J. C. ENGLISH.

SOUND BOX FOR TALKING MACHINES.

APPLICATION FILED OCT. 27, 1908.

1,001,004.

Patented Aug. 22, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

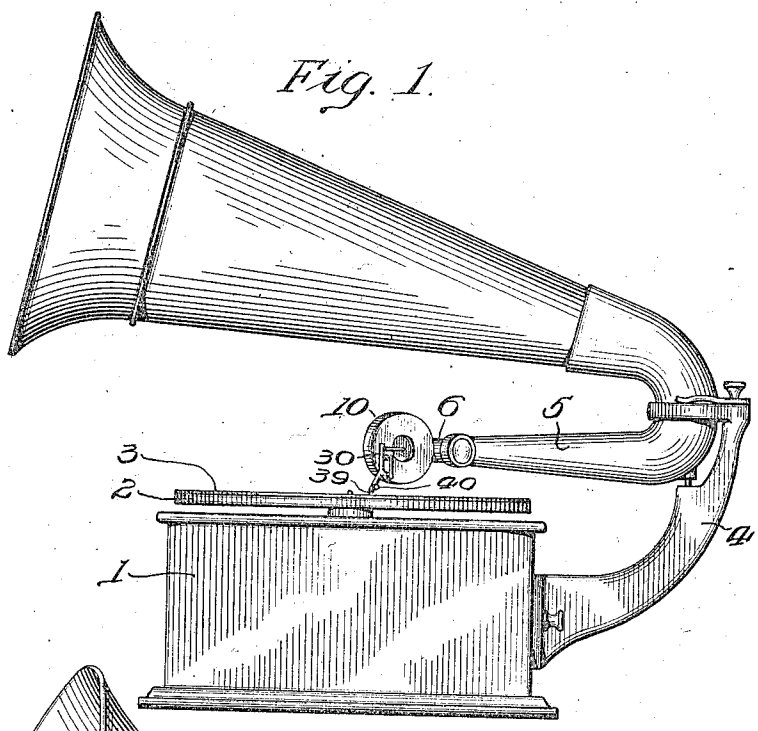
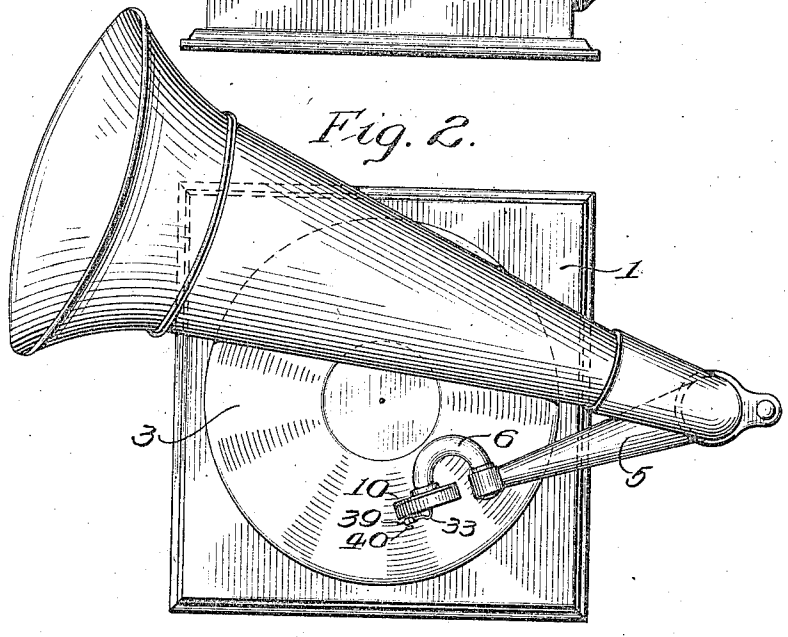


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 4.

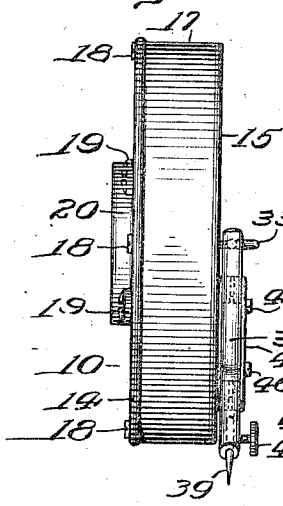


Fig. 3.

