J. C. ENGLISH.

SOUND AMPLIFYING DEVICE.

APPLICATION FILED JUNE 29, 1907.

1,067,905.

Patented July 22, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

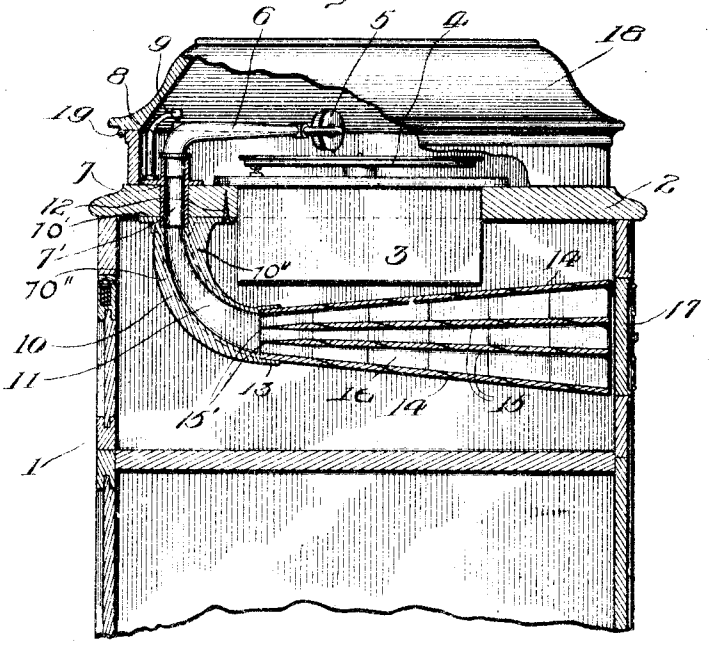
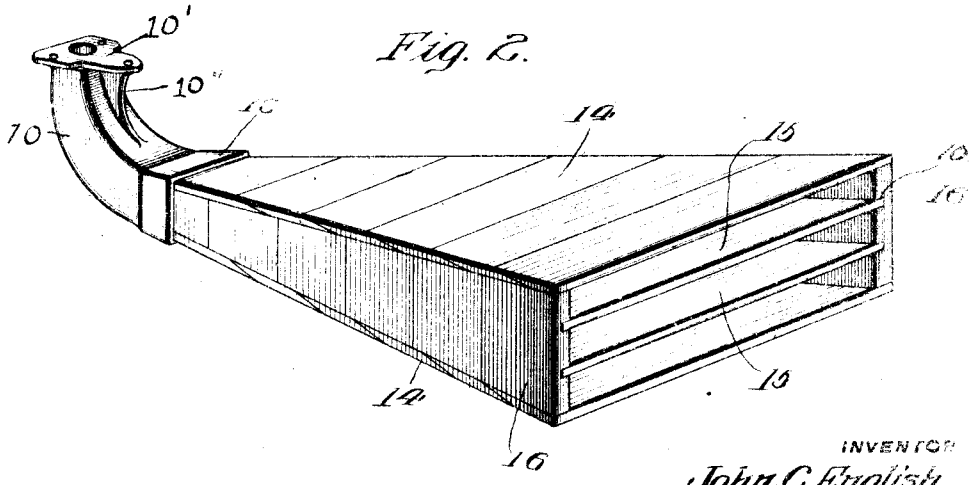


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

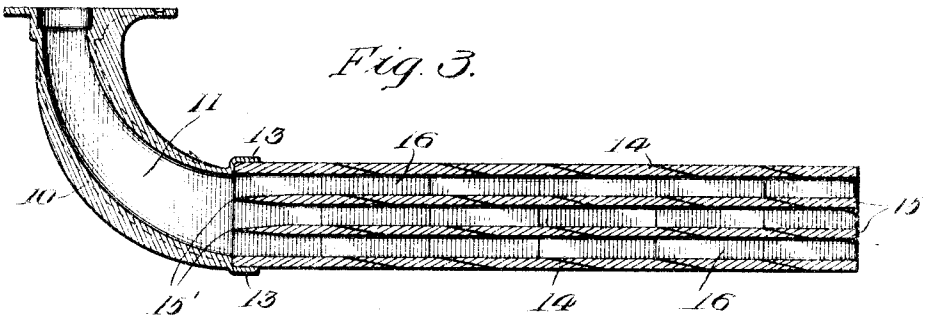


Fig. 4.

