J. C. ENGLISH.

SOUND REPRODUCING DEVICE.

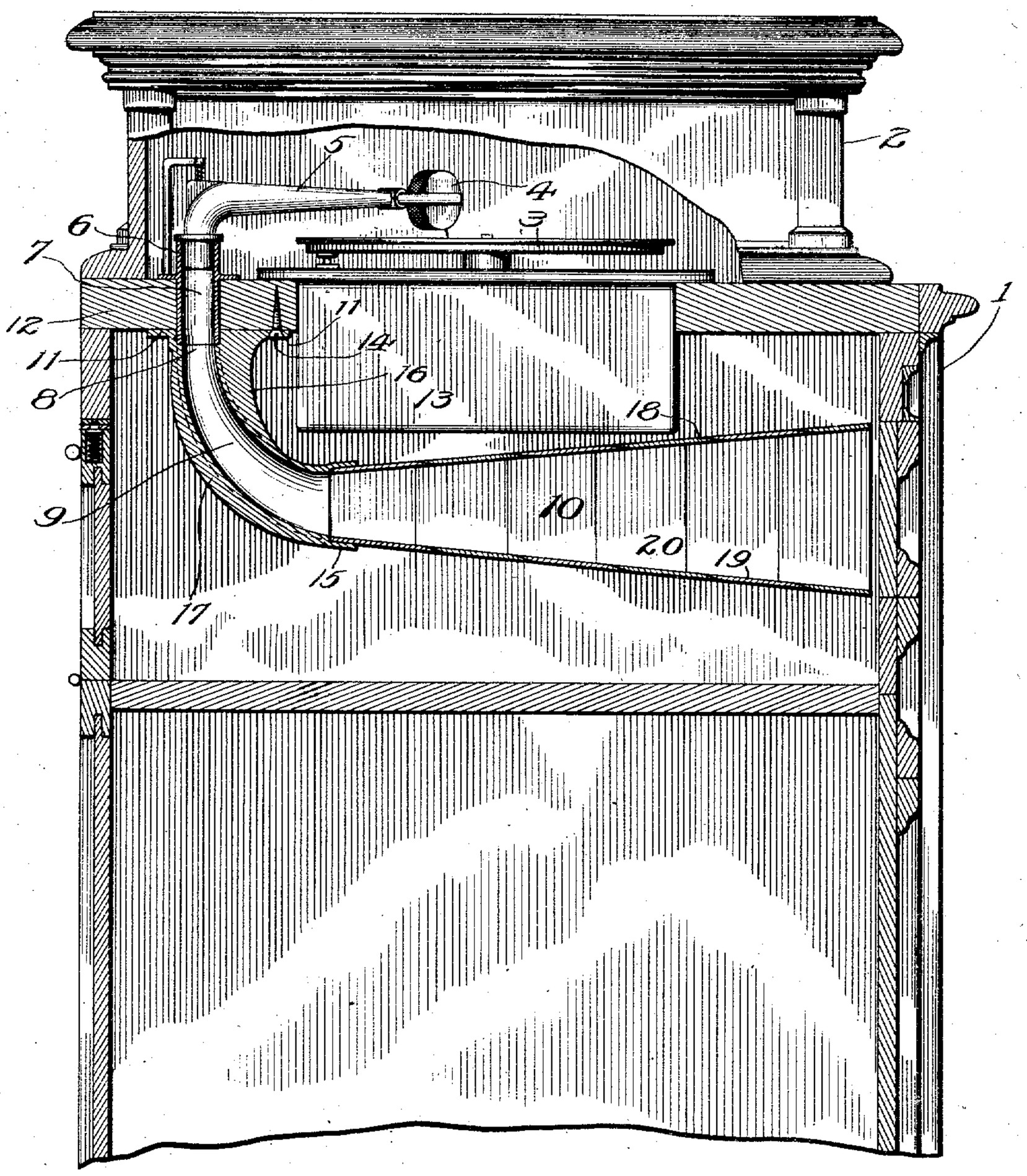
APPLICATION FILED JULY 19, 1906.

