several illustrative embodiments thereof. In the accompanying drawings, which form part of this specification,

Figure 1 is a perspective view of a sound amplifier containing my invention;

Fig. 2 is an inside view showing the various sound compartments;

Fig. 3 is a vertical cross-section taken approximately on line 3—3 of Fig. 2;

Fig. 4 is a detached perspective view of the sound-receiving and sound-distributing compartments;

Fig. 5 shows the inside of a modified form of apparatus constructed in accordance with my invention;

Fig. 6 is a vertical cross-section taken approximately on line 6—6 of Fig. 5;

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Fig. 7 is a sectional view taken approximately on line 7—7 of Fig. 6;

Fig. 8 is a perspective view of the outer box or cabinet shown in Figs. 5, 6 and 7;

Fig. 9 shows the inside of a small elongated box embodying my invention;

Fig. 10 is a longitudinal cross-section approximately on line 10—10 of Fig. 9;

Fig. 11 is a transverse cross-section approximately on line 11—11 of Fig. 9; and

Fig. 12 is a perspective view of the pyramidal compartments shown in Figs. 9, 10 and 11.

I will first describe the construction illustrated in Figs. 1 to 4 inclusive. The outer box or cabinet, which may be constructed of wood, metal or other suitable material, is indicated as a whole by A. This box or cabinet comprises a base 1, top 2, side walls 3 and 4, and end walls 5 and 6. The wall 4 may be removable to provide easy access to the interior of the box. The outer walls of the box A have suitable sound openings 7; the number, shape and arrangement of which may vary, depending upon the size and shape of the box or the effect it is desired to produce.

Within the box A are mounted diverging panels 8, 9, 10 and 11, connected together to form a substantially pyramidal chamber indicated as a whole by B. Within the pyramidal chamber B are partitions 12, 13, 14 and 15, which are preferably (but not necessarily) affixed to the diverging panels 8, 9, 10 and 11. It will be seen that the partitions and the panels form a central compartment indicated as a whole by C, and a plurality of adjacent or surrounding compartments D. The compartments C and D are substantially pyramidal in form or outline, as best shown in Figs. 3 and 4. The central compartment C may be called the sound-receiving compartment and the surrounding compartments D may be referred to as sound-distributing or developing compartments. The compartment C is laterally in communication with the compartments D through openings 16 and 17 in the partitions 12, 13, 14 and 15. Preferably the openings 16 and 17 in the partitions are so arranged that the sound-distributing compartments D communicate with each other, as may be clearly seen from Fig. 4. The shape, arrangement and number of the openings 16 and 17 may be varied to suit the size and shape of the partitions.

The diverging panels 8, 9, 10 and 11 are preferably attached to the box A at their inner or converging ends. There is a cross-piece 18 fixed to the wall 3 of the box, as shown in Fig. 3, and to this cross-piece are secured the panels 8, 9, 10 and 11 in any convenient way, as any carpenter will understand.

While in the present instance I have shown four panels and a corresponding number of partitions, it is evident that the number and arrangement of the panels and partitions may vary in accordance with the shape and dimensions of the outer box.

The wall 3 of the box A has an opening 19 for receiving a suitable telephone receiver E. This receiver may be of any approved type, such as may be bought in the market, and as the construction and operation of these devices are well understood, I have therefore not deemed it necessary to show the structural details thereof. As will be understood, the receiver E contains a vibratory diaphragm for producing sound vibrations. In the broader aspect of my invention, this vibratory diaphragm may be any suitable diaphragm adapted to be operated either electrically or mechanically to produce sound vibrations, as in a telephone receiver or in a phonograph sound-box, and so I will conveniently refer to the part E as a vibratory diaphragm. The diaphragm E has a tubular projection 19′ adapted to pass through, or fit into, a corresponding opening in the cross-piece 18, so as to terminate in proximity to the opening 20 at the inner or converging end of the pyramidal chamber B. In this way the sound waves caused by the vibrations of the diaphragm issue directly into the compartment C.

It will be understood that the diaphragm E is merely illustrative of a suitable source of sound which communicates with the compartment C. In describing the apparatus shown in Figs. 1 to 4, I have assumed, for the sake of simplicity, that the box is used as a telephone amplifier, in which case the member E would be a telephone receiver connected in a talking circuit. Instead of attaching the member E directly to the box, a suitable horn may be interposed between the diaphragm and the inner end of the receiving compartment C. When my invention is used in a phonograph, the tone-arm is so attached as to communicate with the opening 20.

