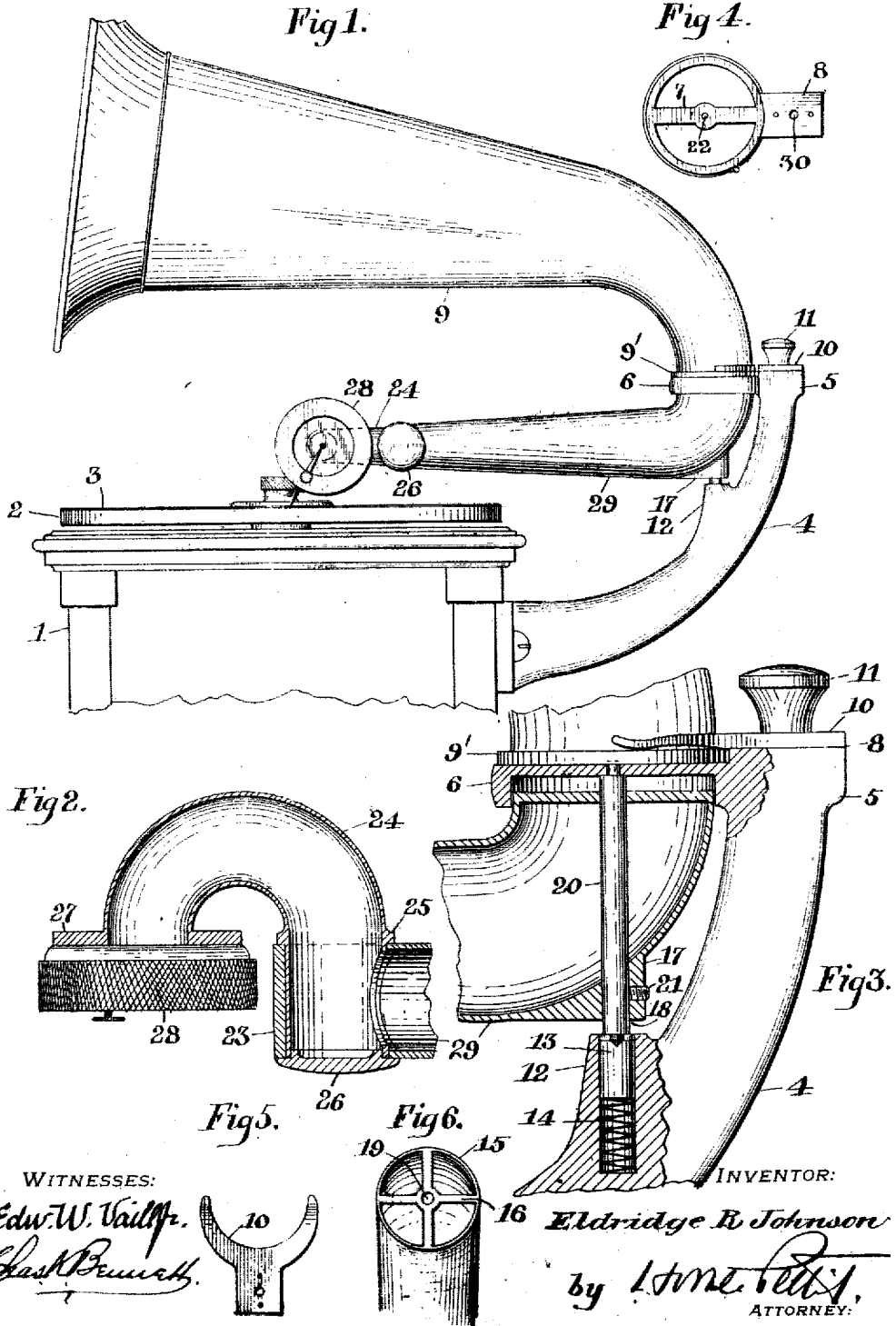


E. R. JOHNSON.
TALKING MACHINE.
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UNITED STATES PATENT OFFICE.

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TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW
JERSEY.

TALKING-MACHINE.

No. 814,786.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ELDRIDGE R. JOHNSON, of the city of Philadelphia, State of Pennsylvania, have invented certain new and useful
5 Improvements in Talking-Machines, of which the following is a full, clear, and complete disclosure.

