Dec. 26. 1922. 1,440,294.

R. HEAD.

SOUND BOX FOR PHONOGRAPHS.

ORIGINAL FILED JAN. 28, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

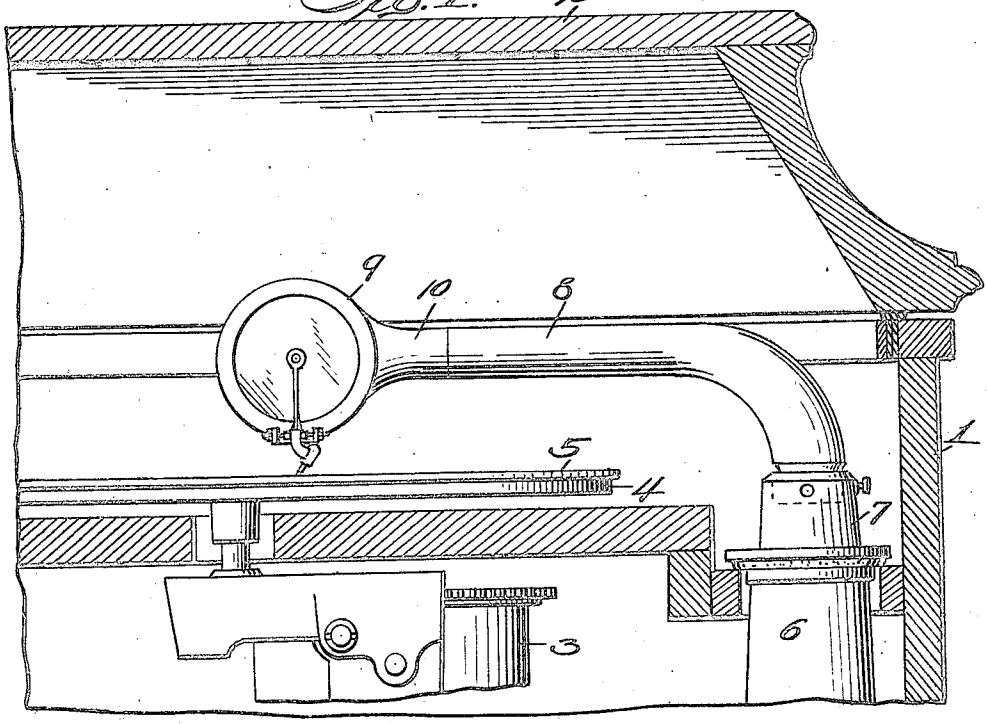
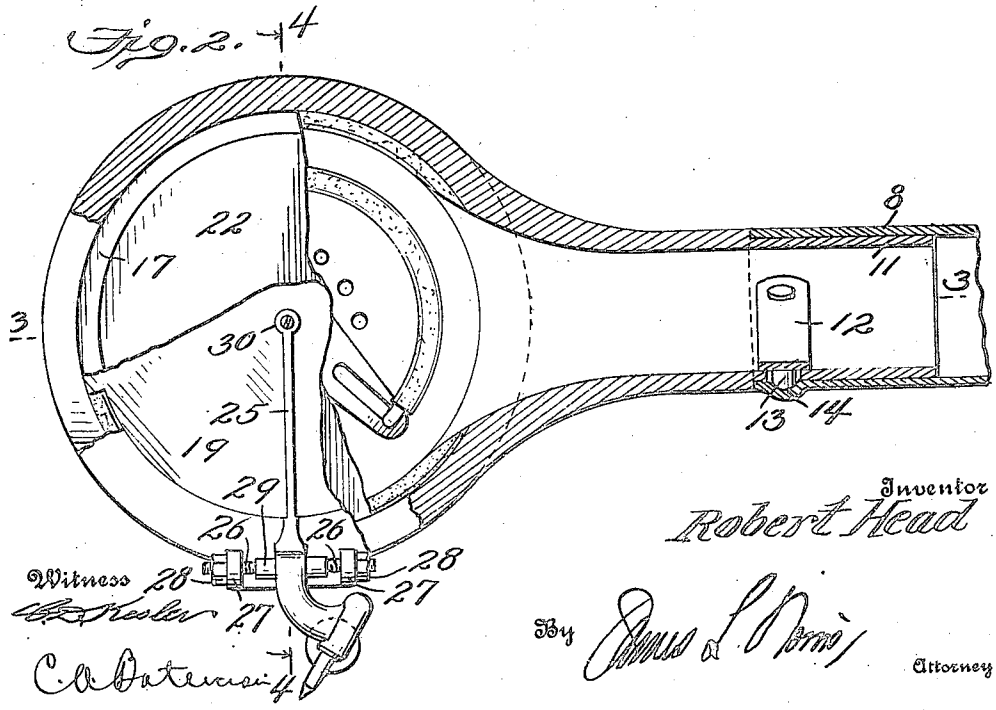


Fig. 2.