947,227.

Patented Jan. 25, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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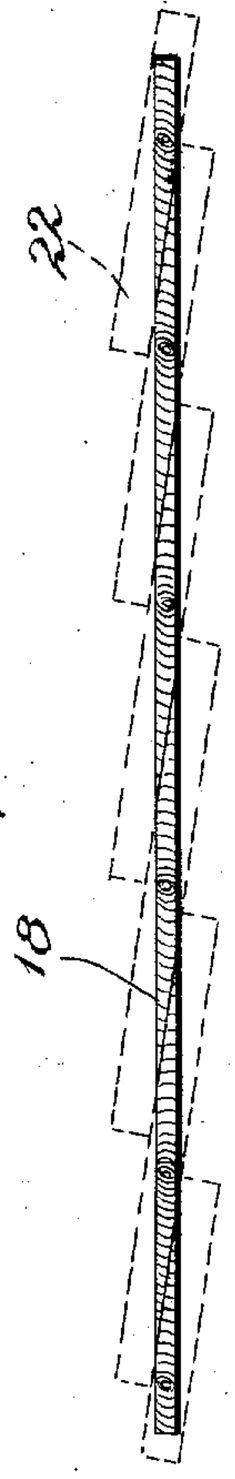

Fig. 3.

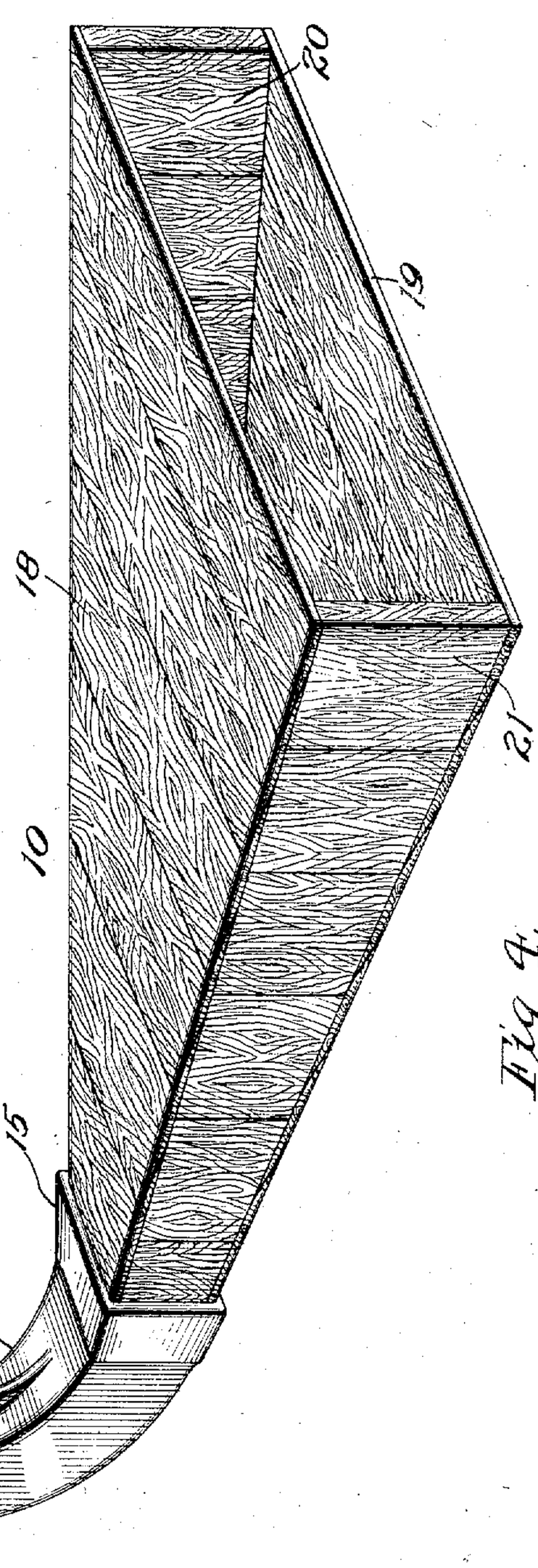

Fig. 2.