In a talking-machine where an amplifying-horn is employed for delivering the reproduced sounds it is desirable and advantageous in obtaining the highest degree of efficiency in the quality and volume of the tone reproduced to employ not only a large horn, but also to locate the small end of the horn as
10 near as possible to the sound-box or reproducing mechanism. By locating the small end of the horn in this manner so that the sound-conducting tube or horn flares outwardly practically from the sound-box I have
15 found that it allows the sound-waves to advance with a regular, steady, and natural increase in their wave fronts in a manner somewhat similar to that of the ordinary musical instruments, thus obviating the well-known
20 disadvantages due to long passages of small and practically constant diameter. It is also desirable to avoid abrupt turns in the sound-conducting tube or passage.

It is therefore the object of my invention to
30 provide a talking-machine with an amplifying-horn meeting these requirements and at the same time to reduce the size, length, and weight of the horn, so that it can be conveniently transported.

Other objects of my invention will appear
35 in the specification in connection with the accompanying drawings, forming a part thereof, which show a preferred form of apparatus embodying my invention.

In said drawings, Figure 1 is a side elevation of my improved construction as applied to the talking-machine; Fig. 2, a horizontal sectional view of the small end or hollow arm portion of the amplifying-horn, showing the
5 means to allow of the vertical movement of the sound-box; Fig. 3, a vertical sectional view showing the means whereby the larger portion of the horn is adjustably mounted and the hollow arm or lower portion of the
10 horn is pivoted so as to communicate therewith; Fig. 4, a plan view of the end of the support for the larger portion of the amplifying-horn; Fig. 5, a view of the yoke for holding the same in position upon its support, and

Fig. 6 a plan view of the end of the hollow
arm or pivoted portion of the amplifying-horn.

The numeral 1 indicates the usual motor-casing, above which revolves the usual turntable 2 and upon which is carried the sound-record 3. At one side of the casing 1 a bracket or arm 4 is provided which is similar in shape to those already in use excepting its upper end portion. This upper end portion 5 consists of a ring 6, having a bar 7 across one diameter thereof. The bell portion 9 of amplifying-horn is provided at its end, with a flange 9', which is adapted to be seated upon the ring 6 of the support 4. The upper end of the support 5 is provided with a flat portion 8, having a screw-hole 30 therein. Upon this flat portion a yoke 10 is adapted to be fixed by the thumb-screw 11. The arms of this yoke 10 project over the ring 6 and are adapted to press upon the flange 9 of the bell portion of the amplifying-horn, and thereby retain said portion in position. It will be noticed that this construction enables the bell portion of the horn to be directed at any angle horizontally to send the sound to any point which choice or convenience may require. The arms of the yoke 10 are slightly curved and are made of spring material, so that the bell portion of the horn may be easily placed in position and removed.

Upon the arm 4 a boss or projection 12 is provided which is recessed internally to provide a socket for a bearing-block 13, which is forced upwardly by a coiled spring 14. The horizontally-pivoted hollow arm portion 29 of the amplifying-horn is curved upwardly and terminates in a ring 15, having spider-arm 16 across two diameters thereof. Upon the elbow or curve of the horizontally-pivoted arm of the horn is provided a boss 17, having a hole 18 therein which corresponds with a hole 19 in the spider at the end of said curved portion. A vertical pivot pin or bar 20 passes through these holes or openings and is retained in position by the set-screw 21. The lower end of this pivot-bar 20 has a bearing in the spring-pressed block 13, and its upper end enters the bearing 22 in the bar 7 of the support 4. The parts are of such a size and are so adjusted that the upper end of the pivoted arm of the horn will enter the ring 6 for a short distance; but sufficient space is left between said parts to allow said arm to swing

freely and yet to provide a practically sound-tight joint.

The joint for allowing a vertical movement to the sound-box is constructed as follows:

5 The inner or smaller end of the horizontally-pivoted hollow-arm portion 29 of the amplifying-horn is provided with a strap or ring 23, which is adapted to receive and form a bearing or socket for the end of a semicircular piece of tubing 24. The end of this piece of tubing 24 is held in position by suitable flange 25 and by a cap 26, which also serves to close the outer end thereof. To the other end of the curved tubing 24 is attached a plate 27, which carries the usual sound-box 10 28. It will be seen that by this construction the sound-box is brought practically into alinement with the end of the horizontally-pivoted hollow-arm portion of the horn, and is therefore on a radius from the axis of the pivot-bar 20.

