

E. R. JOHNSON.
SOUND RECORDING AND REPRODUCING DEVICE.

(Application filed Jan. 20, 1900.)

(No Model.)

Fig. 1.

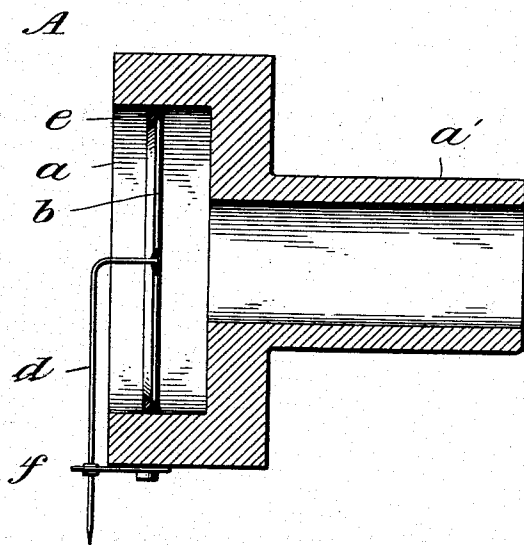


Fig. 2.

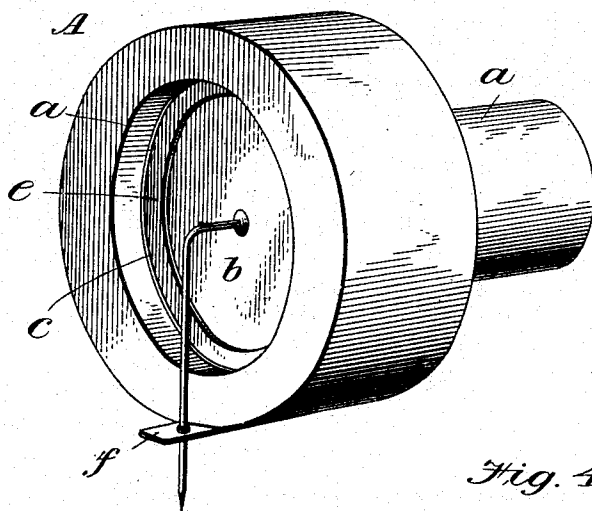


Fig. 3.

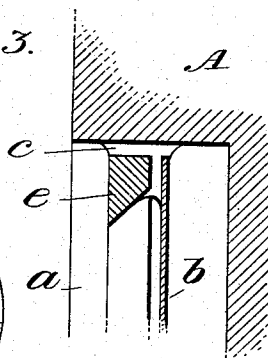
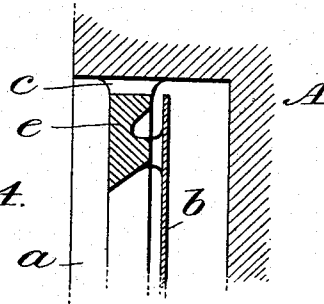


Fig. 4.



Witnesses.
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his Attorney.

UNITED STATES PATENT OFFICE.

ELDRIDGE R. JOHNSON, OF PHILADELPHIA, PENNSYLVANIA.

SOUND RECORDING AND REPRODUCING DEVICE.

SPECIFICATION forming part of Letters Patent No. 675,332, dated May 28, 1901.

Application filed January 20, 1900. Serial No. 2,178. (No model.)

To all whom it may concern:

Be it known that I, ELDRIDGE R. JOHNSON, a citizen of the United States, and a resident of the city of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Sound Recording and Reproducing Devices, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention has relation to sound recording and reproducing machines; and it consists in the improvements hereinafter particularly described and claimed.

My present invention relates to that class of sound-boxes in which a liquid damper or gasket is employed, as particularly set forth and described in my application for United States Letters Patent executed and filed of even date herewith.

One of the objects of my present invention is to provide a novel construction to allow the diaphragm to be adjusted back and forth in the recess of the sound-box, together with an adjustable ring or gasket which is connected with the diaphragm through the medium of a liquid film or damper and connected with the adjacent walls of the casing through the medium of a film of liquid.

Another object is to provide for the diaphragm an enlarged surface adjacent to the diaphragm for the liquid film or damper to adhere to, whereby an increased body of liquid may be maintained and supported by capillary attraction and at the same time the said enlarged surface be adjustable as the diaphragm is adjusted and moved through the medium of the intervening film.

In employing a liquid damper the friction such as usually exists, as where solid gaskets of rubber or other compressible materials are used, is reduced to a minimum, if not eliminated, and the elasticity of the liquid when properly applied allows the vibration of the diaphragm to any practical extent without breaking the seal or film of the liquid.

The accompanying drawings illustrate a sound-box for a sound recording and reproducing machine embodying my present invention.

Figure 1 is a sectional view through the center of the sound-box on the lines 1 1, Fig. 2.

Fig. 2 is a perspective view of the same. Fig. 3 is an enlarged detail view of Fig. 1. Fig. 4 is an enlarged detail view of a modification of the construction shown in Figs. 1 and 3.

