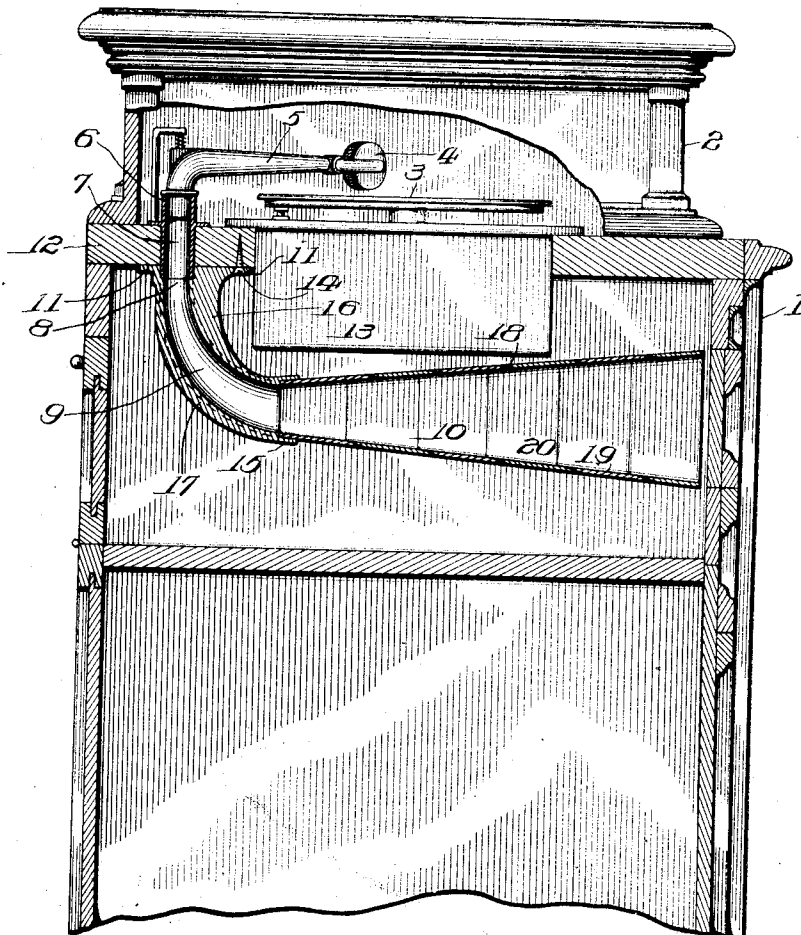


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 AMPLIFIER FOR SOUND REPRODUCING DEVICES.  
 APPLICATION FILED JAN. 15, 1910.

1,022,582.

Patented Apr. 9, 1912.  
 2 SHEETS—SHEET 1.

*Fig. 1.*



WITNESSES  
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*Alston B. Moulton*

BY

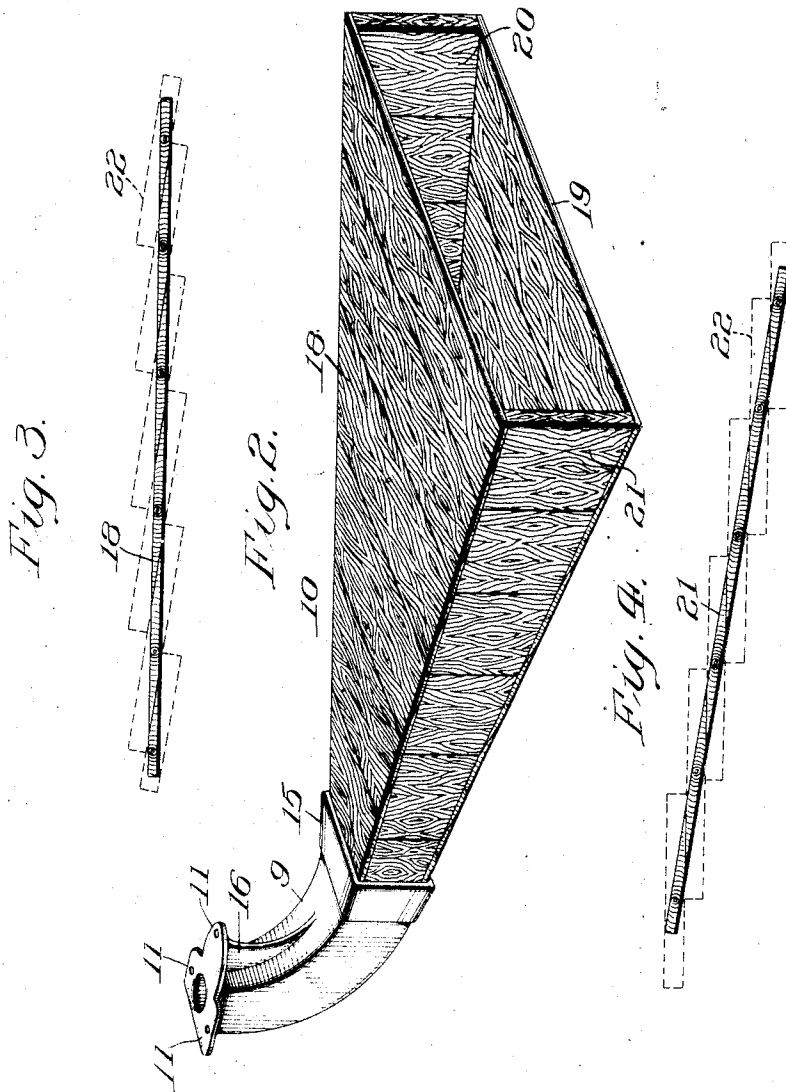
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# UNITED STATES PATENT OFFICE.