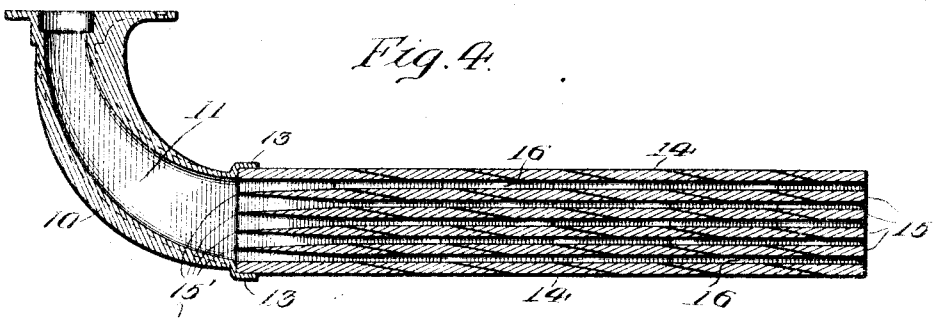
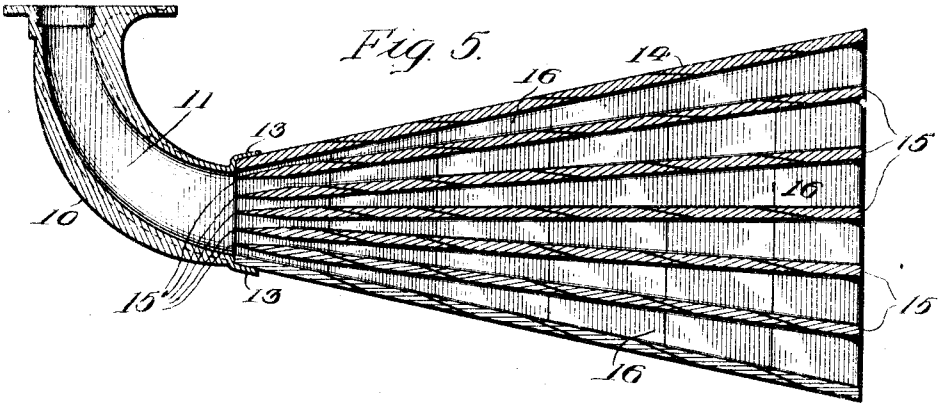


Fig. 5.



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

SOUND-AMPLIFYING DEVICE.

1,067,905. Specification of Letters Patent. Patented July 22, 1913.

Application filed June 29, 1907. Serial No. 381,408.

To all whom it may concern:

Be it known that I, JOHN C. ENGLISH, a citizen of the United States, and a resident of the city of Camden, county of Camden, State of New Jersey, have invented certain new and useful Improvements in Sound-Amplifying Devices, of which the following is a specification.

The principal objects of this invention are, to provide an improved sound amplifier of simple, compact and durable construction, and of relatively great efficiency; to provide an improved sound amplifier particularly adapted for use in a talking machine which will obviate hollow and other objectionable effects, such as are produced by megaphones and some other amplifying devices, and which will act to increase the sonority, brilliancy, and other good qualities in sounds; and to provide other improvements as will appear hereinafter.

In the accompanying drawings, Figure 1 is a fragmentary central vertical section of a talking machine provided with a sound amplifier constructed in accordance with this invention; Fig. 2 an enlarged perspective of the said amplifier; and Figs. 3, 4 and 5 are longitudinal central vertical sectional views of modified forms of this invention.

Referring to the drawings, one embodiment of this invention is shown applied in a talking machine comprising a cabinet 1 having a horizontal partition 2, from which depends a motor 3 for actuating the usual turn-table 4 arranged above the partition 2. Above the turn-table, a sound box 5 is carried by and communicates with the free smaller end of a hollow tapering tone arm 6, the larger end of which is turned downwardly and telescopes rotatively in the upper end of a hollow vertical bushing 7 supported by and extending through the partition 2. A bracket 8 carries a pivot 9 which holds the tone arm rotatively in position.

