

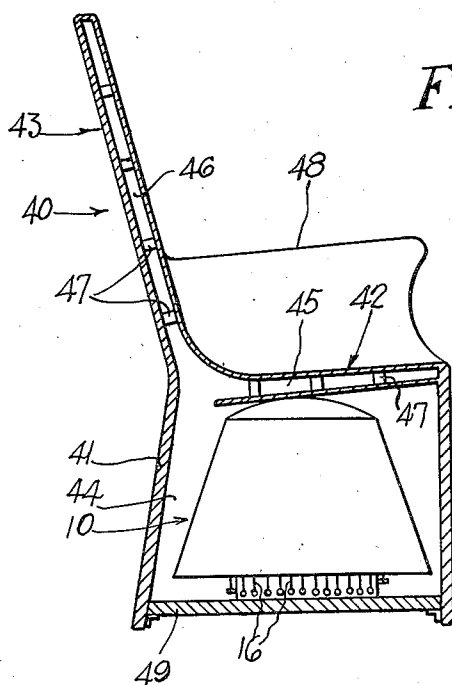
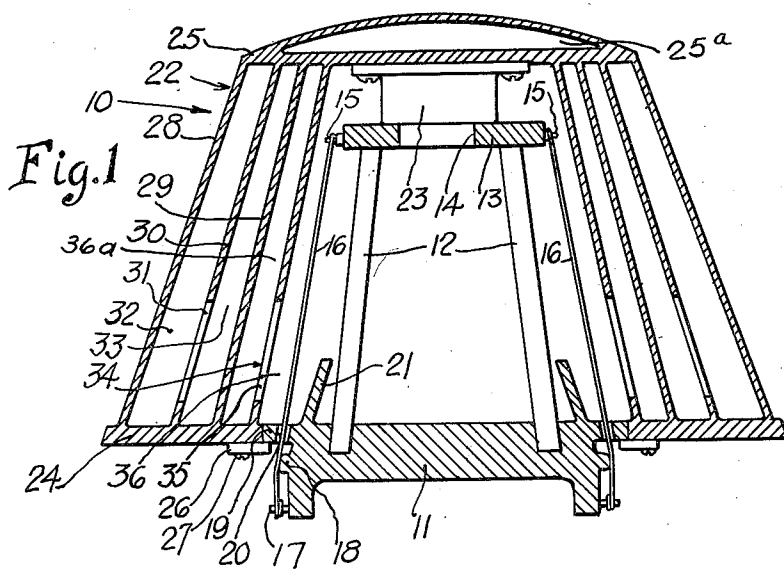
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SOUND INTENSIFIER

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SOUND INTENSIFIER

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1

This invention relates to sound apparatus, such as mechanical sound amplifiers adapted to increase the intensity or depth of sound to improve the musical quality thereof.

One object of the invention is the provision of improved apparatus for building up the intensity and depth of sound along preferably closed, vibratory resonating chambers which are graduated in volume or area.

The invention is addressed to the reproduction of sound for improving the quality thereof and to the enhancement in the quality of sound which is good or almost perfect as produced; and it may also be regarded as pertaining to the art of changing or modifying sound with a view to increasing the depth or intensity thereof. Therefore, within the purview of the invention, the same may include any good source of sound or music such as a radio loud speaker, a piano, violin or other string or reed instrument; and the invention may embody a unit located wholly or only partly at or about the source of sound and partly at points extended or relatively remote therefrom since the system is capable of being greatly expanded over a substantial distance.

Another object of the invention is to furnish an apparatus of the class alluded to having improved means comprising sound chambers arranged in a series to conserve the energy of the sound source and to form an efficient transmitting series outward from the source of sound.

Heretofore the practice has been to provide only one sound chamber or board adjacent to a source of sound as exemplified by a violin, piano and other musical instruments. I discovered that substantial improvement was possible by employing a plurality of sound chambers, providing that they are disposed in a certain novel relationship to each other as hereinafter described. By my invention such added depth or intensity of sound was obtainable that the invention opens up a new field of sound treatment of persons suffering from mental and other ailments directly or indirectly cause by emotional disturbances.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention comprises the novel features, combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated in the annexed drawing, wherein like parts are designated

2

by the same reference characters throughout the several views.

In the drawing:

Figure 1 is a vertical sectional view with parts in elevation showing an apparatus embodying the invention.

Fig. 2 is a view on a reduced scale showing a device such as a chair comprising the device of Fig. 1 and embodying the invention.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined, but useful embodiments may be produced involving less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, that the same may be incorporated in several different constructions. The accompanying drawing, therefore, is submitted merely as showing a preferred exemplification of the invention.