JOHN C. ENGLISH, OF CAMDEN, NEW JERSEY, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

## AMPLIFIER FOR SOUND-REPRODUCING DEVICES.

1,022,582.

Specification of Letters Patent.

Patented Apr. 9, 1912.

Original application filed July 19, 1906, Serial No. 326,827. Divided and this application filed January 15, 1910. Serial No. 538,277.

*To all whom it may concern:*

Be it known that I, JOHN C. ENGLISH, a citizen of the United States, and a resident of Camden, State of New Jersey, have invented certain new and useful Improvements in Amplifiers for Sound-Reproducing Devices, of which the following is a full, complete, and exact disclosure.

My invention relates to sound reproducing devices and particularly to those devices which are used to augment or amplify the sounds which are being reproduced from a record of sound, the present application being a division of a prior application, Serial No. 326,827, filed July 19, 1906.

One object of my invention is to dispense with the ordinary megaphone, sound amplifying trumpet or horn which is usually used to amplify the sound reproduced by talking machines and the like and to increase the volume of the tones by means of an amplifier having sounding boards which are caused to vibrate in sympathy with the air inclosed by the same to which the sound waves are conducted from the reproducer of a sound reproducing machine.

A further object of my invention is to provide the amplifier with a portion or section whereby the vibrations are conducted from the swinging arm or conveyer and are amplified to some extent and to allow said vibrations to emerge from said portion or section between sounding boards.

A further object of my invention is to provide an amplifier with a rigid hollow portion or section which shall also act as a rigid support for the vibratory portion, whereby the vibratory portion is rigidly supported from one end only and whereby the sounding boards, by means of which the sound is further amplified, are free to vibrate substantially throughout their entire area and to vibrate in sympathy with the waves of sound conducted in proximity with the same.

A further object of my invention is to make the sounding boards or sounding sur-

faces used in connection with my sound amplifying device, resonant or capable of being readily set into vibration by sound waves.

Other objects of my invention will appear in the specification and claims below.

In the accompanying drawings forming a part of this specification in which similar parts are referred to by the same reference characters, Figure 1 illustrates a sound reproducing device or talking machine provided with my improved amplifier, the main portions of the same being shown in cross section; Fig. 2 is a perspective view of my improved sound augmenting device; Fig. 3 a diagrammatic view of the method employed to make the sounding boards of the sound amplifying device resonant and Fig. 4 is a view similar to Fig. 3, showing the method of constructing the sides of the vibratory portion of the amplifier.

Referring to the drawings, Fig. 1, as has been above stated, illustrates a talking machine or sound reproducer provided with my improved amplifier and while the amplifier is shown therein as being used in connection with and forming a part of an inclosed talking machine, that is to say a talking machine in which all the operative parts are inclosed within a casing, my invention is not necessarily limited to use in connection with a machine of this type. In Fig. 1 the casing or talking machine cabinet 1 is provided with a compartment 2, which contains a turntable 3, the reproducer 4 and the tapering swinging arm 5, the larger end of which is pivoted as at 6 to a hollow bushing 7 which communicates with the smaller end 8 of the rigid hollow bracket or elbow 9, the opposite end of which is adapted to support the vibratory portion or section 10.