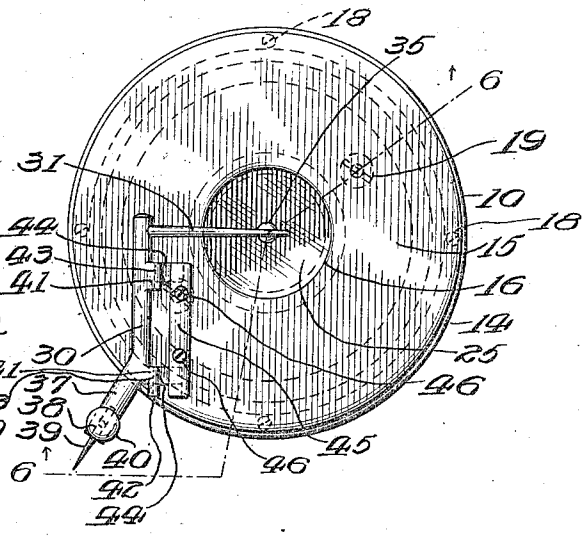


Fig. 5.

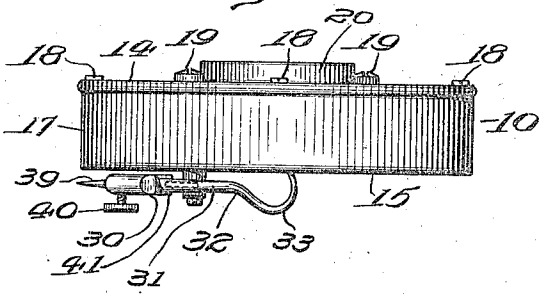
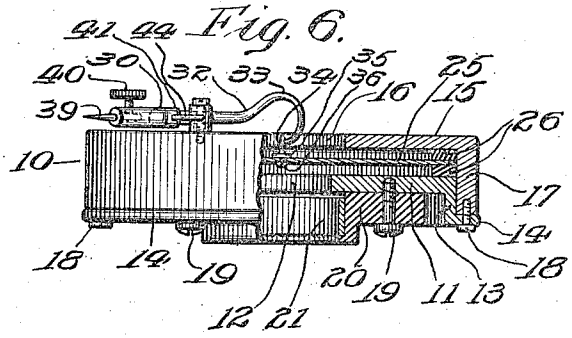


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 7.

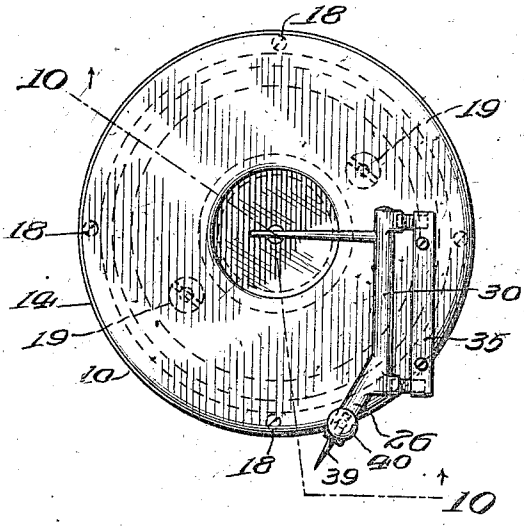


Fig. 8.

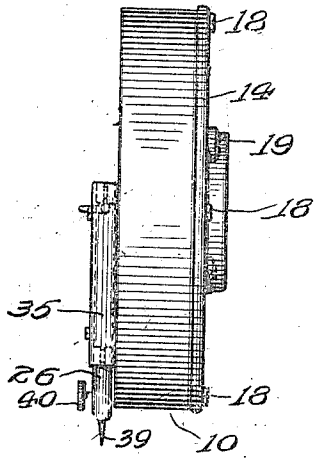


Fig. 9.