For amplifying the sounds reproduced by this machine and delivered through the bushing 7, there is provided an improved sound amplifier or resonator constructed in accordance with this invention. This amplifier includes a longitudinally curved downwardly depending and downwardly flaring substantially rigid and substantially non-vibratory bracket 10 having a longitudinally curved opening 11 extending longitudinally through. The opening 11 through the bracket flares downwardly and gradually changes in transverse section from a substantially circular shape at the upper or smaller end of the bracket to an oblong, substantially rectangular shape, having a substantially horizontal major axis, at the lower or larger end of the bracket. The upper smaller or inlet end of this bracket is provided with a substantially horizontal flange or base plate 10′ integral therewith, and the bracket and its base plate may be braced by webs 10″ integral therewith and preferably extending longitudinally upon the front and rear sides of the bracket respectively. The bracket 10 is clamped rigidly to the under surface of the partition 2 by any suitable means; for instance, by screws 12 extending through the base plate and into the partition. The lower or delivery end of the bracket 10 is slightly enlarged exteriorly and interiorly to form a flange or socket 13 which is oblong and substantially rectangular in transverse vertical section and which flares and opens forwardly in a horizontal direction, the major transverse axis of the socket being substantially horizontal. Fitting snugly and rigidly secured in any suitable manner in the socket 13 of the bracket 10, is the inner end of a hollow body or resonator which forms the major portion or delivery end of this amplifier, the neck or inlet end of which is formed by the bracket 10. This body consists, in this instance, of a structure tapering longitudinally externally, and having a substantially horizontal longitudinal axis forming a forward extension of the longitudinal axis of the hollow bracket 10. In transverse vertical section, this body is externally oblong and substantially rectangular, the major transverse axis being substantially horizontal and parallel to the major transverse axis of the socket 13. The upper and lower external walls of this body, or resonator are formed by two substantially flat comparatively thin sounding boards 14 diverging slightly forwardly. These boards are spaced in vertical alinement and are preferably similar in shape and of equal areas, each being in the form of a truncated triangle. The external side walls of this body are formed of two horizontally spaced and forwardly diverging comparatively heavy and non-resonant substantially flat boards or supports 16, each in the form of a

truncated triangle, which are interposed between the upper and lower external sounding boards 14, the longitudinal edges of the sounding boards overlapping and being rigidly secured to the longitudinal edges of the side walls.

Arranged in vertical alinement between the upper and lower external sounding boards 14 and preferably diverging forwardly from the common axis of divergence of these sounding boards are a plurality of intermediate or internal sounding boards 15 similar in shape and construction to and substantially equal to in length but slightly less than in width than the external sounding boards. These internal sounding boards are rigidly secured to the side walls 16 in any suitable manner, for instance by having their longitudinal edges glued tightly in place in grooves 16′ provided therefor in the inner surfaces of the side walls, and preferably divide the entire interior of the resonator into a plurality of sound passages which are preferably substantially equal to each other in transverse section at any point in the length of the resonator. To permit a smooth and uninterrupted flow or transmission of sound waves from the delivery end of the hollow bracket 10 through the resonator, the inner ends of these internal sounding boards are preferably tapered and terminate in sharp horizontal edges 15′. Also, for this purpose, the inner surfaces of the inner ends of the external walls of the resonator are arranged flush with the adjacent corresponding inner surfaces of the bracket. The construction is such that the transverse sectional area of the inclosed spaces or inlets between the sounding boards at the point of junction with the bracket will be substantially equal to and not less than the transverse section of the opening in the bracket at substantially the same point. Each of the sounding boards 14 and 15, in this resonator is preferably constructed of a plurality of comparatively narrow oblong flat straight strips of wood of equal thicknesses and arranged in the same plane, the grain of the wood running longitudinally of the strips, and the strips being secured together consecutively at their longitudinal edges. Preferably the longitudinal connecting edges of each pair of adjacent strips are oppositely scarfed or acutely beveled and are overlapped and cemented together. The boards 16 forming the side walls of the resonator may also be made in the same manner. The sounding boards and side walls are preferably arranged so that the longitudinal axes of the strips will extend transversely of the resonator.