The bracket 9 constitutes the rigid portion or section of my improved amplifier and consists of a rigid hollow structure, preferably curved longitudinally through an arc of substantially ninety degrees, the smaller end of which is provided with a plate 11

integral therewith by which the same is rigidly secured at one end by means of screws 14 or other suitable fastening devices to the thick partition 12, which separates the upper compartment 2 from the lower compartment of the casing or cabinet 1. This partition 12 may be the motor board upon which the mechanism or motor 13 for rotating the turntable may be supported. The smaller end of the opening in this bracket or rigid non-vibratory portion 9 is substantially circular in cross section, corresponding to and registering with the circular opening in the bushing 7 and from the point of connection between the said bushing and the said bracket, the bracket or rigid non-vibratory portion 9 increases in size and terminates in an enlarged rectangular oblong outwardly flaring socket 15. The opening through the bracket also increases in transverse sectional area downward and gradually changes in shape from circular at its upper end into the oblong shape of the said socket 15 at its lower end. I preferably make this bracket or rigid non-vibratory portion 9 very rigid so the same will not be set into vibration by the sounds conducted or conveyed therethrough by rigidly securing the same to the said thick partition 12 of the cabinet and by bracing or stiffening the same by webs 16—17 at the front and back of the same respectively. If desired the bracket may be made of such proportions and thickness that the bracing by means of the said webs 16 and 17 is unnecessary to prevent the vibration of the same. I preferably make the said bracket or sound conveying portion 9 of metal, as for instance of cast iron since a metal bracket may be easily made sufficiently rigid for my purposes, but any material may be employed by me so long as the same will resist the tendency to vibrate in sympathy with the vibrations of the air contained therein and will rigidly support the sounding boards, hereinafter referred to, at one end only.

Within the larger end of the bracket 9 I support the smaller end of the amplifying portion of the vibratory device, the same consisting of a hollow flattened tapering body 10, having resonant and preferably wooden sides. The top and bottom sides 18 and 19 of the said hollow flattened tapering body 10 are preferably made with thin resonant substantially flat wooden boards, the outer edges of which overlap and are secured in any suitable manner to the edges of the vertically arranged substantially flat wooden supporting boards 20 and 21. The top and bottom sounding boards 18 and 19 are spaced apart from each other and may be substantially parallel or may diverge from

their point of attachment with the said rigid hollow bracket 9, but the edges of the said resonant body 10 preferably diverge considerably, the outer ends of the same being spaced apart from each other by a distance substantially equal to the full width of the cabinet in which the same is inclosed.

While the four sides of the body portion or section of the amplifying device may be made thin and resonant or capable of being set into vibration, I prefer to make the upper and lower sounding boards 18 and 19 of thin resonant material and the sides 20 and 21 of thick and comparatively stiff non-resonant material. In order to produce sounding boards 18 and 19, which will respond quickly to the vibrations impressed upon them and to impart to the sound reproduced the desired amount of amplification and to improve the quality or character of the tones reproduced, I prefer to construct said sounding boards in the manner indicated in Fig. 3, by building up and gluing together a series of boards or blocks 22, so that the sounding board which is to be formed from the same will close the joints between the adjacent boards 22 when glued together at an angle, as plainly indicated in Fig. 3. I then saw or otherwise cut out of the series of boards 22 so glued together, the sounding boards 19 or 20, as the case may be, with the result that the finished sounding board is composed of a plurality of sections of wood cut parallel to the grain, the said pieces being glued together for a considerable distance, notwithstanding the fact that the finished sounding board may be very thin. As is plainly shown in all the figures and as above described, the sounding boards may be described as being composed of a structure composed of substantially overlapping wooden strips having scarfed joints between the same, the grain of said boards being transverse to the length of said sounding board.

If desired I may make the lateral sides 20 and 21 of wooden strips having overlapping or scarfed joints between the strips composing the same in the same manner described above with respect to sides 18 and 19 and as illustrated in Fig. 4 of the drawings, although if desired the said sides 20 and 21 may be thick and non-resonant.