The sound waves caused by the vibratory diaphragm E enter the pyramidal receiving compartment C, whence they spread in all directions, passing through the openings 16 and 17 into the distributing compartments D. From there the waves pass out of the box through the openings 7. It will be seen that the sound waves issue laterally from the receiving compartment C into the distributing compartments D through the openings 16 and 17, and from the compartments D the sound waves pass laterally into the outer air. By "laterally" I mean here in a direction or plane substantially at right angles to the axis (or axes) of the compartments C and D, as distinguished from the operation of the usual open-mouthed horn in which the movement of the sound

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waves is confined in the general direction of the axis of the horn. It is this unnatural confining or compressing of the sound waves which is mainly responsible, as I believe, for the unnatural quality of sound issuing out of a horn. Now, in the apparatus of my invention, the sound waves are free to develop in all directions, as when a person speaks without a megaphone. Because of this spreading and distribution of the sound waves issuing from the restricted end of the pyramidal chamber or conveyor B, the sounds issuing from the box are not only clear and loud, but (what is perhaps more important) they possess a natural quality, being in fact a faithful reproduction of the original sounds. This renders my new amplifying device especially applicable to talking machines or phonographs, from which it eliminates the objectionable "phonography" sounds heretofore present. The pyramidal sound chamber or conveyor B with its partitions may be inserted in a phonograph cabinet of the usual construction and properly connected with the tone-arm. Or the entire box A may be built as part of a phonograph cabinet. In that case, the box forms the upper portion of the cabinet and is preferably arranged with the wall 3 on top, so that the inner or larger end of the tone-arm can be attached over the opening 19. This will be clearly understood by any one skilled in the art.

To increase the sound-carrying power of my amplifying apparatus, I prefer to attach supplementary panels 21, 22, 23, 24, 25 and 26 to the inside of the outer walls of the box by suitable cross-pieces 27. I have also found that these supplementary panels improve the quality of the sound.

Another form of apparatus embodying my invention is illustrated in Figs. 5, 6, 7 and 8. In this instance, the outer box or cabinet A′ is provided with diverging panels 28, 29, 30 and 31, which form a pyramidal sound chamber B′. Strictly speaking, this chamber has the general outline of a truncated pyramid, but it may properly be described as being substantially pyramidal. The panels 28, 29, 30 and 31 are secured to the adjacent walls of the box A′ in any suitable manner, as by means of wedge-shaped cross-pieces 32. Within the pyramidal chamber B′ are mounted partitions 33, 34, 35 and 36. These partitions diverge in a direction opposite to the panels 28, 29, 30 and 31, as perhaps best shown in Fig. 6, and form a central sound-receiving compartment C′, which is substantially pyramidal in shape or outline. In Fig. 5 we are looking from the larger or outer end of the compartment C′ toward the smaller or inner end thereof, while Fig. 7 shows a reverse view. As seen from Figs. 5 to 7, each partition is at one edge connected to the face of another partition and at its other edge to one of the panels. The partitions 33, 34, 35 and 36 form with the panels 28, 29, 30 and 31 a plurality of sound-distributing compartments D′, which are substantially pyramidal in shape or outline, as best shown in Figs. 6 and 7. The central sound-receiving compartment C′ is in communication with the sound-distributing compartments D′ through openings 37 and 38 provided in the partitions. The openings 37 and 38 are preferably so arranged that the compartments D′ are in communication with each other.

The partition 33 is provided at its inner end with an opening or cutaway portion 39 for receiving a suitable horn 40, which extends into the sound-receiving compartment C′. This horn is held in place by any convenient means, such as a screw 41 passing from the outside of the box into the block 42 carried by the horn. The smaller end of the horn is adapted to receive a suitable vibratory diaphragm E′, which is inserted into the box through the opening 43. The panel 28 has a hole or cutaway portion 44 in alignment with the opening 43 to accommodate the diaphragm E′.

Opposite the larger end of the sound-receiving compartment C′ is mounted a sound-deflecting panel 45, which is secured to the outer wall a of the box A′ by means of cross-pieces 46 or otherwise. When the sound waves issuing from the horn 40 strike the panel 45, they are thrown back into the compartment C′, whence they pass through the openings 37 and 38 and from there into the outer air through the openings 47 in the outer walls of the box A′.