The talking machine casing is provided with the usual sound outlet closed by the usual doors 17 and with a cover 18 hinged as at 19 to permit access to the turn-table.

In Fig. 3 is shown a modified form of this invention which is similar to the form hereinbefore described but in which the upper and lower external sounding boards 14 and the intermediate sounding boards 15 are substantially parallel. In Fig. 4 is shown a further modified form of this invention constructed as hereinbefore described, but in which six substantially parallel closely spaced sounding boards are used. It has been found that good results may be obtained in this form even when the distance between the sounding boards is as small as one-fourth of an inch. In Fig. 5 is shown a further modification of this invention constructed as hereinbefore described, but in which seven sounding boards are used and the angle of divergence between the upper and lower external sounding boards is increased. It has been found that these various forms of this invention when in operation produce different results, and that the sounds transmitted by any one of these forms may be modified by slight variations in the angles of divergence between the sounding boards, or by varying the sounding boards in shape, area or thickness, or by varying the number of intermediate sounding boards used, or by varying the widths of the spaces between the sounding boards, or by other changes in the construction.

When in use this amplifier is preferably supported, as shown, entirely from the inlet end of the hollow bracket 10, the body portion of the amplifier being entirely supported from its inlet end by the delivery end of the bracket. This permits the sounding boards to vibrate throughout substantially their entire areas, greatly increasing the sonority of the sounds transmitted through the amplifier in the spaces or passages between the sounding boards. The amplifier may be arranged, however, in any other suitable way to meet various conditions, as for instance, so that the major transverse axis of the delivery end of the amplifier will be vertical instead of horizontal with good results.

In applying this invention the particular form to be used in any case to give the best results may be determined experimentally. By having several sounding boards spaced comparatively close together and by having the body portion of the amplifier oblong in transverse section, as described, a relatively large area of sounding board surface, in proportion to the cubic space occupied by the amplifier, is provided, and the efficiency of the amplifier is increased. In any case an amplifier constructed in accordance with this invention, when used in a talking machine, is relatively compact and is efficient in reducing, or practically eliminating sharp, harsh, hollow, or other unpleasant qualities

from the sounds transmitted and in giving a clear, brilliant, broad, and mellow quality to the reproduction.

Only a few of the various forms in which this invention may be applied have been illustrated herein and it is obvious that the invention is not limited to any particular form but may be varied as hereinbefore noted to meet various conditions and requirements without departing from the spirit of this 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. A sound amplifying device, comprising a heavy substantially non-vibratory section and a hollow vibratory body section communicating therewith, said vibratory section comprising exterior resonant boards and interior resonant 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, said vibratory section being composed of exterior and interior sounding boards having their side edges rigidly secured together and the space between said sounding boards communicating with said non-vibratory section.

3. An amplifying device comprising a series of resonant sounding boards, including a plurality of inner sounding boards, separated at a slight distance from each other, each of said inner sounding boards being provided with a sharp edge at one end thereof.

4. An amplifying device comprising a plurality of resonant sounding boards separated at a slight distance from each other and arranged in substantially parallel planes, each of the boards between the outer boards being provided with a sharp edge at one end thereof.

5. In an amplifying device, the combination with a heavy supporting bracket provided with an opening therethrough, of a resonator comprising a series of resonant sounding boards separated at a slight distance from each other and arranged in substantially parallel planes, and means for connecting the outer edges of said boards rigidly together, said boards being supported at one end by said rigid bracket, and said series including outer boards and intermediate boards arranged between the outer sounding boards and provided with sharp inner edges, so that the cross sectional area of the spaces between the boards at their junction with said bracket will not be less than the cross sectional area of the opening in said bracket at said point.

6. A sound amplifying device comprising a substantially non-vibratory section and a hollow body-section communicating therewith, said body having exterior sides composed of resonant sounding boards and the interior of said body being provided with intermediate sounding boards of resonant material.