From the foregoing description it is seen in the first place that I provide, in effect, an amplifying-horn that extends practically from the sound-box and that it consists of two sections, one of which is the tapering hollow sound-conducting arm permanently mounted upon the machine, while the other section is removable horn proper. The advantage of this is that I secure the requisite length of a constantly flaring or tapering horn, which gives the desired result in the quality and volume of the reproduction, while at the same time the size and weight of the removable horn is materially reduced, so as to be far more convenient in transportation, as it is understood that in transporting the machine the horn is usually removed therefrom and carried separately; but with my invention it is noted that the horn proper forms only a portion of the tapering sound-conducting tube, and thus it is far more convenient and less cumbersome to carry. The other advantage is that the weight imposed upon the stylus and the record is greatly reduced, since the horn is supported entirely by the bracket 4, while it retains all the advantages in that it is capable of being turned in any direction independent of the sound-tube 29, and this sound-tube 29 is supported so that it is capable only of a movement parallel with the face of the record, being free to swing horizontally and unconstrained and unrestrained when swinging in this direction except by the operative contact of the stylus in the sound-grooves of the record-tablet, and the horizontal movement of this sound-tube 29 is also substantially uninfluenced by its own weight and that of the sound-box carried thereby, and it is further to be noted that I have avoided to the greatest degree any abrupt turns, while the sound-box is movable freely toward and away from the record independently of the sound-tube 29 and is unconstrained mechanically in its movement to-

ward and away from the record, resting by its own weight when reproducing and being capable of being lifted and moved and turned on its pivotal support to an inoperative position, resting upon said sound-tube 29. In fact, I have produced, in effect, a sectional horn tapering from end to end, the large section of which is movable independently of the smaller section, which latter is capable of moving only in a plane parallel with the record-tablet and by means of the operative contact of the stylus in the record-groove. I thus secure all the advantages of the large size removable horn with the further advantage that the horn is materially reduced in size and weight, and I secure the further advantage due to the use of a hollow arm, which moves only in a plane practically parallel with the face of the record and upon the end of which is carried the sound-box movable independently thereof toward and away from the record, which overcomes imposing upon the record and reproducing-stylus the weight of the horn and conducting tubes or passages, while at the same time obviating the movement of a large removable horn. Another and important advantage is that by utilizing the tapering sound-tube 29 as a portion of the amplifying-horn and in thus reducing the length of the horn supported by the bracket I greatly reduce the size of the machine, for I am enabled to secure the same result as to quality and volume in reproduction and at the same time greatly reduce the length of horn projecting from the bracket or arm 4.

In employing in the claims the terms "parallel" and "horizontal" it will be understood that such terms are used to express the general relation of the parts referred to and their movement and relation in a general way, and when such parts are used in their ordinary manner and although theoretically perhaps there might not be always a strictly parallel or horizontal relation or condition it would be so to all intents and purposes.

The means for supporting the bell portion 9 of the horn also provides a firm support therefor and are placed at a point in the horn where the same is not so small as to require special means for strengthening its supporting portion.

Changes in details may be made without departing from the spirit and scope of my invention; but,

Having described the nature of the invention, what I claim, and desire to protect by Letters Patent of the United States, is—

1. In a talking-machine, an amplifying-horn proper, a record-support, a tapering sound-tube movable independent of the amplifying-horn proper and communicating therewith, a sound-box mounted upon and communicating with the small end of said sound-tube and movable independently of said sound-tube toward and away from the

record-support and supporting means at the communicating portions of the horn and tube.

2. In a talking-machine, an amplifying-horn proper, a record-support, a tapering sound-tube movable independent of the amplifying-horn proper and supported to move in a given plane parallel with said record-support, a sound-box mounted upon and communicating with the small end of said tube and movable independently thereof toward and away from the record-support, said horn and tube communicating, and supporting means at the communicating portion of said horn and tube.

3. In a talking-machine, an amplifying-horn proper, a record-support, a tapering sound-tube supported in a given plane parallel therewith, and having its large end coupled with the small end of said horn, said tube being movable independent of the amplifying-horn proper, and a sound-box mounted upon and communicating with the small end of said tube and movable independently thereof toward and away from the record-support.