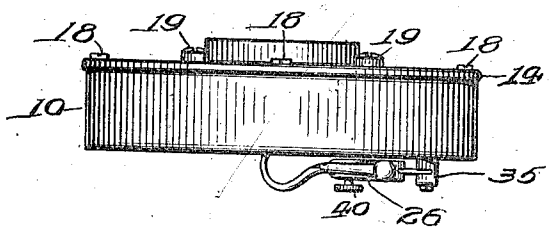
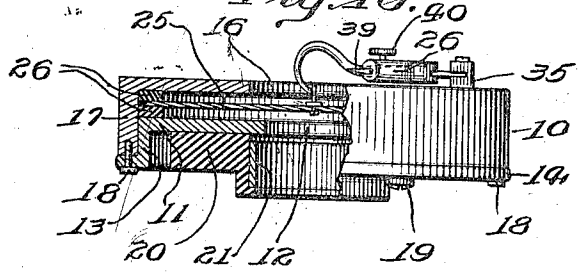


Fig. 10.



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UNITED STATES PATENT OFFICE.

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SOUND-BOX FOR TALKING-MACHINES.

1,001,004. Specification of Letters Patent. Patented Aug. 22, 1911.

Application filed October 27, 1908. Serial No. 459,713.

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, and State of New Jersey, have invented certain new and useful Improvements in Sound-Boxes for Talking-Machines, of which the following is a full, clear, and exact disclosure, reference being had to the accompanying drawings, forming a part of this specification.

The main objects of this invention are to provide an improved sound box having a stylus bar mounted to oscillate upon an axis perpendicular to the face of the record when the bar is in operative position; to provide an improved sound box in which the diaphragm may be removed from the box without disconnecting the stylus bar from its mounting; to provide an improved stylus bar and mounting therefor; and to provide other improvements as will appear hereinafter.

In the drawings, Figure 1 is a side elevation of a talking machine constructed in accordance with this invention; Fig. 2 a top plan view of the same with the amplifier shifted; Fig. 3 a front elevation of a sound box constructed in accordance with this invention; Fig. 4 a side elevation of the same; Fig. 5 a top plan view; and Fig. 6 a bottom plan view of the same partially in section on the line 6—6 of Fig. 3; Fig. 7 a modified form of the sound box of this invention; Figs. 8, 9 and 10 are respectively a side elevation, a top plan view, and a bottom plan view partly in section, on line 10—10 of Fig. 7, of the same.

Referring to the drawings, the preferred embodiment of this invention comprises the usual cabinet or casing 1, carrying a substantially horizontal record support 2, rotated by the usual mechanism within the casing to turn the record 3, which is of the disk type, having laterally undulating sound grooves of uniform depth. The bracket 4, rigid with the casing, the radial hollow tapering sound box arm 5, supported at one end by the bracket 4, to swing in a plane parallel to the face of the record, and the tubular goose neck 6, pivoted upon an axis parallel to the face of the record to the free end of the radial arm and communicating therewith, are of well-known construction.

The preferred form of sound box 10, used in this invention, and shown in Figs. 1 to 6, comprises a casing of well-known construction, including a circular back plate 11 having the usual central circular aperture 12, and having a rearwardly extending cylindrical peripheral flange 13, the rear edge of which is provided with an outwardly extending flange 14. The cover 15 of the casing has a central aperture 16, slightly greater in diameter than the central aperture 12 of the back plate, and is provided with a rearwardly extending peripheral flange 17, the rear portion of which telescopes over the back plate 11, and fits snugly in the recess formed between the flanges 13 and 14 of the back plate, being secured in position by means of screws 18, which pass through the outwardly extending flange 14 of the back plate and into the rear edge of the flange 17 of the cover. Secured to the rear face of the back of the box by means of the screws 19 is the usual yielding tubular extension 20, of rubber or other similar material, having a non-yielding lining 21, of brass or other similar metal, whereby the sound box is telescopically connected over the outer end of the tubular support 6. In the sound box the usual diaphragm 25 is mounted between annular gaskets 26, which are held in position between the back and cover of the casing, the diaphragm being in a plane substantially perpendicular to the face of the record, and being substantially midway between the front and inner surfaces of the casing, thus forming chambers of substantially similar form and equal capacity on each side of the diaphragm.