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SOUND BOX FOR PHONOGRAPHS.

ORIGINAL FILED JAN. 28, 1916. 2 SHEETS—SHEET 2.

Fig. 3.

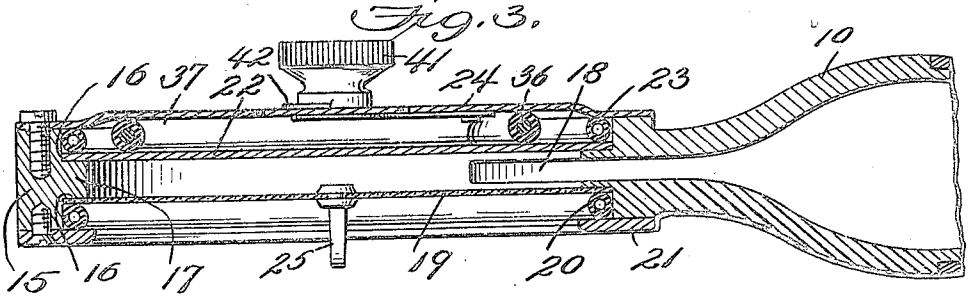


Fig. 4.

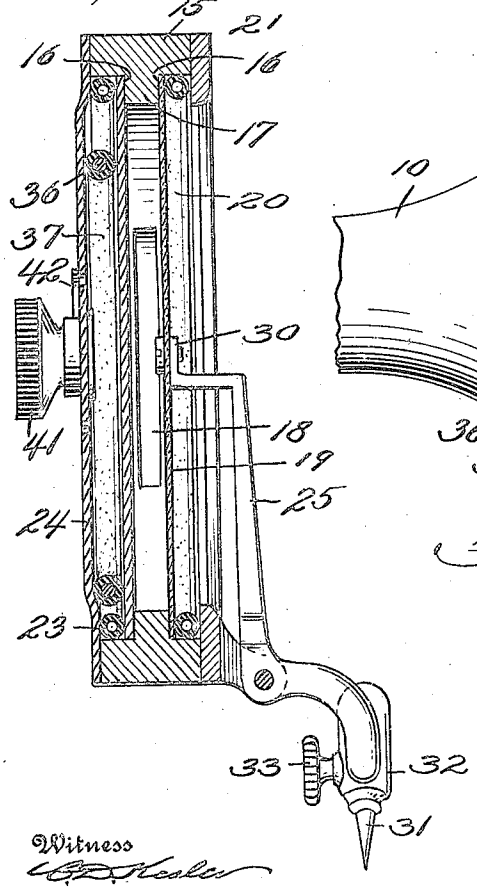


Fig. 5.

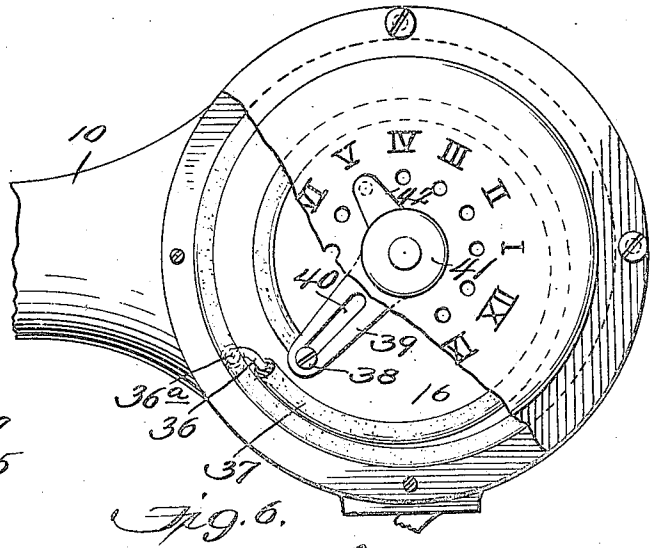
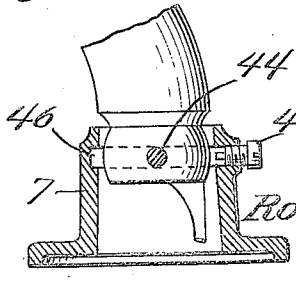


Fig. 6.