4. In a talking-machine, a record-support, a tapering sound-tube, a sound-box mounted upon and communicating with the small end thereof and movable independently of said tube toward and away from the record-support, and a tapering horn having its small end coupled with the large end of said tube, said horn and tube being relatively movable.

5. In a talking-machine, a record-support, a tapering sound-tube, a sound-box mounted upon and communicating with the small end thereof and movable independently of said tube toward and away from the record-support, and a removable tapering horn having its small end coupled with the large end of said tube, said horn and tube being relatively movable.

6. In a talking-machine, a record-support, a tapering sound-tube, a sound-box mounted upon and communicating with the small end thereof, and movable independently of said tube toward and away from the record-support, and a horn having its small end coupled with the large end of said tube, said horn and tube being independently supported.

7. In a talking-machine, a record-support, a tapering sound-tube supported in a given plane parallel therewith, a sound-box mounted upon and communicating with the small end of said tube and movable independently thereof toward and away from the record-support, and a horn having its small end coupled with the large end of said tube, said horn being independently supported and movable transversely independently of said tube.

8. In a talking-machine, a sound-tube and communicating sound-box, a removable horn having its small end communicating with said sound-tube, a support for said horn, said

horn being movable relative to said tube, a lateral projection or shoulder at the small end of said horn, and means for engaging said shoulder for holding said horn in position upon its support.

9. In a talking-machine, a tapering sound-tube and sound-box communicating therewith, a horn having its small end deflected laterally and communicating with the large end of said tube, said horn being movable only in a horizontal plane.

10. In a talking-machine, a tapering sound-tube and sound-box communicating therewith, the large end of said sound-tube being deflected laterally at its point of support, and a horn having its small end deflected laterally and communicating with the large end of said tube, said horn and tube being supported to move in given horizontal planes.

11. In a talking-machine, a tapering sound-tube and sound-box communicating therewith, a support therefor, the large end of said sound-tube being deflected laterally at its point of support, and a horn having its small end deflected laterally and communicating with the large end of said tube, said horn and tube being independently supported and relatively movable in given horizontal planes.

12. In a talking-machine, a tapering sound-tube and sound-box communicating therewith, a support therefor, the large end of said sound-tube being deflected laterally at its point of support, and a horn having its small end deflected laterally and communicating with the large end of said tube, said horn and tube being independently supported and relatively movable in given horizontal planes and the support for the horn serving as a coupling for uniting the horn and tube.

13. In a talking-machine, a sound-tube supported in a given horizontal plane and having a movable small transverse end section extending laterally therefrom, and a sound-box mounted upon and communicating with said section.

14. In a talking-machine, a sound-tube having a movable end section extending laterally therefrom, and a sound-box mounted upon and communicating with said section, said section being adapted to rest upon and be supported by said tube in an inoperative position.

15. In a talking-machine, a sound-tube, a movable end section extending laterally therefrom and comprising a plurality of limbs, and a sound-box mounted upon and communicating with the outer limb, said section being adapted to rest upon and be supported upon said tube in an inoperative position.