Referring in detail to the drawing, 10 denotes a sound apparatus embodying the invention. The same may comprise a frame having a base plate or member 11 carrying two or more uprights or standards 12 on the upper end of which is secured a perforated or ring element 13 that may have a large central opening 14. Carried by the element are the lugs or pins 15 for the vibratory strings or wires 16. The latter are anchored at their other ends to the tension adjusting means or pins 17 provided on the base 11. The member 11 may have a bridge member 18 for contacting the strings 16, and such contact may be at different distances from the ends of the strings to vary the effective length thereof as in the case of a piano sounding board; and the location of the pins 15 or 17 may also be varied for a like purpose. Adjacent to the bridge 18 there may be provided a flange 19 having openings 20 through which the strings 16 may pass individually or in groups, this flange serving as a securing means as hereinafter apparent. Disposed inwardly of the strings 16, or to the rear thereof are provided the deflector plates 21 mounted on the member 11. The general structure and arrangement as thus far in detail described is to furnish a rigid frame unit carrying a vibrator string sounding means with the strings arranged on one or more sides of the unit. For example this unit might be considered to be of square or circular form; if circular the strings may extend in a continuous series there around, and if square there may be a set of strings for each of the four sides of the unit,

3

or there may be a set of strings for only two opposed sides of the unit.

A vibratory system 22 may comprise a series of chambers disposed around a source of sound such as 23 in such a manner that all the energy of said source is substantially confined and directed with high efficiency to the system 22 which transmits and amplifies the energy while greatly increasing the depth and intensity of the sound. The system 22 may include a bottom wall 24 and a top wall 25, and if preferred the latter may be hollow to form a sounding chamber 25a. To this top wall is secured any suitable source of sound herein mentioned such as a radio loud speaker 23, centrally disposed so as to rest on the member 13 in communication with the opening 14. When thus disposed, the bottom wall 24 may lie substantially in the plane of the flange 19, and as thus supported, the system 22 may be detachably latched to the base 11 as by bars 26 pivotally mounted at 27 on the bottom 24 to thus releasably engage under the flange 19.

The system 22 may comprise an outer imperforate wall 28 which may be coordinated with the top and bottom walls and with the base 11 to substantially enclose the source of sound 16 and 23. Spaced inwardly of the outer wall is an imperforate wall 29 which may be similarly related to the source of sound to substantially enclose the latter in conjunction with the top and bottom walls and the base element 11. Intermediate of the walls 28 and 29 is a perforated wall 30 for intercommunicating the adjoining sound chambers 32 and 33 formed thereby. Confronting the wall 29 is a perforated wall 34 having a sound opening 35, and this wall 34 is so arranged as to form a chamber 36a between imperforate wall 29 and perforated wall 34 and to enclose an inner chamber 36. It is thus seen that access of sound directly to the wall 29 from the inner chamber 36 may be had through the opening 35. It is noted that the openings 31 and 35 may be of substantially like size and are generally in alignment with each other and preferably somewhat remote from the source of sound 23 and in relative proximity to the sound deflector 21. It is noted that the top wall 25 forms a bridge between the sound source 23 and each of the various walls 28, 29, 30 and 35, which bridge serves as an additional conductor to energize the various walls. It is noted that the strings 16 pass between the latter and the system 22 whereby the full strength of the sound vibration is imparted to that system particularly adjacent to the openings therein. The arrangement of the system 22 is in general conformity with that of the central unit which comprises the strings 16 and the frame therefor. In other words, the system 22 may comprise only two opposed sets of chambers such as 32, 33, 36 and 36a, or chambers such as 32, 33, 36 and 36a may extend continuously annularly around the device, according to a circle, square or other shape. If preferred the several chambers mentioned may be reenforced by connections between their walls or by partitions.

An essential feature of the invention is that the sound chambers such as 32, 33, 36 are formed by walls consisting of a very fine grade of wood or any other material adapted for vibration for efficient and sensitive sound transmission. These chambers lie in a path extending outward of the source of sound, radially or otherwise, these chambers preferably increasing in size, such as volume or area, with the increase in distance from the source of sound. Thus the chamber 32

4

is substantially larger than that at 33, and the latter is larger than the chamber 36a.

These several chambers cooperate together with each other to form a complete and efficiently vibrating system 22, in which the several chambers have common walls for the direct transmission of sound vibrations therebetween, the arrangement being such that a high efficiency in the propagation of sound is obtained. The invention also includes a vibratory system responsive to a source of sound comprising a series of chambers cooperating with each other to enclose the sound source by intercommunicating with each other to facilitate the travel of sound waves to insure maximum utilization of the vibratory energy that is available. According to the invention, the source of sound 23 may directly act upon the vibratory system 22, with or without an auxiliary sounding means such as the strings 16, the source 23 being illustrative of any musical instrument or device wherein quality and depth are material factors. The sound waves energize the inner chamber 35 which acts as a vibrating chamber and transmits the sound through the vibrating wall 34 and the opening 35 to the chamber 36a which in turn acts as a resonator. The vibrations are thus transmitted in an intensified form to wall 29 which activates chamber 33 as a vibrating chamber. A similar cycle is now begun, chamber 33 vibrating and chamber 32 in turn activated as a resonator through opening 31 and the vibration of wall 30. The vibrations in chamber 32 in turn activate wall 28 which transmits the intensified sound to the atmosphere. It is understood that several series of vibrating and resonator chambers may be set up surrounding system 22 which would further intensify the sound. The top wall or bridge 25 materially aids in activating walls 28, 29, 30 and 34.