7. A sound amplifying device comprising a substantially non-vibratory section and a hollow body-section communicating therewith, said body having exterior sides composed of resonant sounding boards and the interior of said body being provided with intermediate sounding boards also of resonant material, the passage for sound through said sections being of constantly increasing cross sectional area.

8. A sound amplifier for talking machines comprising a hollow body portion provided with a plurality of spaced sounding boards inclosed thereby.

9. A sound amplifier for talking machines comprising a hollow body portion provided with a plurality of spaced sounding boards inclosed thereby and extending longitudinally thereof.

10. A sound amplifier comprising a hollow body, and a sounding board inclosed thereby and dividing the interior thereof into a plurality of sound passages, said board having a sharpened edge arranged to divide the sound waves when said amplifier is in operation.

11. A sound amplifying device comprising a hollow body exteriorly oblong in transverse section and a plurality of sounding boards inclosed thereby, and extending substantially the full width thereof.

12. A sound amplifying device comprising a hollow body exteriorly oblong in transverse section and a plurality of sounding boards inclosed thereby and extending substantially the full width thereof and in planes substantially parallel to a transverse major axis of said body.

13. A sound amplifying device comprising a hollow body exteriorly oblong in transverse section and a plurality of sounding boards inclosed thereby and extending substantially the full width thereof and in the direction of a major transverse axis of said body.

14. A sound amplifying device comprising a hollow major portion exteriorly oblong in transverse section and a plurality of spaced intermediate sounding boards inclosed thereby.

15. A sound amplifying device comprising a hollow major portion exteriorly oblong in transverse section and a plurality of spaced intermediate sounding boards inclosed thereby and extending longitudinally thereof.

16. A sound amplifying device comprising a hollow major portion exteriorly oblong in transverse section and a plurality

of spaced intermediate sounding boards inclosed thereby and extending longitudinally thereof and substantially the full width thereof and dividing the interior of said major portion into as many sound passages as there are intermediate sounding boards plus one.

17. A sound amplifier comprising oppositely disposed relatively thick and rigid exterior walls, two oppositely disposed relatively thin sounding boards connecting said walls and a plurality of sounding boards arranged between said first mentioned sounding boards.

18. A sound amplifier comprising oppositely disposed relatively thick and rigid diverging exterior walls, two oppositely disposed relatively thin parallel sounding boards connecting said walls and a plurality of sounding boards arranged between said first mentioned sounding boards.

19. A sound amplifier comprising oppositely disposed relatively thick and rigid diverging exterior walls, two oppositely disposed relatively thin parallel sounding boards connecting said walls and a plurality of sounding boards arranged between and parallel to said first mentioned sounding boards.

20. A sound amplifier comprising oppositely disposed relatively thick and narrow exterior supports, two oppositely disposed relatively broad and thin exterior sounding boards connecting said supports and a plurality of sounding boards arranged between said first mentioned sounding boards.

21. A sound amplifier comprising oppositely disposed relatively thick and narrow exterior supports, two oppositely disposed relatively broad and thin exterior sounding boards connecting said supports and a plurality of sounding boards arranged between said first mentioned sounding boards and dividing the interior of said amplifier into a plurality of sound passages.

22. A sound amplifier comprising oppositely disposed relatively thick rigid exterior walls, two oppositely disposed relatively thin sounding boards connecting said walls, and a sounding board arranged between said first mentioned sounding boards and connecting said walls.

23. A sound amplifier comprising oppositely disposed relatively narrow supports, two oppositely disposed relatively broad sounding boards connecting said support, and a plurality of sounding boards spaced between said first mentioned sounding boards and connecting said supports.

24. A sound amplifier comprising a transversely oblong hollow major portion consisting of oppositely disposed relatively narrow exterior spaced supports, and two oppositely disposed relatively broad exterior sounding boards connecting said supports, and a plurality of sounding boards spaced between said first mentioned sounding boards and connecting said supports and extending substantially the full width and length of said major portion.

25. A sound amplifier comprising a hollow transversely oblong major portion provided with an inlet and with an outlet at opposite ends respectively, and a plurality of sounding boards inclosed by said major portion and extending substantially the full width and length thereof and dividing the interior of said major portion into a plurality of passages arranged to conduct sound waves from said inlet to said outlet.

