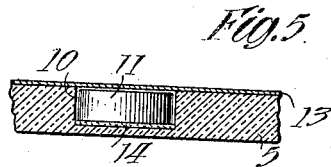
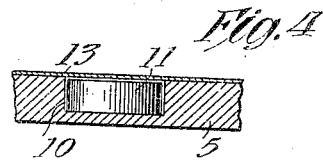
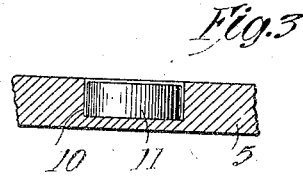
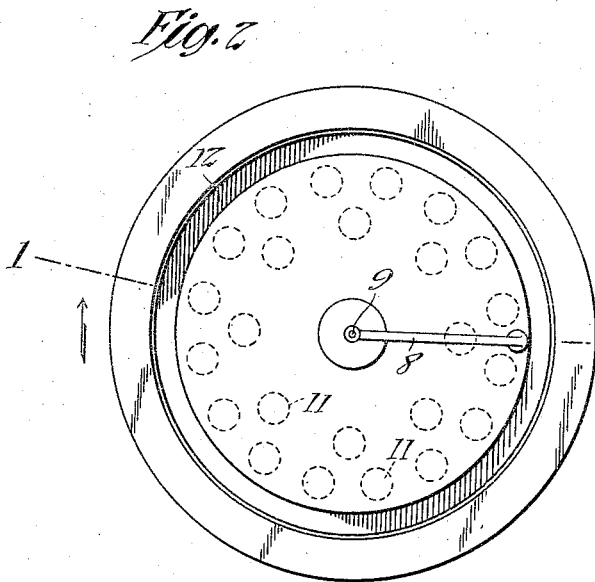
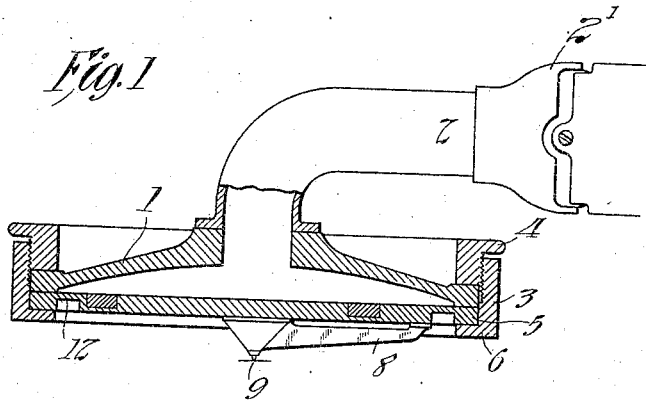


T. A. EDISON.  
 SOUND BOX.  
 APPLICATION FILED APR. 5, 1911.

1,078,266.

Patented Nov. 11, 1913.



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 Frederick Bachmann.

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 His Atty.

# UNITED STATES PATENT OFFICE.

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TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## SOUND-BOX.

1,078,266.

Specification of Letters Patent.

Patented Nov. 11, 1913.

Application filed April 5, 1911. Serial No. 619,012.

*To all whom it may concern:*

Be it known that I, THOMAS A. EDISON, a citizen of the United States, and a resident of Llewellyn Park, West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Sound-Boxes, of which the following is a specification.

My invention relates to sound boxes particularly of the type adapted for use in connection with disk records having vertically undulating grooves, although its use is not limited to that type, as it may be applied to lateral cut records.

In order to hold the reproducing stylus into firm engagement with the record, it has heretofore been customary to weight the casing or support for the diaphragm. I have found that by weighting the diaphragm and distributing the weight uniformly over the same, a better quality of reproduction is obtained than when all the weight comes to the diaphragm through the diaphragm support, the strain, in the latter case, being substantially all transmitted to the diaphragm over a small area above the reproducing stylus, whereas with my improved construction, a large part of the strain is distributed uniformly over substantially the whole diaphragm.

The principal object of my invention is to provide an improved diaphragm weighted as described above.

In a general way, my invention resembles that disclosed in Letters Patent of the United States No. 676,225, granted to me on June 11, 1901, wherein I describe a recorder provided with a movable weight having in its lower end a rubber insert which bears upon the center of the diaphragm to counteract the upward stress exerted upon the diaphragm by the engagement of the cutting or engraving tool with the record material. My present invention, however, refers more particularly to reproducers and is furthermore an improvement on that described in the above named patent in that I distribute the strain over the diaphragm by weighting the same at a plurality of points uniformly distributed over the surface thereof.

Another object of my invention is to provide a diaphragm rigidly secured to its support and having a recess for permitting flexing adjacent the periphery of the dia-

phragm so as to permit a free bodily movement of the latter.

Other objects of my invention will appear more fully in the following specification and appended claims.

In order that my invention may be more fully understood, attention is directed to the accompanying drawing forming a part of this specification and in which—

Figure 1 is a central vertical section taken on the line 1—1 of Fig. 2 of a reproducer provided with a diaphragm embodying my invention. Fig. 2 is a bottom plan view thereof; Fig. 3 is a cross section of a diaphragm illustrating my preferred means of weighing the same; and Figs. 4 and 5 are similar views of modifications thereof.

In all the views, like parts are designated by the same reference numerals.

Referring to the drawing, the body of the reproducer is formed in any suitable way as by the flat metallic conical member 1 having secured thereto a hollow neck 2, and by the flanged annulus 3 and the threaded ring 4 screwed into the annulus 3 to position and hold the members as shown.