In Figs. 9, 10, 11 and 12 I have illustrated another embodiment of my invention which is characterized by even greater compactness than the constructions previously described. The box A^2 is of elongated shape and is designed to stand on legs 48. The outer walls of this box are provided with sound openings 49 sufficient in number and size to permit free emission of the sound to the outer air. Inside the box A^2 is mounted a pyramidal casing or chamber indicated as a whole by B^2, which is formed by panels 50, 51, 52 and 53. Within the chamber B^2 are arranged partitions 54, 55, 56 and 57. As best seen from Figs. 9 to 12, the partitions overlap in such a way that each partition abuts at one edge against the face of another partition and at the other edge against the face of one of the panels which form the pyramidal chamber B^2. The result is that the partitions and panels cooperate to form a plurality of substantially pyramidal sound-distributing compartments D^2, which surround the pyramidal sound-receiving compartment C^2. The compartments D^2 are in communication with the central compartment C^2 and with

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each other by means of suitable openings or cutaway portions 58 in the partitions 54, 55, 56 and 57. The panels 50, 51, 52 and 53 have sound openings 59; this is preferable but not essential.

The pyramidal casing or chamber B^2 is secured in place in any suitable manner. In the drawings I have shown the casing attached at its inner end to the block 60 carried by the top 61 of the box A^2. The block 60 has an opening 62 adapted to communicate with a vibratory diaphragm, whereby the sound waves caused by the diaphragm pass into the pyramidal chamber B^2 and the compartments C^2 and D^2.

If it is desired to attach a vibratory diaphragm, such as a telephone receiver, directly to the box A^2, I provide an opening 63 in the top 61 of the box to receive the casing of the diaphragm. It is obvious that a horn or other similar conveyor may be interposed between the diaphragm and the opening 62. If the box A^2 is to be used in connection with a phonograph, the inner end of the tone arm is fixed over the opening 62.

As in the case of the boxes A and A′, previously described, I prefer to provide the box A^2 with supplementary panels to augment the sound-carrying capacity of the box. A panel 64 is attached to the bottom of the box opposite the open mouth of the chamber B^2, as best shown in Figs. 10 and 11. A similar panel 65 is secured to the top 61 of the box. The panel 65 has an opening 66 to accommodate the projecting portion of the block 60. The panels 64 and 65 are secured to the box by any suitable means, such as cross-pieces 67. The two ends of the box A^2 have attached thereto panels 68 by wedged-shaped cross-pieces 69, so that the panels incline or diverge outwardly at their lower ends, as best shown in Fig. 10. Similarly, diverging panels 70 are attached to the side walls of the box, as best shown in Fig. 11. By inclining the panels 68 and 70 in the manner referred to, I am able to provide an increased sound space between these panels and the sound chamber B^2, thereby obtaining a maximum of amplification and sound-carrying capacity in a box of small dimensions. I have repeatedly demonstrated by actual trial that a box like that shown in Figs. 9 to 12, about 11 inches long, 5 inches wide and 5 inches high, with a telephone receiver attached thereto, is capable of reproducing and amplifying the sound waves caused by the vibratory diaphragm in such a way that they can be distinctly heard throughout the room in which the apparatus is situated. Furthermore, if the human voice is reproduced by the diaphragm, the amplified sound coming out of the box has the natural quality and clearness of the original voice.

When I use the descriptive terms front, rear, top and bottom in reference to the outer box, it will be understood that I use them merely in a relative sense and not restrictively. Also, when I speak of the sound-receiving compartment C, C′ or C^2 as a central compartment, I do not mean that it must be arranged in the exact center of the box or of the surrounding casing B, B′ or B^2. In referring to the sound-receiving and sound-distributing compartments as pyramidal, I do not use the term in its strict geometric sense, but rather in its more flexible meaning of diverging—that is to say, compartments with diverging walls. Furthermore, in the broader aspect of my invention, the sound-distributing compartments may be so constructed and arranged in relation to the sound-receiving chamber that some of the sound-waves pass directly into the sound-distributing compartments on entering the amplifier. This is shown in the construction of Figs. 9–12. The outer box as well as the interior panels and partitions may be made of a variety of materials, resonant or non-resonant—such as wood, metal or a suitable composition.

It will be seen from the foregoing description that my invention is capable of a variety of uses in which it is necessary or desirable to reproduce and amplify sound caused by a vibratory diaphragm. The pyramidal sound compartments contained in the box make it possible to construct the apparatus in compact form without reducing its efficiency. This renders my invention applicable in cases where larger and more cumbersome devices would be out of the question.

