

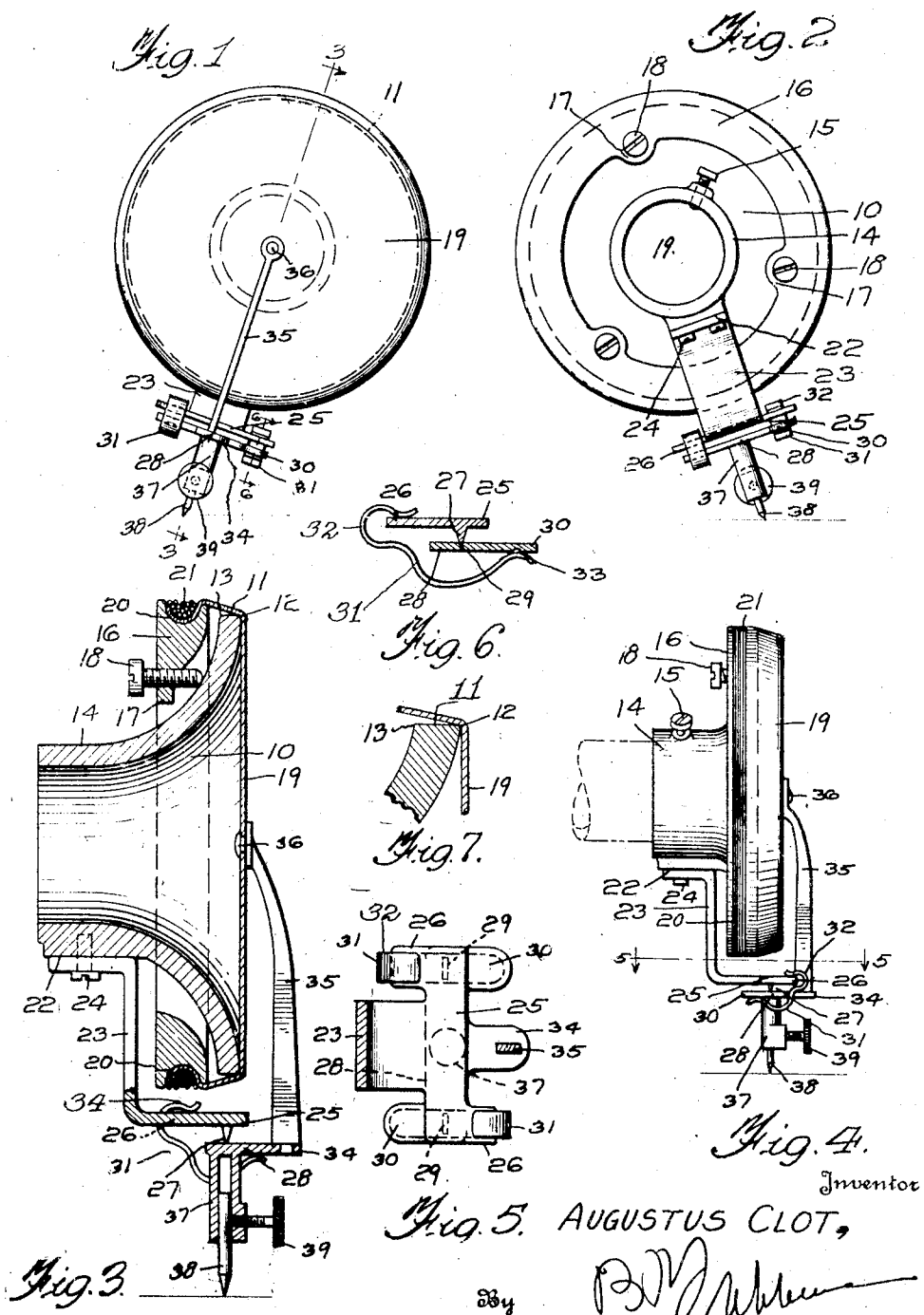
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SOUND BOX FOR SOUND REPRODUCING MACHINES

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UNITED STATES PATENT OFFICE.

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SOUND BOX FOR SOUND-REPRODUCING MACHINES.

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My invention relates to improvements in sound boxes for sound reproducing machines.

An important object of the invention is to provide a sound box of the above mentioned character, so constructed that the sounds are reproduced with the maximum accuracy, and music, vocal or instrumental, is cantabile, with the full and proper reproduction of the low notes or basses.

A further object of the invention is to provide a sound box so constructed that the flexible diaphragm is held under suitable tension, with its maximum area free for vibration, whereby the device will produce the sound in its maximum fullness, for the size or diameter of the diaphragm.

A further object of the invention is to provide a device of the above mentioned character which is of simple construction with its parts arranged in a highly compact manner.

A further object of the invention is to provide simple and reliable means to adjust the diaphragm for maintaining the same under the proper degree of tension.

A further object of the invention is to provide a sound box which will improve in tone, with age.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of a sound box embodying my invention,

Figure 2 is an elevation of the opposite side of the same,

Figure 3 is a transverse section, taken on line 3—3 of Figure 1, upon an enlarged scale,

Figure 4 is an edge elevation of the sound box,

Figure 5 is a horizontal section, taken on line 5—5 of Figure 4,

Figure 6 is a detailed section, taken on line 6—6 of Figure 1, and,

Figure 7 is a fragmentary radial section, upon an enlarged scale, through the shell or casing and diaphragm.

In the drawings, wherein for the purpose of illustration, is shown a preferred embodiment of my invention, the numeral 10 designates a shell or casing, circular in cross section, and tapered in one direction. At its outer end, this casing has a cylindrical periphery 11, with its forward and rear edges 12 and 13 slightly rounded. The shell 10, at its reduced end, leads into a cylindrical neck or reduced extension 14, adapted to be inserted upon the tone arm of the horn of a sound reproducing machine, of any well known or preferred construction. The neck 14 is clamped to this tone arm by means of a set screw 15, or the like.