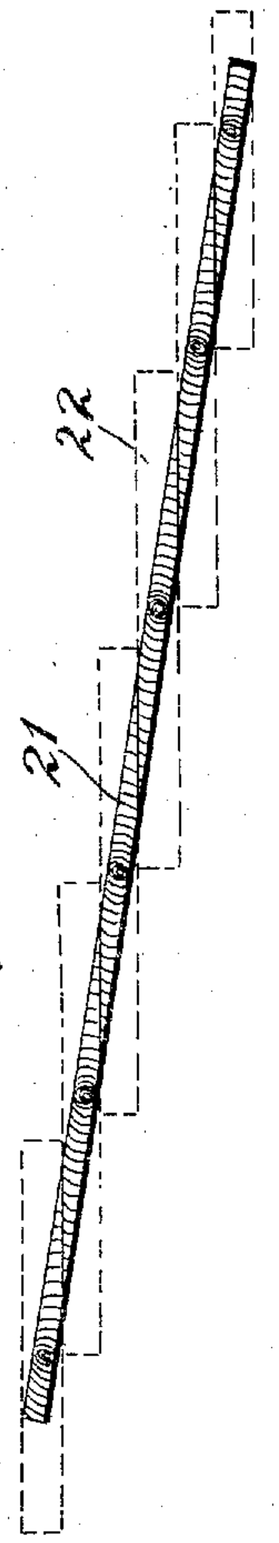

Fig. 4.

WITNESSES:

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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.

SOUND-REPRODUCING DEVICE.

947,227. Specification of Letters Patent. **Patented Jan. 25, 1910.**

Application filed July 19, 1906. Serial No. 326,827.

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 Sound-Reproducing Devices, of which the following is a full, complete, and exact disclosure.

My invention relates to sound reproducing devices and especially to those devices which are used to augment or amplify the sounds which are being reproduced from a record.

The object of my invention is to dispense with the ordinary megaphone, sound amplifying-trumpet, or horn which is usually used to amplify the sounds reproduced by talking machines, and to increase the volume of the tones by means of an amplifier having sound boards which are caused to vibrate in sympathy with the vibration of the air conducted between the same from the sound conveying tube.

A further object of my invention is to convey the vibrations from the reproducer to the sound amplifying device without loss, and then to allow the said vibrations to emerge between the sound boards of the amplifier.

A further object of my invention is to support the amplifier at one end only so that the sound boards may be free to respond to the vibrations imparted to them from the sound reproducer.

A further object of my invention is to make the sound boards used in connection with my sound amplifying device resonant in order to cause the same to readily vibrate in sympathy with the air inclosed between the same.

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 provided with my improved sound 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 is a diagrammatic view showing the method employed by me to make the sound boards of the sound amplifying device resonant, and Fig. 4 is a view similar to Fig. 3 showing the method of constructing the inner sides of my improved device.

Referring to the drawings, one embodiment of this invention comprises a casing or talking machine cabinet 1 upon the top of which is the housing 2, which contains the turntable 3, the reproducer 4 and the swinging arm 5. The larger end of the tapering swinging reproducer arm 5 is pivoted as at 6 to a hollow bushing 7 which communicates with the smaller end 8 of a hollow bracket, or elbow 9, the opposite end of which is adapted to support my sound amplifying device 10.

The bracket 9 or sound conductor consists of a rigid hollow structure, curved longitudinally through an arc of about 90 degrees, the smaller end of which is provided with a plate 11 integral therewith by which the same is rigidly secured by means of screws 14 to the thick partition 12 which supports the talking machine motor 13. The smaller end of the opening in this bracket is substantially circular in cross section and registers with the circular opening in the bushing 7, and, from the point of connection between the bushing and the bracket, this bracket 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 downwardly and gradually changes in shape from circular at its upper end, to the oblong shape of the socket at its lower end. I make this bracket 9 very rigid, so that the same will not be set into vibration by the sounds conveyed therethrough, by rigidly securing the same to the thick top 12 of the cabinet, and by bracing the same by webs 16, 17 at the front and back sides of the same respectively. If desired, the bracket may be made of such proportions that the bracing is unnecessary to prevent the vibration of the same. I preferably make the bracket 8 of metal, since a metal bracket may be 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 support the sound boards.