I have found that a sound amplifying device constructed and arranged in the manner above described, that is to say one in which one portion of the amplifier is composed of a flattened hollow body having resonant or vibratory sound amplifying sides or surfaces and in which the said hollow body portion is supported by a rigid non-vibratory portion or bracket and in which the

outer or larger end of the said vibratory portion is out of engagement with any support other than the said rigid non-vibratory portion, effects a loud and pleasing brilliant reproduction of sound of a quality different from that effected by the use of the ordinary conical megaphone or horn, while at the same time it will be apparent that the construction of my amplifier, as above described, occupies less space than that usually required to produce the ordinary desired amplification of the sound. I have also found that a sound amplifying device in which the upper and lower sounding boards are nearly parallel will effect as loud a reproduction of sound as the megaphone or ordinary tapering horn and that the sound reproduced is of a much more pleasing effect and quality than that reproduced with the use of the ordinary horn or megaphone.

The sound waves passing through the rigid non-vibratory bracket or member pass out and between the thin resonant boards of my improved amplifying device. These boards are set into sympathetic vibration with and by the waves being conducted between the same and by the vibration of these sounding boards the sounds are greatly augmented or amplified.

By the use of an amplifier comprising the tapering longitudinally curved rigid bracket or sound conveyer having an opening through which is substantially circular at its inlet end and oblong at its outlet end, and which opens between the transversely oblong body portion of the amplifier, it is possible to amplify the sound to some extent, and at the same time to convey it to the resonant body portion of the amplifier without substantial loss of energy and to utilize with a high degree of efficiency comparatively broad sounding boards without taking up much space vertically in the cabinet of the machine. By making the body portion of the amplifier oblong and comparatively broad horizontally but narrow vertically it is thought a desirable quality is obtained in reproducing sound therewith.

Although only one form has been herein illustrated for which this invention may be embodied, it is obvious that many changes may be made in the construction shown, without departing from the spirit of the invention or the scope of the appended claims.

Having thus fully described my invention what I claim and desire to protect by Letters Patent of the United States is:

1. A sound amplifying device comprising a rigid, substantially non-vibratory section having a sound conveying passage of constantly increasing cross section extending

therethrough, and a hollow vibratory body section comprising exterior sounding boards spaced apart from each other.

2. A sound amplifying device comprising a heavy substantially non-vibratory section and a hollow vibratory body section communicating therewith, the passage through said sections being of continuously increasing cross sectional area.

3. A sound amplifying device comprising a section having rigid non-vibratory sides, and a body-section communicating therewith having vibratory sides, said sections having a continuous sound conducting passage therethrough.

4. A sound amplifying device comprising a substantially non-vibratory section, and a hollow body-section communicating therewith, said body-section having an exterior side consisting of a resonant sounding board.

5. A sound amplifying device comprising a substantially non-vibratory section, and a hollow body-section communicating therewith, said body-section having an exterior side consisting of a resonant sounding board, the passage for sound through said sections being of continuously increasing cross sectional area.

6. A sound amplifying device comprising a rigid non-vibratory section having a sound conveying passage of constantly increasing cross section extending therethrough, and a plurality of sounding boards supported at one end by said rigid section.

7. A sound amplifying device comprising a hollow body having a resonant side composed of a plurality of strips extending transversely to the direction of said body and secured together longitudinally by a scarfed joint.

8. A sound amplifying device comprising a hollow body having opposite exterior resonant sides, each composed of a plurality of strips extending transversely to the direction of said body and having their side edges secured together by a scarfed joint.

9. In a sound amplifying device, a hollow non-vibratory support, and a plurality of longitudinally scarfed boards supported at one end by said support.

10. A sound amplifier comprising a hollow relatively non-vibratory support forming the neck of said amplifier, and a hollow body portion connected at one end to one end of said support and communicating therewith, said body portion comprising a sounding board consisting of a plurality of strips joined together in a single plane and extending transversely of said body portion.

11. A sound amplifier for talking machines, comprising a substantially non-vibratory hollow portion and a hollow vi-

bratory portion connected thereto and communicating therewith, said portions forming a smooth continuous conduit for sound waves, said conduit being free from any sudden change in direction.

12. A sound amplifier for talking machines, comprising a substantially non-vibratory hollow portion and a hollow vibratory portion connected thereto and communicating therewith, said portions forming a smooth continuous conduit for sound waves, said conduit being free from any sudden change in cross-sectional area.