Surrounding the tapered shell 10 is a tension ring 16, of slightly larger diameter, and this tension ring is provided with inwardly projecting radial apertured ears 17, having screw-threaded engagement with tension screws 18, which engage the rear concave face of the shell 10. These screws are equidistantly spaced and I preferably employ three or more of them.

The numeral 19 designates a flexible diaphragm, formed of fibrous material, and I preferably employ a membrane, such as sheepskin, while I may employ parchment or other suitable fibrous material. The flexible diaphragm 19 has its material passed over the periphery 11 of the shell 10 and engages with the slightly rounded edge 12, while the vibrating portion of the diaphragm is spaced from the shell 10 at all points inwardly of the shoulder 12, whereby the maximum vibrating surface is obtainable for a diaphragm of given diameter. This is an important feature of the invention as it contributes to the fullness and accuracy of the sound reproduction. The material of the diaphragm, at its edge, is now carried into an annular groove or recess 20, formed in the periphery of the tension ring 16, and is tied or securely bound within this groove by cord 21 or the like. The diaphragm may be also glued or cemented to the wall of the groove 20, in addition to the tying action, if desired. It is preferred that the material of the diaphragm be securely anchored within the groove 20, so that there will be no possibility of such material slipping within the groove.

The neck 14 is preferably provided with a flattened portion 22, having the inner or upper end of an L-shaped bracket 23 secured thereto by screws 24 or the like. At its lower end, the bracket 23 is provided with a transverse bridge 25, preferably formed integral

therewith. This transverse bridge has lateral extensions 26, at the ends thereof, projecting in opposite directions. The bridge 25 is provided near its ends with depending knife edge pivots 27, rigidly attached thereto.

Arranged beneath the bridge 25 is a transverse vibratory bar 28, provided on its upper surface, near the ends thereof, with grooves 29, which are V-shaped in cross section and receive the knife edge pivots 27, the arrangement being such that the vibratory bar 28 is freely pivoted to swing upon its longitudinal axis. The vibratory bar is provided near its opposite ends with lateral extensions 30, projecting in opposite directions. These extensions are arranged adjacent to the extensions 26, but project in opposite directions. The numeral 31 designates resilient clips. Each clip has a U-shaped end 32, engaging over the lateral extension 26 of the transverse bridge 25. The opposite end portion of this clip is bowed and is arranged beneath the extension 30, and is provided with a raised lug 33, to enter a recess in the lower surface of the extension 30. These spring clips are oppositely faced, and have the same strength or tension and, therefore, their force upon the vibratory bar is balanced.

The vibratory bar is provided near its center with a laterally projecting arm 34, having rigid connection with a vibratory lever 35, extending radially of the diaphragm 19 and positively attached to the diaphragm, at the center of the diaphragm, by means of a rivet 36 or the like. This point of attachment is concentric with the edge 12 and hence the edge of the vibratory area of the diaphragm.

Rigidly secured to the vibratory bar 26, at its center, is a tube or socket 37, depending therefrom, adapted for the reception of a needle or stylus 38, held within the socket by a set screw 39 or the like.

In use, the needle is placed in contact with the record, and the vibrations transmitted to the needle are transmitted to the diaphragm 19, through the medium of the lever 35 and associated elements. The entire vibratory area of the diaphragm, within the edge 12, is free from contact with the shell 10, and hence the maximum vibratory area is obtainable. It is highly desirable that the diaphragm be maintained at the proper tension, and when the tension is to be adjusted, such as when it is desired to restore the proper degree of tension to the diaphragm, the screws 18 are turned in a direction to cause the ring 16 to move away from the shell 10. All of the screws should be turned for about the same extent, so that the pull upon the diaphragm will be equal in all directions, and there will be no tend-

ency for the diaphragm to become eccentric with respect to the connection 36.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:—

1. A sound box for sound reproducing machines comprising, a shell flaring toward one end and having a contact edge at its periphery, a flexible diaphragm arranged at the large end of the shell and engaging with said edge, said engagement defining the vibratory area of the diaphragm, which area is free from contact with said shell, a stylus, and connecting means between the stylus and diaphragm.

2. A sound box for sound reproducing machines comprising, a shell flaring toward one end and having a contact edge at its periphery, a flexible diaphragm arranged at the large end of said shell and engaging with said contact edge, said engagement defining the vibratory area of the diaphragm, which area is free from contact with said shell, adjustable means to regulate the tension of the diaphragm, a stylus, and connecting means between the stylus and diaphragm.

3. A sound box for sound reproducing machines comprising, a shell which is circular in cross section and increases in diameter in one direction, a flexible diaphragm arranged at one end of the shell and engaging the periphery of the same, a tension ring surrounding the reduced portion of the shell and connected with the diaphragm, and adjusting screws carried by the tension ring and engaging said shell, a stylus, and connecting means between the stylus and the diaphragm.

4. A sound box for sound reproducing machines comprising, a shell embodying a tube which flares outwardly, a flexible fibrous diaphragm arranged at the outer large end of the shell and passed over its periphery and extending to the rear of the same, a tension ring surrounding the reduced portion of the shell and disposed rearwardly of the large end and having a groove upon its periphery, means for binding the edge of the diaphragm within the groove of said ring, adjusting screws carried by the ring and engaging the rear side of the large end of the shell, a bracket carried by the shell, a stylus pivoted upon the bracket, and a lever connected with the stylus and with the diaphragm.

In testimony whereof I affix my signature.
AUGUSTUS CLOT.