Within the larger end of the sound conveying bracket 9, I support the smaller end of the major portion of my sound amplify-

ing device, the same consisting of a hollow flattened tapering body 10, having resonant wooden sides. The top and bottom sides 18 and 19 of this body, are made of thin resonant substantially flat wooden boards, the outer edges of which overlap and are secured in any suitable manner to the edges of vertically arranged substantially flat wooden supporting boards 20, 21.

The top and bottom sound boards 18, 19 are spaced apart from each other and may be substantially parallel, or may diverge from their point of attachment with the rigid bracket 9, but the vertical sides of the resonant body preferably diverge considerably, the outer ends of the same being spaced apart nearly the full width of the talking machine cabinet.

While the four sides of the body of the amplifying device, may be made thin and resonant, I prefer to make the upper and lower sound boards, 18, 19, of thin resonant material, and the sides 20, 21 of thick and comparatively non-resonant material.

To give a pleasing resonant quality to the upper and lower sound boards 18, 19, I construct the same in the manner indicated in Fig. 3; that is to say, I build up and glue together a series of boards 22, so that the sound board which is to be formed from the same will cross the lines upon which the boards 22 are glued together at an acute angle, as plainly shown in said Fig. 3. I then saw or otherwise cut out of the series of boards 22 glued together, the sound boards 19 or 20, as the case may be, with the result that the finished sound boards are 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 sound board is very thin. As plainly shown in all the figures and as above described, the sound boards may be described as being composed of a structure composed of substantially overlapping scarfed wooden strips, the direction of the grain thereof, being transverse to the length of the resonator.

If desired, I may make the sides 20, 21 of wooden strips similar to the sides 18, 19, as plainly shown in Fig. 4, although the sides 20, 21 may be thick and non-resonant as above described.

I have found that a sound amplifying device constructed and arranged in the manner above described, effects a loud and mellow, but brilliant reproduction of the sound, in addition to taking up less space than that which is ordinarily required in the amplifying horns usually employed in connection with talking machines. I have also found that a sound amplifying device in which the upper and lower sound boards are nearly parallel, will effect as loud a reproduction of the sound as a megaphone or an ordinary tapering horn 12 inches across the bell thereof, and that the sound reproduced is of a much more pleasing quality than that from a horn or megaphone of the ordinary type above referred to.

The sound waves set into vibration by the reproducer are transmitted through the rigid swinging sound conveying tube 5 and through the rigid bracket 9, out and between the thin resonant sound boards of my improved sound amplifying device, these boards being set into sympathetic vibration with and by the waves being conducted therethrough and by the vibration of these sound boards, the sounds corresponding to the vibrations being reproduced, are greatly augmented or amplified. By thus using in the talking machine an amplifier comprising a tapering longitudinally curved rigid bracket having an opening therethrough which is substantially circular at its inlet end and oblong at its outlet end which opens between the transversely oblong body portion of the amplifier, it is possible to convey the sound waves from the sound box to the resonant body of the amplifier without loss of energy, and to utilize, with a high degree of efficiency, comparatively broad sound boards, without taking up much space vertically in the cabinet of the machine. By making the body of the amplifier oblong and comparatively broad horizontally but narrow vertically, it is thought that a desirable quality is obtained in reproducing sound.

Although only one form has been herein illustrated in 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 described my invention, what I claim and desire to protect by Letters Patent of the United States is:—

1. In a talking machine, the combination with a vertical cabinet, of a hollow, longitudinally curved rigid support rigidly secured to said cabinet and depending downwardly therein, a sound amplifier entirely supported at one end by one end of said support and communicating therewith, and a reproducer communicating with the other end of said bracket.