26. A sound amplifier having a sound passage therethrough, and a sounding board located within the passage and bounded by two diverging restrained edges and two free edges, the free edges being adjacent to the ends of the passage.

27. A sound amplifier having a sound passage extending therethrough, and a sounding board located within the passage and bounded by two oppositely disposed restrained edges and two oppositely disposed free edges, the free edges being adjacent to the ends of the passage.

28. A sound amplifier for talking machines comprising a hollow body portion provided with a plurality of spaced sounding boards inclosed thereby and dividing the interior of said body portion into a greater number of sound passages than the number of said sounding boards.

29. A sound amplifier for talking machines comprising a hollow body portion having an inlet and outlet and forming a sound conduit between said inlet and said outlet, and a plurality of spaced sounding boards inclosed thereby and dividing the interior of said body portion into a greater number of sound passages than the number of said sounding boards.

30. A sound amplifier for talking machines comprising a hollow longitudinally tapering body portion having an inlet and outlet and forming a sound conduit between said inlet and said outlet, and a plurality of spaced sounding boards inclosed thereby and dividing the interior of said body portion into a greater number of sound passages than the number of said sounding boards.

31. A sound amplifier for talking machines comprising a substantially non-vibratory section, and a hollow vibratory section communicating therewith, said vibratory section being provided with an interior sounding board forming a partition therein.

32. A sound amplifier for talking machines comprising a substantially non-vibratory section, and a hollow vibratory section communicating therewith, said vi-

bratory section being provided with interior sounding boards forming partitions therein.

33. A sound amplifier including a sounding board bounded by two opposite restrained edges, and having its remaining edges free, the sounding board being decreased in thickness along one of its free edges.

34. A sound amplifier including a sounding board bounded by two opposite diverging restrained edges and two free edges, and being decreased in thickness along its shorter free edge.

35. A sound amplifier including a hollow body having a sound passage therethrough and a sounding board within said passage, said sounding board having oppositely disposed restrained edges and being supported thereby in said body, the remaining edges of said sounding board being free to vibrate.

36. A sound amplifier comprising a hollow body having a sound passage therethrough, elongated in transverse section, and a sounding board disposed within said body in the direction of said elongation.

37. A sound amplifier comprising a hollow body having a sound passage therethrough, elongated in transverse section, said body having its major transverse axis considerably greater than its minor transverse axis, and a sounding board disposed within the said body in the direction of said major transverse axis.

38. A sound amplifier comprising a hollow body having a sound passage therethrough, elongated in transverse section, said body having its major transverse axis considerably greater than its minor transverse axis, and a sounding board disposed across said sound passage and of greater width than the minor transverse axis of said body.

39. A sound amplifier comprising a hollow body having a sound passage therethrough, elongated in transverse section, a sounding board disposed within said body in the direction of said elongation and dividing said passage into a plurality of sound conduits, and means adjustable with respect to said body and arranged to extend across the delivery ends of all of said conduits to modify the sound issuing therefrom.

40. A sound amplifier comprising a hollow body having a sound passage therethrough, elongated in transverse section, said body having its major transverse axis considerably greater than its minor transverse axis, a sounding board disposed within said body in the direction of said major transverse axis and dividing said passage into a plurality of sound conduits, and a member adjustable with respect to said body and arranged to extend across the delivery ends of all of said conduits to modify the sound issuing therefrom.

41. A sound amplifier comprising a hollow body having a sound passage therethrough, elongated in transverse section, said body having its major transverse axis considerably greater than its minor transverse axis, a sounding board disposed within said body in the direction of said major transverse axis and dividing said passage into a plurality of sound conduits, and a sound deflecting member mounted to swing about a predetermined axis with respect to said body and arranged to extend across the delivery ends of all of said conduits to act upon the sound issuing therefrom.

In witness whereof I have hereunto set my hand this 27th day of June, 1907.

JOHN C. ENGLISH

Witnesses:

ALSTON B. MOALTON,

ALEXANDER PARK.