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Patented Dec. 26, 1922. 1,440,294

UNITED STATES PATENT OFFICE.

ROBERT HEAD, OF YONKERS, NEW YORK, ASSIGNOR TO THE AEOLIAN COMPANY, A CORPORATION OF CONNECTICUT.

SOUND BOX FOR PHONOGRAPHS.

Original application filed January 28, 1916, Serial No. 74,731. Divided and this application filed January 8, 1920. Serial No. 350,167.

To all whom it may concern:

Be it known that I, ROBERT HEAD, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented new and useful Improvements in Sound Boxes for Phonographs, of which the following is a specification.

My present invention relates to improvements in phonographs and more especially to sound boxes therefor, the present application being a division of my prior application filed January 28, 1916, Serial No. 74,781.

The primary object of the invention is to provide an improved sound box and a novel mode of connecting it to the tone arm whereby a greater volume of sound and an improved quality of tone are obtained and also to provide novel and improved means whereby the volume of sound and the quality of the tone may be easily adjusted or modulated to suit the requirements of different records or the wishes of the one playing the instrument.

To these and other ends, the invention consists in certain improvements and combinations and arrangements of parts, all as will be hereinafter more fully described, the features of novelty being pointed out particularly in the claims at the end of the specification.

In the accompanying drawings:—

Figure 1 is a vertical section taken through the upper portion of a phonograph cabinet showing one embodiment of the improved sound box of the present invention applied thereto,

Figure 2 represents an enlarged detail of the sound box shown in Figure 1, the same being partly in vertical section and partly in elevation, the diaphragm being partly broken away to show the sounding board and the sounding board being also broken away to show the sound regulating device and the rear wall of the sound box,

Figure 3 represents an enlarged horizontal section through the sound box shown in Figure 1,

Figure 4 represents a vertical section through the sound box taken on the line 4—4 of Figure 2 and looking in the direction of the arrows,

Figure 5 is an enlarged rear elevation of the sound box shown in Figure 1, the back of the sound box being broken away to show the structure contained therein, and

Figure 6 is an enlarged detail view partly in vertical section and partly in elevation, showing the mounting of the tone arm.

Similar parts are designated by the same reference characters in the several views.

The sound boxes constructed in accordance with the present invention are applicable generally to phonographs or talking machines of the various types and to records having either lateral or hill-and-dale sound grooves, although the invention is particularly applicable to phonographs of the type which play flat or disk records. The preferred embodiment of the invention is herein shown and described, but it is to be understood that the invention is not restricted to the precise construction shown, as equivalent constructions are contemplated and will be included within the scope of the claims.

In the present instance, 1 represents the cabinet of the phonograph, 2 the lid thereof, 3 the motor, 4 the turn table which is revolved by the motor, 5 a disk record which rests on the turn table and is revolved thereby, 6 the neck of the horn, 7 a sleeve supported on or connected with the neck of the horn, 8 the tone arm, and 9 the sound box. The vertical limb of the tone arm which is elbow shape is connected with the sleeve 7 by suitable means which enables the tone arm to swing horizontally across the face of the record and also to have a limited up-and-down motion.

The sound box is formed with a neck 10 which extends out from the edge of the box. This neck preferably and as shown is in alinement with the horizontal diameter which intersects the geometric center of the sound box or substantially so, and the axis of the neck is preferably coincident with the median plane of the sound box, as will be observed from a comparison of Figures 1 and 2 with Figure 3, and this neck, which is tubular serves to deliver sound from the interior of the sound box to the tone arm. The neck becomes a round tube where it connects with the round mouth of the tone arm and it preferably has a swiveled telescopic fit upon the mouth of the tone arm which will permit the sound box to be twisted or rotated about

the longitudinal axis of the neck and tone arm to bring it into playing position relatively to the record and to move it out of playing position and to facilitate changing of the needle or stylus. Preferably and as shown, the neck has a reduced portion 11 which fits rotatably within the mouth of the tone arm and means is provided to prevent accidental detachment of the sound box from the tone arm, such means preferably comprising a curved strip of spring metal 12 which is arranged circumferentially within the neck and is fixed to the neck at one end, and carries at its opposite end a pin 13, the pin projecting through the slot or opening in the neck and bearing yieldingly against the inside of the tone arm. The latter is provided with two recesses or sockets 14 into which the pin 13 is adapted to seat itself to prevent unintentional rotation of the sound box relatively to the tone arm. One of these sockets, namely, that shown in Figure 2, receives the pin and locks the sound box in its vertical or playing position while another socket, not shown, may be provided to similarly lock the sound box in its out of play position with the stylus socket extending upwardly, the sound box being moved into its out of play position by twisting or rotating it about the neck 10 as the axis through an angle of 180° or thereabouts.