2 In a talking machine, the combination with a vertical cabinet having an opening in one side thereof, of a hollow, rigid longitudinally curved bracket rigidly secured to said cabinet and depending downwardly therein, a hollow sound amplifier oblong in transverse section entirely supported at one

end by one end of said bracket and communicating therewith, the free end of said amplifier terminating within said cabinet and adjacent the opening in the side thereof, and a reproducer connecting with the other end of said bracket.

3. In a talking machine, the combination with a reproducer, of a sound amplifying device comprising a plurality of strips extending transversely of said body, and having overlapping edges forming a substantially scarfed sound board.

4. In a talking machine, the combination with a reproducer, of a sound amplifying device comprising a plurality of strips in the same plane and having acute overlapping edges forming a substantially scarfed sound board.

5. In a talking machine, the combination with a casing, of a rigid hollow bracket secured at one end to said casing, said bracket being provided with a substantially circular opening at one end, and with an oblong opening at its opposite end, and a sound amplifier of oblong transverse section secured over said oblong opening and entirely supported by said bracket.

6. In a talking machine, the combination with a casing, of a rigid hollow bracket secured at one end to said casing and depending downwardly therein, said bracket being provided with a substantially circular opening at its upper end, and with an oblong opening at its lower end, and a sound amplifier of oblong transverse section within said casing, secured over said oblong opening and entirely supported by said bracket.

7. In a talking machine, the combination with an inclosing casing, of a sound amplifying device comprising a hollow body, a reproducer, and a rigid hollow bracket connecting the reproducer and the hollow body and having an end oblong in cross section rigidly supporting said body at one end.

8. In a talking machine, the combination with an inclosing casing, of a sound amplifying device comprising a flattened tapering hollow resonant body rectangular in cross section, a rigid hollow bracket communicating therewith and having a transversely oblong end supporting said body at one end, and a reproducer communicating with said bracket.

9. In a talking machine, the combination with an inclosing cabinet, of a reproducer, a hollow body having sides adapted to vibrate sympathetically with the sounds passing through said body, and a rigid hollow bracket connecting the reproducer and the said body and having an oblong outlet communicating with said body.

10. In a talking machine, the combination with a reproducer of a sound amplifying device comprising a hollow body substantially in the form of a truncated pyramid and having scarfed sides, extending transversely of said body and means to support said body at its smaller end.

11. In a talking machine, extending transversely of said body a sound amplifying device comprising a hollow body substantially in the form of a truncated pyramid and having scarfed resonant sides extending transversely of said body, and means to support said body rigidly at its smaller end.

12. In a talking machine, the combination with an inclosing cabinet, of a sound amplifier having scarfed resonant sides extending transversely of said body, said amplifier being mounted at one end, and a reproducer communicating with the said mounted end of the said amplifier.

13. The combination in a talking machine, of a casing, a motor, a turntable and a sound conveying tube, all inclosed within said casing, of a resonator oblong in cross section, also inclosed within said casing and located beneath said motor, and a hollow rigid bracket having an oblong end communicating with said resonator.

14. In a talking machine, an amplifier comprising a hollow sound conveying rigid bracket, a sound box communicating with one end of said bracket and a resonator communicating with the other end of said bracket.

15. In a talking machine, the combination with a cabinet, of a transversely oblong hollow amplifying body in said cabinet, and a hollow rigid bracket having a transversely oblong end supporting one end of said body and communicating therewith.

16. In a talking machine, the combination with a cabinet, of amplifying means within said cabinet comprising a hollow transversely oblong body having substantially flat resonant sides, and a rigid bracket rigidly secured within said cabinet and having a tapering opening therethrough, one end of said opening being substantially oblong transversely and communicating with said hollow body.

17. In a talking machine, the combination with a cabinet, of a hollow transversely oblong amplifying body within said cabinet, and a hollow rigid bracket rigidly supported in said cabinet and having one end provided with a substantially oblong socket supporting said body.

