

T. A. EDISON.
SOUND RECORDING APPARATUS.
APPLICATION FILED OCT. 20, 1910.

1,142,507.

Patented June 8, 1915.

Fig. 1

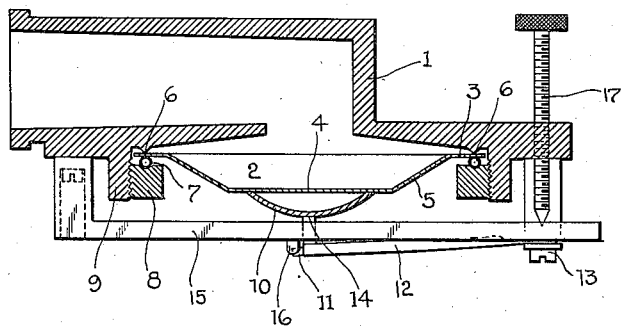
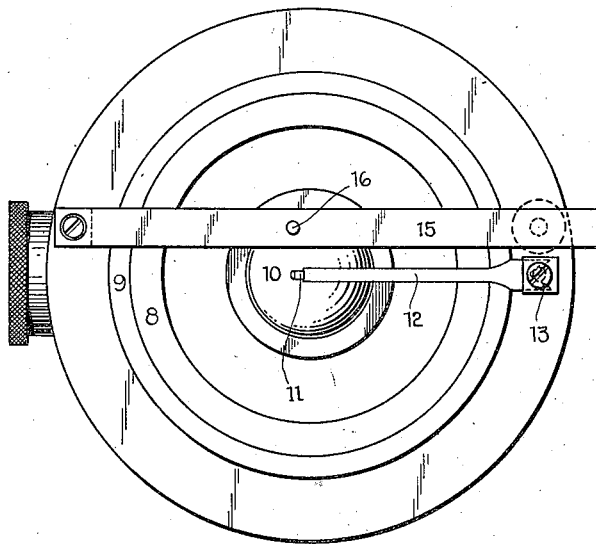


Fig. 2



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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, WEST ORANGE, NEW JERSEY, ASSIGNOR TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SOUND-RECORDING APPARATUS.

1,142,507.

Specification of Letters Patent.

Patented June 8, 1915.

Application filed October 20, 1910. Serial No. 588,138.

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, Essex county, New Jersey, have invented certain new and useful Improvements in Sound-Recording Apparatus, of which the following is a description.

My invention relates to devices for recording sound and is an improvement on the structures described in my applications Serial No. 556,469, filed April 20, 1910, and Serial No. 566,069, filed June 9, 1910, both applications being entitled Sound recording apparatus.

My objects are the provision of an extremely sensitive sound recorder of simple construction, one which may be readily manufactured, and which is intended to record sounds both weak and strong more truly than has heretofore been possible.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings, forming part of this specification, and in which—

Figure 1 represents a vertical central cross section through a sound recorder embodying one form of my invention, and Fig. 2 is a bottom plan view thereof.

Referring to the drawings, the sound box 1 is provided with the diaphragm denoted generally by the reference character 2, formed of flexible material and preferably of acetyl cellulose, nitro-cellulose, cellulose xanthate (viscose cellulose), paper, or similar material, the porous structure of which permits of large flexing with very little power, as described in my application Serial No. 566,069 referred to. The diaphragm 2 is formed with an outer or edge annular flat portion 3 and a central circular portion 4 situated in a plane parallel to the edge portion 3 and joined thereto by the inclined annular portion 5, the diaphragm preferably being pressed into the desired shape from a disk of the material while hot, in a suitable die. The sound box 1 is provided with an annular knife edge 6 upon which the diaphragm is mounted adjacent the outer edge of edge portion 3 thereof. Preferably, a tubular washer 7 of small circular cross section and preferably of rubber is mounted in contact with edge portion 3 of

the diaphragm on the side opposite to knife edge 6, the parts being clamped or secured together by means of the ring 8 screw-threaded within the depending annular flange 9 of the sound box. The washer 7 at its median section is of the same diameter as the knife edge 6 and contacts the diaphragm in alinement with the knife edge, the diaphragm thereby being given an extremely sensitive support. The diaphragm is not secured to the sound box in any way except by being clamped adjacent to its edge between the knife edge and washer as described.

The diaphragm 2 should flex only or chiefly in the annular edge portion 3 between the knife edge support therefor and the inclined portion 5 of the diaphragm, and accordingly, the central portion 4 of the diaphragm should be stiffened in some manner. I prefer to use the construction illustrated in which a rigid member 10 is cemented or otherwise secured to the central portion 4 of the diaphragm. This member 10 is preferably circular, is given the form of an arch as shown, and is formed of any convenient light metal. The recording stylus 11 is carried by spring lever 12, the other end of which is secured to the sound box by screw 13. Lever 12 is joined to the center of rigid member 10 by the rigid connection 14 as shown. Lever 15 carrying tracking member 16 may be used if desired, the screw 17 being mounted in the sound box with its lower end bearing upon the upper side of the free end of lever 15 to adjust the vertical position of tracking member 16 to regulate the depth of cut permissible for recording stylus 11. The spring lever 12 may be given an upward flexure if desired, as described in my application Serial No. 556,469 referred to, in order to prevent excessive movement of the diaphragm and recording stylus in a direction away from the recording stylus under the influence of sound waves of great amplitude.

It will be seen that the structure described embodies an extremely sensitive diaphragm having a flexing annular outer portion and a non-flexing central portion integral therewith, flexure under the influence of sound waves being nearly entirely confined to the annular edge portion of the diaphragm, and the movement of the dia-

phragm as a whole being therefore similar to that of a piston.

It is obvious that my invention is not limited to the exact construction described, but that it may be modified or varied within the language of the appended claims without departing from the spirit of my invention.

Having now described my invention, what I claim and desire to protect by Letters Patent is as follows:—

1. In sound recording apparatus, the combination of a flexible circular diaphragm having a single flat annular edge portion and a central circular portion located in parallel planes and directly connected by an annular portion inclined at an angle to said planes, means supporting said edge portion, a rigid member secured to said central portion adjacent the periphery thereof, a recording stylus rigidly connected to said rigid member, and means for applying an elastic pressure on the stylus and thereby imposing an initial stress on the diaphragm, substantially as described.

2. In sound recording apparatus, the combination of a flexible circular diaphragm having a single flat annular edge portion and a central circular portion located in parallel planes and directly connected by an annular portion inclined at an angle to said planes, a knife edge, means clamping said edge portion against said knife edge, a rigid member secured to said central portion adjacent the periphery thereof and a record-

ing stylus rigidly connected to said rigid member, substantially as described.

3. In sound recording apparatus, the combination of a flexible circular diaphragm having a single flat annular edge portion and a central circular portion located in parallel planes and directly connected by an annular portion inclined at an angle to said planes, a knife edge adapted to contact one surface of said edge portion adjacent the periphery thereof, a washer of small cross sectional area adapted to contact the opposite surface of said edge portion in alignment with said knife edge, means for clamping said parts together in the positions indicated, a rigid member secured to said central portion adjacent the periphery thereof, and a stylus rigidly connected to said rigid member, substantially as described.

4. As a new article of manufacture, a diaphragm of acetyl cellulose having a single flat annular edge portion and a circular central portion located in parallel planes and directly connected by an annular portion inclined at an angle to said planes, and a non-flexible circular member secured to said central portion adjacent the periphery thereof, substantially as described.

This specification signed and witnessed this 17th day of October 1910.

THOMAS A. EDISON.

Witnesses:

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ANNA R. KLEHM.