A represents the sound-box casing, having the usual recessed portion *a*, which is connected with the sound receiving or transmitting tubular portion *a'*. The diaphragm *b* is located, as illustrated, in the recessed portion *a* and is of a diameter slightly less than the diameter of the said recess. Adjacent to the diaphragm *b*, though not in immediate contact therewith, is a ring or gasket *c*, preferably of metal, of a diameter about equal to the diameter of the diaphragm. A body or film *c* of any suitable liquid is applied at and about the peripheral portions of the diaphragm *b* and of the ring or gasket *c*. The gasket *c* presents an enlarged surface or face opposite the adjacent face of the diaphragm *b* for the liquid film or damper, which is applied to the face of the diaphragm to adhere to. Both the gasket *c* and the diaphragm *b* are out of contact with the inner walls of the recess and are free to move backward and forward in said recess as the diaphragm may from time to time require a backward or forward adjustment, which it frequently does on account of the stylus *d*, with which it is connected, requiring from time to time such adjustment in adapting it to or fitting it upon the record-tablet. The diaphragm also in this construction is free to vibrate as a whole approximately evenly throughout its entire area under the impulses of sound-vibrations. It is clear that the presence of the gasket *c*, as particularly shown in Fig. 3, affords an increased surface for the liquid damper, and consequently a larger quantity of liquid may be supported or suspended by adhesion or capillary attraction upon the diaphragm and gasket and the adjacent portion of the inner walls of the casing to which the film is attached. Therefore the film will not evaporate as quickly and will not require renewal as frequently as where a smaller quantity of liquid is employed. It is also clear that where a larger quantity of liquid may be employed the elasticity of the damper is somewhat increased and the to-and-fro adjustment of the diaphragm in the casing in a measure facilitated. The liquid may be applied to the

peripheral edges of the diaphragm and gasket and to one or both surfaces of each about its peripheries, as desired. No more liquid should be applied than such as may be readily supported upon the surfaces to which it is adapted. By holding the sound-box when the diaphragm is in position at a suitable angle the liquid may be readily applied from an oiler or other convenient device around the edges of the diaphragm in a manner so that it will at once properly adhere to the peripheral portions of the diaphragm and metal gasket and to the adjacent portions of the walls of the recess, or it may be applied at one point as the sound-box is held at a desirable angle and the diaphragm and metal gasket turned around in the casing-carrying the liquid with it about its peripheral portions, and thereby bringing it also in contact with the adjacent portions of the walls of the casing.

The liquid film or gasket being applied in the manner as above described will act as a damper to retard to a slight extent the vibrations of the diaphragm, while at the same time the yielding qualities of the liquid will permit said diaphragm to move freely under the action of the sound-waves. The edges or portions adjacent the edges of the diaphragm being immersed in the liquid and the diaphragm vibrating in said liquid will necessarily be dampened to a certain extent, and I have found this damping action to be highly beneficial in the production of records.

It is clear that the liquid damping material may be applied to one face of the diaphragm and to the adjacent face of the gasket *e*, and the gasket *e* in turn may be connected with the casing through the medium of the liquid film upon its peripheral portion—as, for instance, in the manner illustrated in Fig. 4. In this construction the liquid damper applied to the face of the diaphragm is not directly but only indirectly connected with the walls of the casing. The rings or gaskets *e* may be, if desired, applied in like manner on both sides of the diaphragm. It is clear that my present invention may also be embodied in other forms of construction.

A stylus-bar of any desired construction—such, for instance, as the stylus-bar *d* (illustrated in the drawings)—is connected with the diaphragm *b* and is supported in any desirable manner—as, for instance, by the support *f*, as illustrated in the drawings—the construction of the stylus and the manner of support and connection being immaterial.

Different kinds of liquids may be employed, such as water and various kinds of oils, oil being preferable.

My invention herein described is adapted both for recording and reproducing purposes, though it is particularly important for recording purposes in order to produce primarily upon the recording tablet or material a record as nearly true as possible.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a sound recording and reproducing machine, a sound-box casing, a diaphragm loosely mounted therein, and a sliding ring, or gasket, adjacent to said diaphragm, a liquid damper interposed between said diaphragm and gasket, said diaphragm and gasket being capable of to-and-fro motion within said casing, substantially as described.

2. In a sound-box for sound recording and reproducing machines, a diaphragm and gasket adjustable to and fro within the recess of the casing, and a film of liquid provided about the peripheral portions of said diaphragm and gasket and adhering to the inner walls of the casing by capillary attraction, substantially as described.

3. In a sound-box a diaphragm adjustable in the recess of the sound-box, a sliding gasket adjacent to said diaphragm, a film of liquid adhering to the adjacent faces of said diaphragm and gasket provided between the two and adhering to the adjacent portions of the walls of the casing, substantially as described.

4. In a sound-box for sound recording and reproducing machines, a sliding gasket provided in the recess of the casing, a film of liquid applied about the peripheral portions of said gasket adhering thereto and to the adjacent portions of the inner walls of the casing, a diaphragm adapted to slide within the recess of said casing for purposes of adjustment adjacent to said gasket and a liquid damper intervening between the said diaphragm and said gasket adhering to the surfaces thereof by capillary attraction, substantially as described.

5. In a sound recording and reproducing machine, a loosely-mounted diaphragm and gasket adjustable within the recess of the sound-box and a film of liquid applied to said diaphragm and gasket at or near the peripheral portions thereof and to the adjacent portions of the inner walls of the casing, substantially as described.

In witness whereof I have hereunto set my hand this 6th day of January, A. D. 1900.

ELDRIDGE R. JOHNSON.

Witnesses:

JNO. T. CROSS,
FRANK D. GRAHAM.