16. In a talking-machine, a sound-tube having a semicircular section movably

- mounted upon the end thereof, to move independently of the sound-tube during its operative movement, and a sound-box mounted upon and communicating with the outer limb of said section.
17. In a talking-machine, a sound-tube having a transversely-extending tubular bearing portion, a tubular section movably mounted therein to move independently of the sound-tube, during its operative movement, and a sound-box mounted upon and communicating with said section.
18. In a talking-machine, a sound-tube having a movable end section, a sound-box mounted upon and communicating with said section, said tube being located in the path of said movable end section, whereby the latter is adapted to be supported upon said arm to hold the sound-box in an inoperative position.
19. In a talking-machine, a sound-tube having a movable bent end section extending laterally therefrom, and a sound-box mounted upon and communicating with said section, said tube being located in the path of said movable end section, whereby the sound-box is adapted to be supported by said tube in an inoperative position.
20. In a talking-machine, a record-support, a tapering sound-tube, a horn having its small end communicating with the large end of said tube, the communicating ends of said tube and horn being deflected laterally toward each other, said horn and tube being supported at their deflected portions to move in a given plane parallel with the record-support, and a sound-box mounted upon and communicating with the small end of said tube and movable independently thereof toward and away from the record-support.
21. In a talking-machine, a record-support, a tapering sound-tube having a laterally-deflected large end, said tube being supported at its deflected portion to move in a given plane parallel with the record-support, a sound-box mounted upon and communicating with the small end of said tube and movable independently thereof toward and away from the record-support, and a horn having its small end laterally deflected and communicating with the deflected large end of said tube.
22. In a sound recording or reproducing mechanism, a hollow tapering sound-conducting arm, a record-support, said arm being vertically pivoted at its larger end to constrain its smaller end to move in a given plane parallel with the face of the record-support, a sound-box mounted upon the smaller end of said arm and having communication therewith, and means to allow a movement of the sound-box toward and from the record-support independently of the hollow arm.
23. In a sound recording or reproducing mechanism, a hollow tapering sound-conducting arm, a vertical pivot at its larger end which constrains said arm to move in a given plane parallel with the face of the record, a sound-box mounted upon the smaller end of said arm and a bent pivoted tube connecting said arm and said sound-box to allow a movement of the sound-box toward and from the record independently of the hollow arm and to carry said sound-box in substantial alinement with the tapering portion of said arm.
24. In a sound recording or reproducing mechanism, a hollow tapering sound-conducting arm, a vertical pivot at its larger end which constrains said arm to move in a given plane parallel with the face of the record, a sound-box mounted upon the smaller end of said arm and a semicircular pivoted tube connecting said arm and said sound-box to allow a movement of the sound-box toward and from the record independently of the hollow arm and to carry said sound-box in substantial alinement with the tapering portion of said arm.
25. In a sound recording or reproducing mechanism, a horizontally-pivoted tapering hollow arm, a curved portion mounted at the end of said horizontally-pivoted portion and adapted to swing vertically, a sound-box mounted on the end of said curved portion, an adjustable flanged horn communicating with the pivoted end of said horizontally-pivoted arm, a ring adapted to receive the flange of said horn and means for securing the flange upon said ring.
26. In a sound recording and reproducing mechanism, a horizontally-pivoted tapering arm, a strap or ring at the smaller end thereof, a semicircular portion, the end of which is mounted to turn in said strap or ring, a sound-box mounted at the outer end of said semicircular portion, a support for the pivot of said horizontally-pivoted arm and a fixed adjustable horn carried by said support.
27. In a sound recording and reproducing mechanism, a horizontally-pivoted tapering arm, a curved tapering portion joined to said horizontally-pivoted arm, a sound-box carried by said curved portion, a pivot-pin for said horizontal arm, a supporting-arm for said pivot-pin, a spring-pressed block forming a bearing for said pin and carried by said supporting-arm, a horizontal ring carried by said supporting-arm and having a cross-bar adapted to receive the upper end of the pivot-pin an adjustable flanged horn adapted to rest upon said ring and a yoke for retaining the flange of the horn in position upon the ring.
28. In a sound recording and reproducing mechanism, a hollow tapering sound-conducting arm constrained to move in a given plane parallel with the face of the record, a sound-box mounted upon the smaller end of

said arm and having communication therewith, means to allow of a movement of the sound-box toward and from the record independent of the hollow arm, a support for the larger end of said arm and an amplifying-horn also carried by said support.

29. In a sound recording or reproducing mechanism, a hollow tapering sound-conducting arm, a sound-box mounted upon the smaller end of said arm, said end comprising a semicircular tube pivoted to the straight portion of said arm.

30. In a talking-machine, a record-support, a hollow swinging arm extending horizontally above the same, movable in a given plane parallel with the face of the record-support, and having a hinged joint intermediate in its length to permit one section to move vertically, and a sound-box having means for holding a stylus-point, said sound-box being mounted upon and communicating with said vertically-movable section and movable away from the record-support to a position to permit the insertion or withdrawal of a stylus-point.

