(No Model.)

T. A. EDISON.

PHONOGRAPH RECORDER OR REPRODUCER.

No. 454,941. Patented June 30, 1891.

Fig. 1.

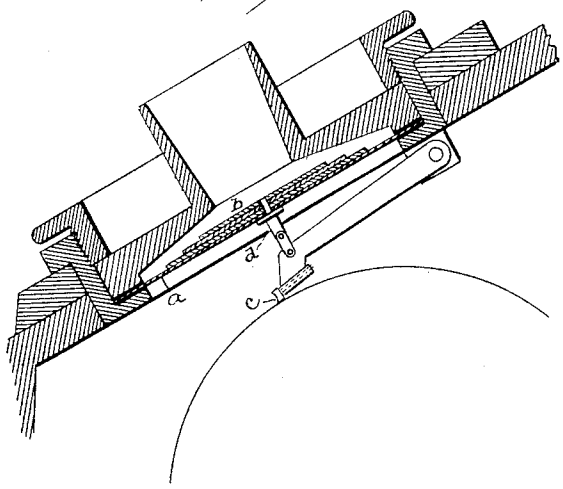


Fig. 2.

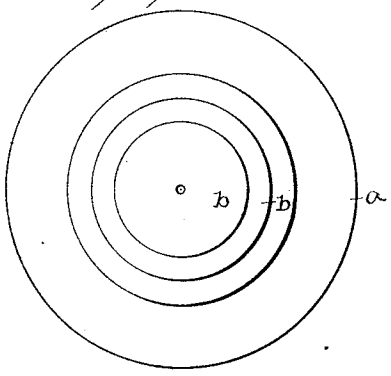


Fig. 3.

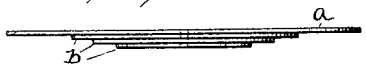


Fig. 4.

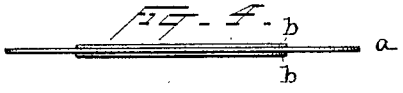
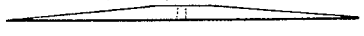


Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

PHONOGRAPH RECORDER OR REPRODUCER.

SPECIFICATION forming part of Letters Patent No. 454,941, dated June 30, 1891.

Application filed May 24, 1890. Serial No. 352,985. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex, State of New Jersey, have invented a certain new and useful Improvement in Phonograph Recorders or Reproducers, (Case No. 859,) of which the following is a specification.

The object of this invention is to render phonographic recorders or reproducers more sensitive, and this I accomplish by means of an improved construction of the diaphragm of such instruments.

In carrying out my invention in the most perfect form I construct a composite diaphragm made up of a number of disks of graduated sizes cemented together, so as to form a diaphragm which is thickest at the center and thinnest and most sensitive at its periphery, where only one of the disks (the largest) is present. These disks I also preferably make of varying thicknesses, the largest disk being the thinnest and the smallest the thickest, while the intermediate disks are of intermediate thicknesses. The diaphragm is clamped at its edge, as usual, in the supporting-frame of the recorder or reproducer, and in the operation of the instrument moves bodily, thus producing a greater amplitude of vibration than is secured with a diaphragm of uniform thickness throughout, which my experience shows moves only at its central portion, since it is there most flexible and elastic. The composite diaphragm may be made with the smaller disks wholly on one side of the largest disk, and this may be either the inner or the outer side of the diaphragm, or the diaphragm may have the smaller disks on each side of the largest disk. The disks may be made of glass, mica, celluloid, or any of the materials that are used in the construction of diaphragms for acoustic instruments.

The advantages of the invention may, in a measure, be secured by constructing the diaphragm in one solid piece, made thickest at the center of the diaphragm and tapering gradually and uniformly to the edge, although this is a much more expensive construction than the composite form.

In the accompanying drawings, Figure 1 is a sectional view of a phonograph-recorder provided with my improved diaphragm. Fig. 2 is a top view of the same diaphragm. Figs. 3, 4, and 5 are sections of modified constructions of the diaphragm.

The diaphragm is made thickest at its center and thinnest at its periphery, as shown. In Figs. 1 to 4 it is shown as composed of a disk *a*, which is larger in diameter than the other disks employed, and of three or more smaller disks *b*, which are of graduated size and are cemented together and to the largest disk. These smaller disks may be on the inner side of the diaphragm, as in Fig. 1, or on its outer side, as in Fig. 3, or on both sides, as in Fig. 4. The recording-point *c* is connected by a link with a stud *d*, the shank of which passes through a hole in the center of all the disks, and is secured therein by cement or otherwise. The diaphragm may be made of a solid piece, as shown in Fig. 5, and it may be beveled on one side only, which may be either the outer or the inner side of the diaphragm, or it may be beveled on both sides, as in the case of the composite diaphragm.

In the case of the composite diaphragm the disks may also be of varying thicknesses, although this is not an essential feature. Thus if the smallest disk is .005 of an inch thick, the next larger in diameter will be .004, the next .003, and the largest disk .002; but these thicknesses may be varied to suit the conditions of the material employed.

What I claim as my invention is—

1. In a phonograph, a phonograph recorder or reproducer and a phonograph-diaphragm made thickest at its center and thinnest at its periphery and controlling the recording or reproducing point, substantially as described.

2. The combination of a phonograph-diaphragm made thickest at its center and thinnest at its periphery, and a phonograph recorder or reproducer operatively connected to said diaphragm, substantially as set forth.

3. The combination of a diaphragm consisting of a number of disks of graduated size and a phonograph recorder or reproducer operatively connected to said diaphragm, substantially as set forth.

This specification signed and witnessed this 6th day of May, 1890.

THOS. A. EDISON.

Witnesses:

THOMAS MAGUIRE,

HARRY F. MILLER.