18. In a talking machine, the combination with a cabinet, of a hollow longitudinally curved support rigidly secured to said cabinet and extending downwardly therein, a sound amplifier comprising a hollow resonant body entirely supported at one end by one end of said support and communi-

cating therewith, and a reproducer communicating with the other end of said support.

19. In a talking machine, the combination with a casing, of a rigid hollow bracket secured at one end to said casing, said bracket being provided with a substantially circular opening at one end and with an oblong opening at its opposite end, and a hollow resonant sound amplifier oblong in transverse section communicating with said bracket through the oblong opening therein and entirely supported by said bracket.

20. In a talking machine, the combination with a casing, of a hollow longitudinally curved rigid bracket rigidly secured to said cabinet and depending downwardly therein, a hollow resonant sound amplifier entirely supported at one end by one end of said bracket and communicating therewith, and extending in a substantially horizontal direction therefrom, and a reproducer communicating with the other end of said bracket, said amplifier being entirely inclosed by said casing but out of contact therewith.

21. In a talking machine, the combination with a casing, of a hollow rigid bracket rigidly secured to said cabinet and extending downwardly therein and terminating in an oblong socket, and a resonant hollow sound amplifier having an oblong end secured in said oblong socket.

22. In a talking machine, an inclosure, the combination with a reproducer of an amplifier comprising a hollow, rigid, substantially non-vibratory sound conductor rigidly mounted within said inclosure, said sound reproducer communicating with one end of said conductor, and a sounding board entirely inclosed within said inclosure and communicating with the other end of said conductor.

23. In a talking machine, the combination with an inclosure of a hollow amplifying body substantially rectangular in cross section, and a hollow rigid sound conducting member secured within and to said inclosure and communicating with the interior of said body.

24. In a talking machine, the combination with an inclosure of a reproducing mechanism, a swinging arm communicating with said reproducing mechanism and pivotally mounted within said inclosure, a hollow wooden amplifier substantially rectangular in cross section inclosed by said inclosure, and a rigid sound conducting member secured within said inclosure and provided with an opening extending through said member, one end of said opening being circular and communicating with said swinging arm and the opposite end of said opening being rectangular and communicating with said amplifier.

25. In a talking machine, the combination with an inclosure of a reproducing mechanism, a swinging arm secured thereto and pivotally mounted in said inclosure, an amplifier mounted within said inclosure and comprising a wooden hollow portion substantially rectangular in cross-section and a heavy substantially non-vibratory metallic portion secured to said inclosure, said heavy portion having an opening therethrough, said opening being circular at one end and communicating with said swinging arm, and rectangular at its other end and communicating with said amplifier.

26. In a talking machine, the combination with a casing of a hollow rigid sound conducting member secured to said casing and extending downwardly therein, terminating in a rectangular end, and a hollow sound amplifier having a rectangular end communicating with the said rectangular end of said sound conducting member.

27. In a talking machine, the combination of a cabinet provided with a sound outlet opening, sound reproducing means within said cabinet, a rigid hollow substantially non-vibratory sound conducting member mounted within said cabinet and having one end in communication with said reproducer, and a sounding board mounted within said cabinet and arranged between the other end of said sound conducting member and said opening in said cabinet.

28. In a talking machine, the combination of a cabinet, a sound reproducing mechanism within said cabinet, a rigid hollow substantially non-vibratory sound conducting member secured within said cabinet, and a plurality of spaced sounding boards mounted within said cabinet, with the space between said boards communicating with said opening in said conductor, said cabinet being provided with an opening adjacent the outer ends of said sounding boards.

29. In a talking machine, the combination with a cabinet, a motor, a sound reproducer, and a sound conveyer, inclosed within said cabinet, of a substantially rectangular hollow sound amplifying body mounted within and stationary with respect to said cabinet, one of the outer sides of said body being a sounding board.

30. In a talking machine, the combination with a cabinet of a substantially rectangular hollow sound amplifying body mounted within said cabinet, one of the outer sides of said body being a sounding board, and a rigid non-vibratory sound conductor, said hollow body being supported at one end only by said conductor.