I am aware that attempts have heretofore been made to modify the sounds of phonograph horns by the addition of so-called sympathetic resonators, which have been proposed in various forms,—such as, sounding boards, musical strings, resonance tubes, and the like. With all of those prior devices, in which the sounds would issue out of a horn or trumpet, my present invention is not concerned. The construction and arrangement of chamber in my amplifier are such that the sound is freely developed and distributed in all directions, thereby producing a naturalness of tone. The amplification of sound in the apparatus of my invention is independent of any resonant element, and it is therefore immaterial, as already stated, of what particular substance the walls and partitions of the chambers are constructed. Of course, different materials may impose their own sound peculiarities on the ultimate quality of tone produced, and the selection of a suitable material is left to the skill of the experienced workman. Also, in my invention, it will be clear that the amplifying power and general tonal effect will vary with the size, shape and design of the con-

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struction. Then, again, if my invention is used to amplify the vibrations of a telephone diaphragm, it may be found that different kinds of telephone receivers and circuits require different forms and sizes of amplifying boxes to produce the best results. These matters lie within the training of the acoustic expert.

Obviously, the basic idea of my invention may be mechanically carried out in other ways than those herein set forth by way of illustration. The size and shape of the box may be varied to suit circumstances and conditions; likewise, the inside partitions and panels may vary in number, form and arrangement, provided the sound-receiving and sound-distributing compartments are made substantially pyramidal or diverging, although some or a portion of the walls may be substantially parallel, as shown, for instance, in Figs. 2, 3 and 4. Also, it will be apparent that in the broader aspect of my invention the diverging walls or panels of the sound-receiving chamber form with the outer walls of the box or cabinet a plurality of substantially pyramidal or diverging sound-distributing compartments which communicate with said chamber and are open to the outer air. This is clear from Figs. 6 and 11.

I do not herein claim broadly the idea of a sound-receiving chamber and a plurality of sound-distributing or developing compartments in communication with said chamber and with the outer air, because that basic principle is covered in my co-pending application Serial Number 524,507, filed December 23, 1921, as a renewal of application Serial Number 325,256, filed September 20, 1919, said application being a continuation of an application filed by me June 24, 1918, Serial Number 241,624.

I claim as my invention:

1. A sound amplifier consisting of an outer box or cabinet having sound openings in its walls, a plurality of diverging panels supported within said box to form a substantially pyramidal chamber, and partitions arranged within said chamber to provide a substantially pyramidal central sound-receiving compartment adapted to communicate with a vibratory diaphragm, said diverging panels and said partitions forming a plurality of substantially pyramidal sound-receiving compartments around said central compartment and in communication therewith, said sound-distributing compartments being in communication with the outer air through said openings in the outer box or cabinet.

2. A sound amplifier consisting of an outer box or cabinet having sound openings in its walls, a plurality of diverging panels supported within said box to form a substantially pyramidal chamber, and partitions secured to said panels within said chamber to provide a substantially pyramidal central sound-receiving compartment adapted to communicate with a vibratory diaphragm, said diverging panels and said partitions forming a plurality of substantially pyramidal sound-distributing compartments around said central compartment and in communication therewith, said sound-distributing compartments being in communication with the outer air through said openings in the outer box or cabinet.

3. A sound amplifier consisting of an outer box or cabinet having sound openings in its walls, a plurality of diverging panels supported within said box to form a substantially pyramidal chamber, partitions arranged within said chamber to provide a substantially pyramidal central sound-receiving compartment, said compartment being open at its larger end and having a hole at its smaller end to permit communication with a vibratory diaphragm, said diverging panels and said partitions forming a plurality of substantially pyramidal sound-distributing compartments around said central compartment and in communication therewith, said sound-distributing compartments being in communication with the outer air through said openings in the outer box or cabinet, and a vibratory panel mounted within said box adjacent the larger end of said central compartment.

4. A sound amplifier consisting of an outer box or cabinet having sound openings in its walls, a plurality of diverging panels supported within said box to form a substantially pyramidal chamber, partitions arranged within said chamber to provide a substantially pyramidal central sound-receiving compartment, said compartment being open at its larger end and having a hole at its smaller end to permit communication with a vibratory diaphragm, said diverging panels and said partitions forming a plurality of substantially pyramidal sound-distributing compartments around said central compartment and in communication therewith, said sound-distributing compartments being in communication with the outer air through said openings in the outer box or cabinet and a vibratory panel secured to the inner side of one of the outer walls of said box at the larger end of said central compartment, said vibratory panel being substantially coextensive with the adjacent open end of said pyramidal chamber and spaced therefrom.