13. A sound amplifier for talking machines, comprising a substantially non-vibratory hollow portion and a hollow vibratory portion connected thereto and communicating therewith, said portions forming a smooth continuous conduit for sound waves, said conduit being free from any sudden change in direction or in cross-sectional area.

14. A sound amplifier for talking machines, comprising a hollow relatively non-vibratory portion forming the inlet end thereof and a hollow relatively vibratory portion connected to said first mentioned portion and communicating therewith and forming the delivery end of the amplifier, said portions forming a continuous passage for sound waves, free from any sudden change in direction or transverse sectional area, the said passage gradually increasing in transverse area throughout its full length.

15. A sound amplifier for a talking machine, comprising a hollow body forming a sound passage and including a sounding board formed of a plurality of strips having longitudinal edges joined together and extending transversely of said body.

16. A sound amplifier for talking machine, comprising a hollow body forming a sound passage and including a sounding board formed of a plurality of strips extending in the same plane and having longitudinal edges joined together and extending transversely of said body.

17. A sound amplifier for talking machines, comprising comparatively rigid spaced supports and comparatively yielding spaced sounding boards connecting said supports and forming therewith a sound conduit.

18. A sound amplifier for talking machines, comprising comparatively rigid spaced supports and comparatively yielding spaced sounding boards connecting said supports and forming therewith a sound conduit oblong in transverse section.

19. A sound amplifier comprising a pair of spaced elongated comparatively narrow and thick exterior diverging supports and

a pair of elongated relatively broad and thin spaced exterior sounding boards connecting said supports and forming a hollow body substantially oblong in transverse section.

20. A sound amplifier, comprising a hollow body portion tapering exteriorly and interiorly longitudinally in one direction both in width and in thickness and including a pair of elongated comparatively narrow and thick exterior diverging supports and a pair of comparatively broad and thin exterior diverging sounding boards connecting said supports.

21. A sound amplifier, comprising a hollow body portion tapering exteriorly and interiorly longitudinally in one direction both in width and in thickness and including a pair of elongated comparatively narrow thick and non-vibratory exterior diverging supports and a pair of comparatively broad thin and resonant exterior diverging sounding boards connecting said supports.

22. A sound amplifier comprising a hollow body portion including a sounding board consisting of a plurality of flat, oblong, wooden strips having the grain of the wood extending longitudinally thereof and said strips being arranged consecutively in the same plane, the longitudinal edge of one strip being connected to the longitudinal edge of an adjacent strip, said strips extending transversely of said body portion.

23. A sound amplifying device comprising a hollow body portion, provided with an outlet spaced from said inlet and including a wooden sounding board in which the grain of the wood is arranged transversely of the path of the sound waves between said inlet and said outlet, said sounding board being composed of a plurality of flat, oblong strips cut lengthwise of the grain and arranged consecutively in substantially the same plane, the longitudinal edge of one strip being joined to the longitudinal edge of an adjacent strip.

24. A sound amplifier including a wooden sounding board composed of a plurality of oblong, flat, strips cut longitudinally of the grain of the wood and arranged consecutively in substantially the same plane, each strip having a transversely acute, longitudinal, beveled edge overlapping and joined to a correspondingly and oppositely beveled, longitudinal edge of an adjacent strip, said strips being arranged transversely of said amplifier.

25. A sound amplifier for talking machines comprising a substantially non-vibratory hollow portion provided with a tapering passage therethrough, said passage

terminating at its larger end in an oblong outlet, the major axis of which is considerably greater than its minor axis, and a hollow transversely oblong vibratory portion communicating with said outlet.

26. A sound amplifier for talking machines comprising a substantially non-vibratory hollow portion provided with a tapering passage therethrough, said passage terminating at its larger end in an oblong outlet, the major axis of which is considerably greater than its minor axis, and a hollow transversely oblong longitudinally tapering vibratory portion having an oblong inlet at its smaller end communicating with said outlet.

27. A sound amplifying device comprising a substantially non-vibratory hollow section, and a hollow body section communicating therewith, said body section having an exterior vibratory side.

28. In a sound amplifier for talking machines, a substantially non-vibratory hollow bracket provided with a tapering passage therethrough, said passage terminating at its larger end in an oblong outlet.

In witness whereof I have hereunto set my hand this 12th day of January 1910.

JOHN C. ENGLISH.

Witnesses:

Wm. EARLY,

HARRY COBB KENNEDY.