31. In a talking-machine, a swinging longitudinally-extended tapering sound-conducting tube movable in a given plane parallel to that of a record-tablet directly over which the small end of said tube extends, a fixed vertical support provided with a collar in which the larger end of said tube is pivoted, a laterally-extended stub-tube pivotally connected to the small end of said tapering tube whereby it may swing toward and away from the record-tablet independently of said sound-tube, and a longitudinally-projecting tapering horn, swiveled to said collar whereby it may be turned on a vertical axis, said tapering sound-tube, collar and horn constituting a sound-conduit gradually increasing on cross-section from the small end of the sound-tube to the large end of said horn.

32. In a talking-machine adapted to reproduce from a horizontally-disposed flat record-tablet having a record-groove of even depth with lateral undulations in the sides thereof, a record-support, a hollow sound-conducting arm mounted to swing freely in a given plane parallel with said support, a sound-box mounted upon, communicating with one end of said arm and movable independently of said arm toward and away from the record-support, the horizontal movement of said arm and sound-box across the record being substantially uninfluenced by the weight of said arm and sound-box, and a horn having its small end coupled with the other end of said arm.

33. In a talking-machine, a record-support, a hollow sound-conducting arm movable in a given plane parallel with said support, a sound-box mounted upon, communicating with, and movable independently of

said arm toward and away from the record-support, and means forming part of the machine for holding, independent of other means, the said sound-box in an inoperative position relative to the record.

34. In a talking-machine, a record-support, a hollow sound-conducting arm movable in a given plane parallel with said support, and a sound-box mounted upon, communicating with, and movable independently of said arm toward and away from the record-support, said arm serving as a support upon which said sound-box rests and is maintained in an inoperative position.

35. In a talking-machine, a record-support, a hollow sound-conducting arm movable in a given plane parallel with said support, and a sound-box mounted upon, communicating with, and movable independently of said arm, toward and away from the record-support, said sound-box being movable away from the record to, and being adapted to be supported by the arm in an inoperative position independent of other means.

36. In a talking-machine, a record-support, a hollow sound-conducting arm movable in a given plane parallel with said support, and a sound-box mounted upon, communicating with, and movable independently of said arm toward and away from the record-support, said sound-box being movable upwardly and to the other side of its point of support, whereby it may be supported in an inoperative position by contact with said arm or a portion thereof.

37. In a talking-machine, a record-support, a hollow sound-conducting arm movable in a given plane parallel with said support, and a sound-box mounted upon, communicating with, and movable independently of said arm toward and away from the record-support, said sound-box having a removable stylus, and the movement of said sound-box independent of the arm being to an extent to permit the removal and insertion of said stylus.

38. In a talking-machine, a record-support, a sound-tube movable in a given plane parallel with said support, and a sound-box movable toward and away from said support independently of said tube and having a diaphragm extending and movable only in a plane parallel with the axis of said tube when the sound-box is moved away from or toward the record-support.

39. In a talking-machine, a record-support, a sound-tube movable when reproducing in a given plane parallel with the record-support, a sound-box mounted upon and communicating with said tube, said sound-box having a movement independent of the movement of the sound-tube and sound-box in reproducing to move the stylus toward and away from the record-support and means

forming part of said machine for holding, independent of other means, the sound-box in an inoperative position relative to the record.

5 40. In a talking-machine, a support, a longitudinally-extending tapering sound-conducting tube having its larger end mounted upon said support to swing in a given plane parallel to that of a record-tablet directly
10 over which the small end of said tube extends, a laterally-extending stub-tube movably connected with the small end of said tapering tube whereby it can move toward or away from the record-tablet independently
15 of said sound-tube, and a longitudinally-projecting tapering horn having its small end movably mounted upon said support whereby said horn can swing, the small end of said horn and the larger end of said tapering
20 sound-tube communicating through said support, and said tapering sound-tube, sup-

port and horn constituting a sound-conduit gradually increasing in cross-section from the small end of the sound-tube to the larger end of said horn.

25 41. A talking-machine, comprising a tapering sound-conveyer, means for attaching sound-reproducing means to the small end thereof, and a horn-coupling at the large end portion of said conveyer.

30 42. A talking-machine, comprising a tapering sound-conveyer, means for attaching sound-reproducing means to the small end thereof, and horn-coupling and supporting means with which the other end of said conveyer is movably connected.

In witness whereof I have hereunto set my hand this 23d day of January, 1903.

ELDRIDGE R. JOHNSON.

Witnesses:

EDW W. VAILL, Jr.,
JOHN F. GRADY.