The sound box comprises a body 15 which may be formed from a casting which is provided with opposed circular recesses 16 in its opposite faces, the recesses being separated by an internal annular rib 17. This rib at one side is slotted, as at 18, and this slot connects the interior of the sound box with the sound conducting neck 10. The diaphragm 19 which may be of mica, or any other suitable material, is contained in one of the recesses 16 and its periphery is held seated against one side of the annular rib 17 preferably by a rubber gasket 20 and a retaining ring 21, which is secured by screws, or other suitable means, to the front face of the box. A sounding board 22 of wood, or other suitable material for the purpose, is fitted into the other recess 16 and its periphery is held in seated relation to the rear side of the annular rib 17, preferably by a gasket 23 and a back plate 24, the latter being secured to the rear face of the sound box by screws or equivalent means. Other gaskets may be provided if desired between the annular rib 17 and the diaphragm and sounding board respectively, so as to prevent direct contact between these parts and the body of the sound box. The particular construction and arrangement of the stylus bar shown is not claimed herein, it forming the subject-matter of my prior copending application, Serial No. 74,781. It may be briefly described, however, as comprising a bar 25 in the form of an elbow lever fulcrumed to the body of the sound box so as to occupy a substantially vertical playing position relatively to the plane of the record, as will appear from Figures 1 and 2. The suspension by which the stylus bar is fulcrumed to the sound box may comprise pivot screws 26 (see Figure 2) which are mounted in lugs 27 on the sound box, the screws being locked in adjusted position by the nuts 28, the points of the screws bearing in suitable sockets in the ends of the trunnion piece 29 which forms a part of the stylus bar. The upper end of the stylus bar comprises a suitable foot 30 (see Figure 4) which may be secured in the usual manner to the center of the diaphragm, the needle or stylus 31 is supported at a proper inclination to the record in a rearwardly inclined stylus socket 32 which has a set screw 33, the socket being connected by a rearwardly curved arm to a horizontal limb of the stylus bar, as will be understood from a comparison of Figures 2 and 4. It may be stated that a stylus bar of the construction just described is preferably used, as it is capable of playing records having either the hill-and-dale or the lateral sound grooves without requiring any change in the position of the sound box.

The sound box of the present invention produces a greater volume of sound and also an improved quality of tone. These advantages are obtained not only by virtue of the sounding board 22 but also because the sounding board is located closely adjacent and opposite to the entire surface of the diaphragm. In this respect the sound box of the present invention differs substantially from sound boxes, as heretofore constructed, in which the sound tube or neck connects with the box at the middle portion of the diaphragm and hence the advantage of compression or concentration of the sound waves at this place, which is the most important part of the diaphragm, because there its oscillation is greatest was lost. According to the present invention, however, the disadvantage just described as existing in sound boxes as heretofore constructed, is avoided, the sound being conducted from the interior compression chamber of the box through the slot 18 which is formed in the edge of periphery of the box so that the sounding board is opposite to the central, as well as the peripheral, portions of the diaphragm. The sounding board also mellows and enriches the tones. It is preferable to construct the sounding board of such vibratable quality that it will be relatively rigid or non-absorptive to the range of desirable tones but shall be vibrated by the blast tones so that these tones will be absorbed in part and mellowed and transformed for the remainder, thus resulting in an increase in volume of the desirable tones.

Another feature of the present invention

consists in providing means for varying or adjusting the extent of the active area of one of the vibratory elements of the sound box, the adjusting means being shown applied in the present instance to the sounding board. Preferably and as shown, such means comprises a piece of spring wire 36 which may be covered with rubber fabric, felt or the like 37. This covered wire is located in the rear circular recess of the sound box, one of its ends 36ª being secured to the sound box at the periphery of the recess, and the other end of the wire being provided with a head 38 which is connected to a rotatably adjustable arm 39 so that the head may slide along the slot 40 in said arm. The arm 39 is rigidly connected to a pin which projects through a hole in the back plate 24 of the box from a knurled head 41 at the rear of the sound box. This head preferably carries a pointer 42 which is movable over an index which comprises a circular series of holes marked I to XII formed in the back plate of the sound box, said pointer having a projection 43 which is adapted to one or another of these holes to retain the wire member 36—37 in a given position of adjustment and at the same time to indicate that adjustment.