The arrangement of the device 10 is such that the tensions exerted on and by the strings 16 are not adapted to be transmitted accidentally or otherwise to the vibratory system 22, being assumed entirely by the elements 11, 12 and 13, which form an independent unit that may be directly removed from the system 22 without effecting the source of sound 23.

In Figure 2 is shown a device such as a chair 40 embodying the invention. This device illustrates the utilization of the invention for the purpose of imparting vibrations to a person to correct certain defects which may be mental conditions or physical conditions that are influenced by mental or emotional stimuli. Thus the chair 40 is so arranged that a person may be conveniently seated therein with various parts of his body in contact with portions that vibrate in response to sound. It will be readily apparent to those skilled in the art that other devices may be provided on which a person may sit, recline or lie down for purposes such as those herein contemplated.

Specifically, the chair 40 comprises a base section or chamber 41 having a hollow seat 42 and a hollow back 43, these several portions providing the sound compartments 44, 45 and 46 respectively. In the case of the chambers 45 and 46, certain walls thereof which are close to or substantially in direct contact with the body of the patient may be quite thin so as to be capable of vibrating with suitable efficiency; the other or adjoining walls may be relatively thick in order to afford sufficient strength or to reenforce the relatively thin sec-

5

tions. At various points reenforcing spacer units 47 may be provided in the chambers 45 and 46. The side arm sections 48 of the chair may be similarly chambered and constructed. A removable bottom closure wall 49 for the base 41 may mount the sounding device 10 so that the latter will energize the intercommunicating sound chambers 44, 45 and 46, and cause vibration of wall portions thereof to assure a relatively ample surface of contact with a person who may be seated in the chair in a natural and normal manner. Thus a person may be entertained by the music, and at the same time subjected to beneficial treatment under medical supervision, by the musical sounds acting with great intensity and depth.

By my invention it will be perceived that any ordinary sounding source may be utilized for the purpose of building up and increasing the depth and intensity of the sound to add to the aesthetic beauty of the music involved and more particularly to constitute the sound as a medium of sufficient strength to be capable of scientific use in the treatment of persons suffering from various ailments or mental conditions. It will be apparent to those skilled in the art that the device 10 may constitute a piano sounding board or may be used in lieu thereof and that the strings 16 may be regarded as the strings of a piano or other musical instrument vibrated in the usual manner of such instruments, instead of by the source of sound 23; and it will be further perceived that the strings 16 may be placed externally as well as internally of the system 22 or may be positioned in partly internal and in partly external relation.

I claim:

1. A sound intensifying apparatus comprising a source of sound, a first set of chambers including an inner vibrating chamber containing the sound source and an outer resonator chamber concentrically surrounding said inner chamber formed with a substantially enclosing imperforate sound responsive wall enclosing said first chamber set, a perforated sound responsive wall dividing said inner vibrating and said outer resonator chambers, a second set of chambers concentrically surrounding said first chamber set including an inner vibrating and outer resonator chambers having a perforated sound responsive wall dividing said inner vibrating and said outer resonator chambers and an imperforate sound responsive wall enclosing the entire chamber series for transmitting the intensified sound impulses to the atmosphere.

2. A sound intensifying apparatus comprising a source of sound, a plurality of substantially closed compartments concentrically disposed about said source with the latter positioned centrally within an innermost compartment, each compartment including a perforated sound responsive wall dividing the compartment into an inner vibrating and an outer resonator chamber, and an imperforate sound responsive wall enclosing

6

ing each compartment for intensifying and transmitting sound from within each compartment to the air surrounding each of said imperforate walls.

3. The sound intensifying apparatus defined in claim 1 including a sound transmitting bridge interconnecting all of said sound responsive walls for imparting sound vibrations thereto from said sound source.

4. The sound intensifying apparatus defined in claim 2 including a sound transmitting bridge interconnecting all of said sound responsive walls for imparting sound vibrations thereto from said sound source.

5. The sound intensifying apparatus defined in claim 1 including an outermost chamber enclosing said two sets of chambers having a vibratory wall formed with means shaped to fit contours of the human body so constructed and arranged as to transmit sound vibrations thereto when in contact therewith.

6. The sound intensifying apparatus defined in claim 1 in which said inner vibrating chamber of said first set of chambers included vibratory strings.

7. An apparatus for intensifying sound from a source comprising a compartment enclosing a sound carrying medium formed with an imperforate vibratory enclosing wall effective to serve as a sound diaphragm, said compartment being divided by a perforated partitioning wall into vibrating and resonator chambers, said vibrating chamber enclosing the sound source for activating the medium contained therein, the medium of the vibrating chamber communicating with the medium of the resonator chamber through said perforated wall for activation thereby, said imperforated vibratory wall being so constructed and arranged as to respond to the sound vibrations of the resonator chamber medium for intensifying the effective sound transmitted to the exterior of said apparatus.

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