31. In a talking machine, the combination

with sound reproducing means, of a stationary amplifier, the major portion of which has cross sectional axes of substantially different lengths connected therewith, and an inclosure embracing the major portion of the amplifier.

32. In a talking machine, the combination with sound reproducing means, of a stationary amplifier, the major portion of which is oblong in cross section connected therewith, and an inclosure, the major portion of the amplifier being mounted within said inclosure in a fixed position.

33. The combination with sound reproducing means, of a coöperating amplifier having a curved throat and diverging side walls, an inclosure embracing the major portion of the throat and walls of said amplifier, said inclosure being provided with an opening opposite the delivery end of said amplifier, said delivery end being out of engagement with and unattached to said inclosure.

34. In combination with sound reproducing means, of a flattened amplifier located below said reproducing means, and means to convey the sound from said reproducer to said amplifier.

35. The combination with sound reproducing means, of an amplifier the axes of the major portion of which are of substantially different lengths, and substantially non-vibratory means to conduct the sound from said reproducing means to said amplifier.

36. The combination with sound reproducing means, of an amplifier oblong in cross section and located below said sound reproducing means and means to conduct the sound from said sound reproducing means to said amplifier.

37. The combination with sound reproducing means, of a plurality of sounding boards spaced apart from each other and located below said sound reproducing means and means to conduct the sound from said reproducing means between said sounding boards.

38. The combination with sound reproducing means of a coöperating amplifier, and an inclosure entirely embracing said sound reproducing means and said amplifier, and supporting said amplifier at one end only, said inclosure being provided with an opening in a side thereof and adjacent the delivery end of said amplifier.

39. The combination with sound reproducing means, of a coöperating amplifier, an inclosure entirely embracing said sound reproducing means and said amplifier and supporting said amplifier at one end only, said inclosure being provided with an opening in a side thereof and adjacent the delivery end of said amplifier, and a closure for said opening.

40. The combination with sound reproducing means, of a coöperating amplifier having a substantially non-vibratory smaller end and a vibratory larger end, an inclosure entirely inclosing said sound reproducing means and said amplifier and rigidly supporting said amplifier at its smaller end only.

In testimony whereof, I have hereunto set my hand this 18th day of July, A. D. 1906.

JOHN C. ENGLISH.

Witnesses:
ALSTON B. MOULTON,
ALEXANDER PARK.

Corrections in Letters Patent No. 947,227.

It is hereby certified that in Letters Patent No. 947,227, granted January 25, 1910, upon the application of John C. English, of Camden, New Jersey, for an improvement in "Sound-Reproducing Devices," errors appear in the printed specification requiring correction, as follows: Page 1, line 13, the word "The" should read *One;* same page, line 61, before the word "swing-" the word *tapering* should be inserted, and line 62, the word "tapering" should be stricken out; page 3, lines 69–70, the words "extending transversely of said body" should be stricken out and the words *the combination with a reproducer, of* be inserted instead; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22d day of February, A. D., 1910.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.

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35. The combination with sound reproducing means, of an amplifier the axes of the major portion of which are of substantially different lengths, and substantially non-vibratory means to conduct the sound from said reproducing means to said amplifier.

36. The combination with sound reproducing means, of an amplifier oblong in cross section and located below said sound reproducing means and means to conduct the sound from said sound reproducing means to said amplifier.

37. The combination with sound reproducing means, of a plurality of sounding boards spaced apart from each other and located below said sound reproducing means and means to conduct the sound from said reproducing means between said sounding boards.

38. The combination with sound reproducing means of a coöperating amplifier, and an inclosure entirely embracing said sound reproducing means and said amplifier, and supporting said amplifier at one end only, said inclosure being provided with an opening in a side thereof and adjacent the delivery end of said amplifier.

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40. The combination with sound reproducing means, of a coöperating amplifier having a substantially non-vibratory smaller end and a vibratory larger end, an inclosure entirely inclosing said sound reproducing means and said amplifier and rigidly supporting said amplifier at its smaller end only.

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