When the pointer 42 is at I on the index, the coiled wire member 36—37 will, due to its springy nature, be fully expanded against the periphery of the circular recess. This adjustment renders the maximum area of the sounding board active, but by adjusting the pointer 42 toward the hole designated XII, this active sounding board area is gradually diminished by the inward movement of the wire member 36—37 toward the center of the sounding board, due to the contraction or winding up of the wire member on itself, the contact of the wire member with the sounding board dampening the latter, except substantially for the middle portion thereof, which portion is enclosed by the wire member. In order to insure contact with sufficient pressure between the wire 36—37 and the sounding board, the wire member is preferably made to fit tightly in the space between the sounding board and the back plate 24 of the sound box so that this back plate will keep the wire at every point forced tightly or firmly against the sound board. The character of the record will determine the particular adjustment which should be given the sounding board.

The connection between the vertical limb of the tone arm and the sleeve 7 consists preferably of a pair of trunnion pins 44 which project from the tone arm and engage freely in an internal annular groove 46 formed in the sleeve 7. A screw 47 limits the lateral swing of the tone arm by contacting with one of these trunnion pins. A downwardly extending lug 45 on the vertical limb of the tone arm contacts with the inside of the sleeve when the sound box is not supported by the record, the sound box and tone arm being then supported to prevent dropping thereof.

I claim as my invention:—

1. A sound box for phonographs having an open front and a wall closing its rear, a diaphragm in the front of the sound box, a sounding board located between and spaced a short distance from the diaphragm and also the rear wall of the sound box, and means for delivering sound from the space between the diaphragm and the sounding board.

2. A sound box for phonographs having a wall closing its rear side, a diaphragm in the front of the sound box and having a stylus cooperative therewith, a sounding board co-extensive in area with and spaced a short distance from the diaphragm, said sounding board being located opposite to and spaced from said rear wall, and means for delivering sound from an edge of the space between the diaphragm and the sounding board.

3. In a sound box containing a vibratory diaphragm and a vibratory sounding board arranged opposite thereto, means for damping varying areas of one of said vibratory parts.

4. A sound box containing a vibratory diaphragm and a vibratory sounding board located opposite thereto, the space between said vibratory parts having a sound outlet at its peripheral edge, and means for damping progressively varying areas of one of said vibratory parts.

5. In combination with the diaphragm of a sound box, a sounding board spaced a short distance therefrom, means for delivering the tones from the space between said diaphragm and sounding board, and means for varying the size of the active area of the sounding board.

6. In combination with the diaphragm of a sound box, a sounding board spaced a short distance therefrom, means for delivering the tones from an edge of the space at one side of the sounding board, and means cooperative with the opposite side of the sounding board for varying the condition of the latter.

7. In combination with a sound box having a vibratory part and means for varying the active area of said vibratory part comprising a covered spring-wire adapted to be wound up and unwound in surface-contact with said part to enclose varying extents of its area.

8. In combination with a sound box having a vibratory part and means for varying the vibratory effects of said vibratory part comprising an elongated member adapted

to be wound up and unwound in surface contact with such part to enclose varying extents of its area.

9. In combination with a sound box having a vibratory part and means for varying the active area of said vibratory part comprising an elongated member adapted to be wound up and unwound in surface contact with such part to enclose varying extents of its area, the outer end of said member being fixed and its inner end being connected to a rotatably adjustable arm adjacent the middle portion of the said vibratory part.

10. In combination with a sound box, a vibratory part and means for varying it comprising an elongated member adapted to be wound up and unwound in surface contact with the part to enclose varying extents of its area, the outer end of said member being fixed and its inner end being connected to a rotatably adjustable arm adjacent the middle portion of the part to slide along said arm towards the axis on which it rotates when the elongated member is wound-up, and away from said axis when said member is unwound.

11. A sound box for phonographs comprising a diaphragm and cooperating stylus, a vibratory sounding board associated with the diaphragm, and means for damping progressively varying areas of the sounding board.

In testimony whereof I have hereunto set my hand.

ROBERT HEAD.