The stylus bar, as shown in its operative position in Figs. 1 and 2 of the drawing, and as shown in detail in Figs. 3 to 6, comprises a substantially vertical rigid intermediate portion 30, which extends over the lower portion of the front of the cover of the box, being spaced slightly therefrom. Integral with the upper end of this vertical portion is a slightly yielding resilient arm 31, which tapers inwardly, and which extends in a horizontal plane to a point 32 spaced between the vertical portion of the

bar and the center of the diaphragm, then curves away from the face of the box 33 to a point substantially opposite the center of the box, then curves toward the face of the box, forming a loop projecting laterally beyond the center of the box, and terminates adjacent the center of the diaphragm in a short stud 34 integral with the bar extending axially of the box, and having an enlarged inner end 35, which is secured against the outer surface of the diaphragm by means of a screw 36 through the diaphragm, or in any other suitable manner. It has been found that the comparatively slender tapering and curved construction of the arm 31, connecting the upper end of the stylus bar to the diaphragm gives better results in the reproduction of sound than would be obtained were the arm more nearly straight and rigid. The lower end 37 of the vertical portion of the stylus bar is turned downwardly and laterally outward in an oblique direction, and is provided with the usual socket 38 for the reception of the stylus 39, which is held in position by the thumb screw 40. For mounting the stylus bar, to oscillate upon a vertical axis perpendicular to the face of the record or record support, the vertical central portion of the bar 30 is provided with a pair of inwardly extending spaced lugs 41, which are positioned at the lower end and adjacent the upper end of the vertical portion of the bar respectively, the lower lug having a downwardly projecting portion 42. These lugs are provided upon their inner surfaces with slots 43, in vertical alinement and in a plane normally substantially parallel to the face of the box, in each of which is secured one end of a yielding connection 44, which preferably consists of a flat piece of tempered steel, but which may be made of any other yielding material, such as copper, or fabric of any sort. The ends of these yielding connections are brazed or fastened in place by any suitable means. For connecting the stylus bar to the cover of the sound box, a vertical cleat or rib 45 is secured to the face of the cover by means of screws 46. This rib is of a length equal to the distance from the lower end of the lower lug 41 of the stylus bar to the upper edge of the upper yielding connection of the bar, and the cleat is provided with longitudinal slots corresponding to and in alinement with the slots of the bar respectively, to receive the inner ends of the spaced yielding connections which are rigidly secured in place. This cleat is substantially parallel to the vertical central portion 30 of the bar, and the adjacent edges of the cleat and ends of the lugs 41 upon the bar are in close proximity.

The modified form of sound box constructed in accordance with this invention, shown in Figs. 7 to 10, is similar in construction to that already described, but the stylus bar and its mounting are located upon the right-hand side of the front of the box instead of upon the left-hand side, as in the form first described. In this modified form, the stylus bar is between the center of the diaphragm and the vertical cleat 35, upon which the bar is mounted, and the lower end 26 of the bar extends obliquely downward and toward the central vertical plane of the sound box, thus bringing the free end of the stylus approximately beneath the center of gravity of the box, whereas in the first form described, the free end of the stylus diverges away from the central vertical plane of the box, and is at a greater distance from the plane.

This improved sound box in either form shown is adapted to be used either with a disk or cylindrical record having a laterally undulating sound groove or ridge of uniform depth or height, and in either case the box is mounted so that the axis of oscillation of the stylus is, at all times when the sound box is in its operative position, substantially perpendicular to the plane tangent to the face of the record at the point of contact of the stylus. The stylus bar is thus held at all times when in operation rigidly against being caused to oscillate on its axis by any pressure on the stylus perpendicular to the plane of the record at its point of contact, such, for instance, as would be caused by the weight of the sound box, but is permitted to respond readily to any lateral pressure.

By this construction of a talking machine, the false and unpleasant vibrations heretofore audible in the reproduction of sound are largely eliminated, and the reproduction is rendered with a very close approach to perfection.

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

1. In a sound box, a casing having a back plate and a removable cover, and a stylus bar mounted on spaced flexible supports extending longitudinally of said bar, and carried by said cover.

2. In a sound box, a casing having a back plate and a removable cover, a diaphragm between said plate and cover, an elongated cleat on said cover and a stylus bar mounted by means of spaced flexible supports on said cleat, said supports being disposed in alinement on said cover.

3. In a sound box, the combination with a casing having a removable cover, an elongated cleat secured to said cover, of a stylus bar mounted by means of spaced flexible supports on said cleat, said supports being disposed in a plane with the axis of said stylus bar.

4. In a sound box, the combination with a

stylus bar, of flexible supports therefor spaced in longitudinal alinement at one side thereof.

5. In a sound box, the combination with a stylus bar, of flexible supports therefor spaced longitudinally thereof.

6. In a sound box, a stylus bar having an intermediate rigid longitudinal portion, and pliant supports for said bar spaced longitudinally of said portion.