5. A sound amplifier consisting of a box or cabinet provided with a substantially pyramidal central sound-receiving compartment and with a plurality of substantially pyramidal sound-distributing compartments around said central compartment, said central compartment communicating laterally

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with said sound-distributing compartments, and said sound-distributing compartments being open to the outer air.

6. A sound amplifier consisting of an outer box or cabinet having sound openings in its walls, a plurality of diverging panels supported within said box to form a substantially pyramidal chamber, and partitions arranged within said chamber to provide a substantially pyramidal central sound-receiving compartment adapted to communicate with a vibratory diaphragm, said diverging panels and said partitions forming a plurality of substantially pyramidal sound-distributing compartments around said central compartment, said partitions having openings through which said sound-distributing compartments communicate with each other and with said central compartment, said sound-distributing compartments being in communication with the outer air through said openings in the outer box or cabinet.

7. A sound amplifier comprising a plurality of inner walls arranged to form a substantially pyramidal central sound-receiving chamber, and a plurality of outer walls arranged to form with said inner walls a plurality of sound-distributing compartments around said sound-receiving chamber, said inner walls having openings through which said sound-receiving chamber communicates laterally with said sound-distributing compartments, and said outer walls having openings through which said sound-distributing chambers communicate freely with the outer air.

8. A sound amplifier consisting of a box or cabinet provided with a substantially pyramidal central sound-receiving compartment and with a plurality of substantially pyramidal sound-distributing compartments around said central compartment, said central compartment communicating laterally with said sound-distributing compartments which are freely open to the outer air, and a panel supported at the larger end of said sound-receiving compartment and extending over the open ends of said sound-distributing compartments.

9. In apparatus for amplifying sound, a sound chamber having outer walls and a plurality of inner partitions arranged to form with said outer walls a substantially pyramidal sound-receiving compartment and a plurality of adjacent sound-distributing compartments, said partitions having openings whereby said sound-receiving compartment communicates laterally with said sound-distributing compartments, which are open to the outer air.

10. In apparatus for amplifying sound, a sound conveyor provided with partitions arranged at an angle to each other and having overlapping portions arranged to form a substantially pyramidal sound-receiving compartment and a plurality of adjacent sound-distributing compartments communicating laterally with said sound-receiving compartment and open to the outer air.

11. A sound amplifier consisting of a box or cabinet having walls arranged to form a substantially pyramidal central sound-receiving compartment and having other walls which form with said first-mentioned walls a plurality of substantially pyramidal sound-distributing compartments around said central compartment, the walls of said central compartment having openings through which said compartment communicates laterally with said sound-distributing compartments, said sound-distributing compartments being open to the outer air.

12. A sound amplifier consisting of an outer box or cabinet having sound openings in its walls, a plurality of diverging panels supported within said box to form a substantially pyramidal chamber, partitions arranged within said chamber to provide a substantially pyramidal central sound-receiving compartment adapted to communicate with a vibratory diaphragm, said diverging panels and said partitions forming a plurality of substantially pyramidal sound-distributing compartments around said central compartment and in communication therewith, said sound-distributing compartments being in communication with the outer air through said openings in the outer box or cabinet, and supplementary diverging panels mounted on the inside of the outer walls of said box.

13. A sound amplifier consisting of a box or cabinet provided with a substantially pyramidal central sound-receiving compartment and with a plurality of substantially pyramidal sound-distributing compartments around said central compartment, and diverging panels mounted on the inside of the outer walls of said box, said central compartment communicating with said sound-distributing compartments and said sound-distributing compartments being open to the outer air.

14. A sound amplifier comprising an outer box or cabinet having sound-openings in its walls, a substantially pyramidal sound-receiving chamber in said box, a plurality of substantially pyramidal sound-distributing compartments around said chamber and communicating therewith and a wall or panel at the larger end of said chamber to deflect sound-waves into said compartments whence they issue through said sound-openings into the outer air.

15. A sound amplifier consisting of an outer box or cabinet having sound openings in its walls, diverging panels arranged

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within said box to form a substantially pyramidal sound-receiving chamber, said diverging panels forming with the walls of said box or cabinet a plurality of substantially pyramidal sound-distributing compartments adjacent said sound-receiving chamber and in communication therewith, said compartments being open to the outer air through said sound openings in the box.

16. A sound amplifier consisting of a box provided inside with a diverging sound-receiving chamber, the walls of said chamber forming with the walls of said box a plurality of diverging sound-distributing compartments adjacent said chamber and laterally in communication therewith, said compartments being open to the outer air.

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