As shown in Fig. 1, the neck 2 is preferably secured by a universal joint 2' to the sound conveying arm of the talking machine; so that the reproducer has a free up and down as well as lateral motion and is therefore capable of readily adjusting itself to the irregularities of the record. The diaphragm 5 is preferably secured between the horizontal annular flange 6 on the member 3 and the lower surface of the member 1 and is preferably made of cardboard or other yielding material; but my invention is not limited to a diaphragm formed of such materials. The stylus arm 8 which is preferably made of aluminium or any other suitable light material is secured to the diaphragm by shellac or any other suitable cement adjacent the periphery of the diaphragm, and also substantially at the center thereof, and supports at its inner end a reproducing stylus 9.

In order to weight the diaphragm, I preferably provide the same with a plurality of symmetrically arranged pockets or recesses 10 in each of which is loosely supported a lead pellet or other suitable weighting means 11.

As shown in Fig. 2, the centers of the pockets or recesses are located in the circumferences of two concentric circles. If

the weights 11 were tightly held in the pockets 10, the diaphragm would be rigid and would not vibrate freely; and I, therefore, preferably make the said weights appreciably smaller than the pockets therefor.

In the modification shown in Fig. 3, I have shown the pockets open at the top; but as this structure would permit the weights to become displaced if the diaphragm were violently jarred or if it were inverted, as for example, during shipping, my invention contemplates the use of a cover 13 of a cloth, tissue paper or other suitable material for the pockets as is shown in Figs. 4 and 5. In order to permit a free vibration of the diaphragm as a whole, I provide the same adjacent its periphery where the flexing takes place with a circumferential groove or recess 12, all of the weights 11 being located within the space bounded by this groove or recess. By the provision of this groove or recess, I am able to employ a stable controllable connection such as that described above to secure the diaphragm in place and thereby to eliminate the use of gaskets of rubber or other constantly changing yielding material.

In Fig. 5, I have shown a modification of my invention as applied to a diaphragm of a hard material as, for example, celluloid. When such a hard material is used, the movement of the weights 11 in the pockets 10 prevents proper movement of the diaphragm and causes objectionable foreign noises unless some means for absorbing the latter is provided. Such a means may consist of a lining of cork or other suitable yielding material for the bottom of the pockets, as shown at 14 in Fig. 5. Theoretically, the weights should stand still when the diaphragm is vibrating, the entire movement being made within the limits of elasticity of the paper or cork; so that the weights, although having slight movement, do not lose contact with the paper or cork to produce a knock resulting in a sound.

While I have shown several preferred embodiments of my invention, I do not wish to be understood as limiting myself to the same as my invention may obviously be embodied in numerous other forms and may be modified in many ways without departing from the spirit thereof.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A diaphragm for sound boxes having a plurality of weights uniformly distributed over the same and loosely supported thereby; substantially as described.
2. A diaphragm for sound boxes provided with a plurality of independent weighting pellets uniformly distributed over the same, substantially as described.
3. A diaphragm for sound boxes, having

a plurality of pockets distributed over the same, and a weight supported in each pocket, substantially as described.

4. A diaphragm for sound boxes, having a plurality of pockets distributed over the same, and a weight loosely supported in each pocket, substantially as described.

5. A diaphragm for sound boxes, having a plurality of open pockets distributed over the same, a weight loosely supported in each pocket, and means for covering the pockets, substantially as described.

6. A diaphragm for sound boxes having a plurality of pockets each provided at its bottom with a lining of yielding material, and a weight loosely supported in each pocket, substantially as described.

7. A diaphragm for sound boxes having a plurality of pockets each provided at its bottom with a lining of yielding material, a weight loosely supported in each pocket, and a covering for the pockets, substantially as described.

8. A diaphragm for sound boxes having a plurality of pockets each provided at its bottom with a lining of yielding material, a weight loosely supported in each pocket, and a layer of fabric covering the pockets for preventing displacement of the weights, substantially as described.

9. A diaphragm for sound boxes having an annular portion of reduced cross section concentric with and adjacent to its periphery and provided with a plurality of independent weighting pellets uniformly distributed over the same within said annular portion, substantially as described.

10. A diaphragm for sound boxes having an annular portion of reduced cross section concentric with and adjacent to its periphery and provided with a plurality of weights uniformly distributed over the same within said annular portion, said weights being unattached to said diaphragm, substantially as described.

11. In a sound box, the combination of a support, and a diaphragm rigidly secured thereto at its periphery, the said diaphragm having an annular portion of reduced cross section concentric with and adjacent to its periphery and being provided with a plurality of weights uniformly distributed over the same within said annular portion, said weights being unattached to said diaphragm, substantially as described.

12. In a sound box, the combination of a support, and a diaphragm rigidly secured thereto at its periphery, the said diaphragm having an annular portion of reduced cross section concentric therewith and being provided with a plurality of independent weighting pellets uniformly distributed over the same, substantially as described.

13. A diaphragm for sound boxes having a portion formed of hard material and other

portions formed of yielding material and a plurality of weights loosely supported by said yielding material, substantially as described.

5 14. A diaphragm for sound boxes having portions formed of yielding material and a plurality of weights loosely supported by said yielding material, substantially as described.

10 15. A diaphragm for sound boxes having an annular portion of reduced cross section and provided with weighting means located entirely within and distributed over the space bounded by said annular portion, substantially as described.

15 16. A diaphragm for sound boxes having an annular portion of reduced cross section and provided with a plurality of weights

loosely supported entirely within the space bounded by said annular portion, substantially as described. 20

17. In a sound box, the combination of a support and a diaphragm rigidly secured thereto at its periphery, said diaphragm having an annular portion of reduced cross section concentric with its periphery and provided with weighting means located entirely within and distributed over the space bounded by said annular portion, substantially as described. 25

This specification signed and witnessed this 3rd day of April, 1911. 30

THOS. A. EDISON.

Witnesses:

FREDERICK BACHMANN,  
ANNA R. KLEHM.