7. In a sound box, a diaphragm, a stylus bar having an intermediate rigid longitudinal portion, and pliant supports for said bar spaced longitudinally of said portion, preventing oscillation of said bar in a plane parallel with said diaphragm, but permitting free vibration in a direction transverse thereto.

8. In a sound box, the combination with a diaphragm, of a stylus bar having an intermediate rigid longitudinal portion, a yielding connection between one end of said portion and said diaphragm, means for supporting a stylus at the other end of said portion, and spaced pliant supports for said bar so arranged as to prevent pressure on said diaphragm due to the weight of said box.

9. In a sound box, the combination with a diaphragm, of a stylus bar having an intermediate rigid longitudinal portion, a yielding connection between one end of said portion and said diaphragm, means for supporting a stylus at the other end of said portion, and flexible supports for said bar spaced longitudinally of said intermediate portion.

10. In a sound box, the combination with a diaphragm, of a stylus bar having an intermediate rigid longitudinal portion, a yielding connection between one end of said portion and said diaphragm, means for supporting a stylus at the other end of said portion, and spring supports for said bar spaced longitudinally of said intermediate portion.

11. In a sound box, the combination comprising a casing, a diaphragm, a single elongated cleat secured to said casing, a stylus bar having an intermediate rigid longitudinal portion, a tapering curved resilient connection between one end of said portion and said diaphragm, means at the other end of said portion for carrying a stylus, and alined pliant means resiliently securing said bar to said cleat, said pliant means extending from one side of said cleat to one side of said bar and maintaining said bar substantially parallel with said diaphragm.

12. In sound producing mechanism, the combination with a casing, of means within said casing arranged to produce sound, a stylus bar, pliant supports for said bar connected by means of a cleat parallel therewith and on one side thereof to said casing and extending in a plane with the axis of said bar, and an arm connecting said stylus bar and said sound producing means.

13. In sound reproducing mechanism, the combination with a casing, of means within said casing arranged to reproduce sound, a stylus bar, spaced pliant supports on one side of said stylus bar detachably connected with said casing and adjustable in a plane parallel with said sound reproducing means, and an arm detachably connecting said bar and said sound reproducing means.

14. In sound reproducing mechanism, the combination with a sound box arranged to be supported in coöperative relation with a sound record disk, of a diaphragm operatively mounted in said sound box, a stylus bar provided with flexible supporting means in vibratory relation with said box and arranged to be supported thereby to vibrate on an axis perpendicular to said sound record disk, and a stylus needle extending in oblique relation with respect to the axis of said stylus bar and arranged to operatively engage said sound record disk and vibrate said diaphragm.

15. In sound reproducing mechanism, the combination with a casing, of a diaphragm operatively mounted in said casing, a stylus bar having spaced flexible supports projecting from one side thereof, detachably engaged in rigid relation with said casing and having its axis of vibration perpendicularly disposed, a tapering resilient arm extending from said stylus bar to said diaphragm, and means arranged to detachably secure said arm to said diaphragm.

16. In sound reproducing mechanism the combination with a sound box arranged to be supported in coöperative relation with actuating means, of means within said box arranged to produce sound, a stylus bar flexibly supported from one side thereof with respect to said box and having its axis of vibration substantially parallel with a perpendicular to said actuating means, a detachably secured connection between said bar and the sound producing mechanism in said box, and a stylus needle carried by said bar arranged to coöperate with said actuating means.

17. In a sound box, the combination with a diaphragm, of a stylus bar, plane flexible supports for said bar secured to a cleat or standard on one side of said bar, spaced apart and extending in the same plane substantially parallel with said diaphragm, preventing pressure on said diaphragm other than the normal vibrations.

18. In a sound box, the combination with a diaphragm, of a stylus bar having a rigid portion provided with an obliquely projecting extension, a stylus needle carried by said extension, plane flexible supports for said

bar secured to a cleat spaced apart and disposed in vertical alinement substantially parallel with said diaphragm and preventing the movement of said stylus bar relative to said diaphragm other than its normal vibratory movement.

In witness whereof, I have hereunto set my hand this 26th day of October, A. D., 1908.

JOHN C. ENGLISH.

Witnesses:
ALSTON B. MOULTON,
ALEXANDER PARK.