

P. WEBER.
DIAPHRAGM FOR TALKING MACHINES.
APPLICATION FILED FEB. 28, 1907.

1,056,475.

Patented Mar. 18, 1913.

3 SHEETS—SHEET 1.

Fig. 1

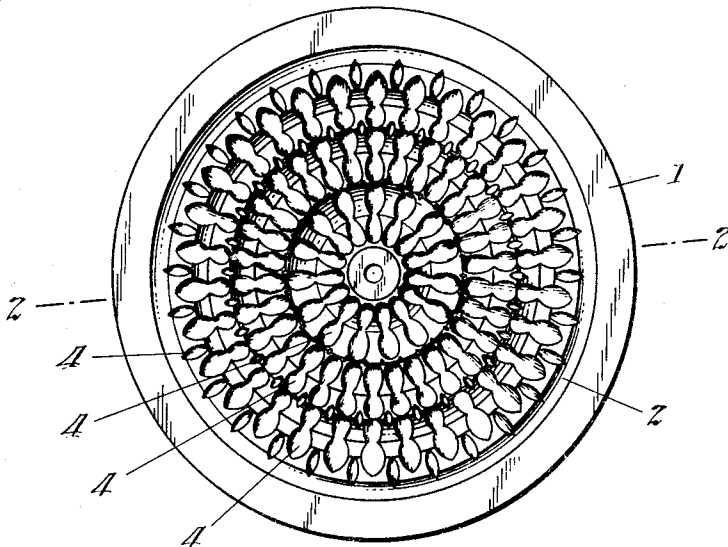
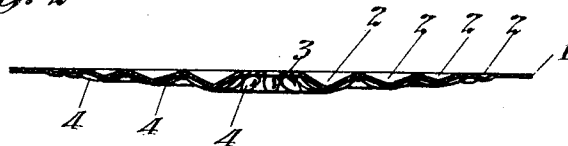


Fig. 2



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3 SHEETS—SHEET 2.

Fig. 3

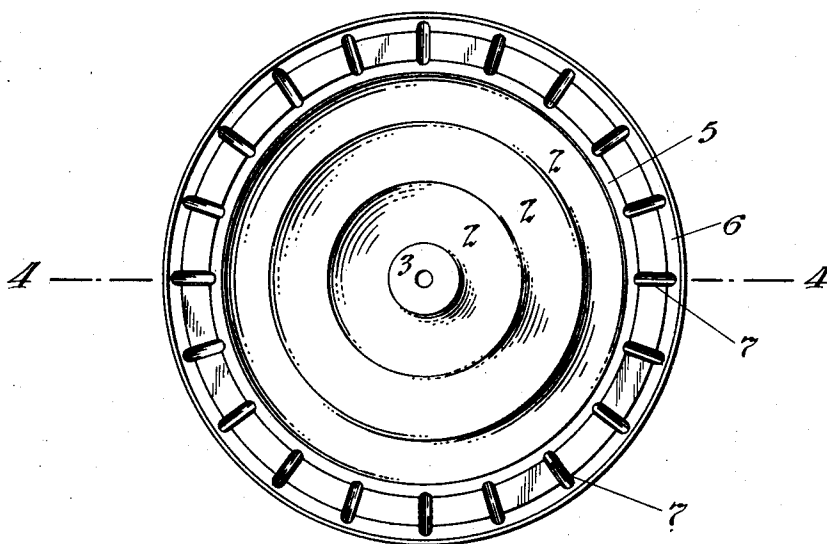
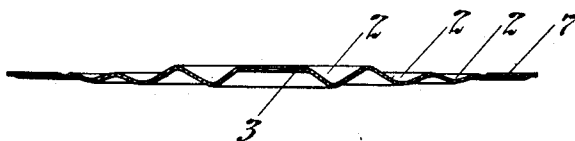


Fig. 4



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3 SHEETS—SHEET 3.

Fig. 5

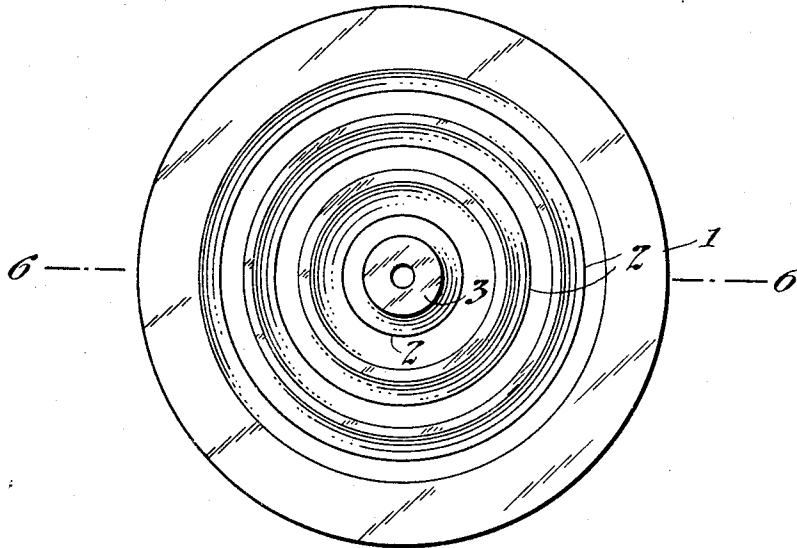
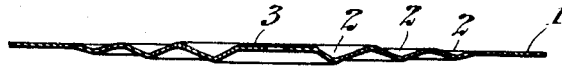


Fig. 6



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UNITED STATES PATENT OFFICE.

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THOMAS A. EDISON, INCORPORATED, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

DIAPHRAGM FOR TALKING-MACHINES.

1,056,475.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed February 28, 1907. Serial No. 359,891.

To all whom it may concern:

Be it known that I, PETER WEBER, a citizen of the United States, residing at Orange, county of Essex, and State of New Jersey, have invented new and useful Improvements in Diaphragms for Talking-Machines, of which the following is a description.

My invention relates to an improved diaphragm for phonographs or other talking machines, and my object is to provide a very simple, cheap and effective diaphragm for the purpose, by means of which superior reproduction can be obtained.

It is now recognized that to secure the best results with a symmetrical diaphragm, the latter should vibrate as nearly as a whole as possible, and to this end the diaphragm should be comparatively rigid or stiff for its greater part, its rigidity preferably increasing toward the center. To secure this object it has been heretofore proposed to construct a diaphragm of a series of disks cemented together, but such a construction is expensive, the disks are likely to work loose, and the diaphragm is unduly heavy, so that it does not respond accurately to the record. It has been also proposed to construct a diaphragm in which substantially the result indicated will be secured by forming the same with a series of concentric shallow depressions, which are arranged nearer together toward the center, but such an arrangement is undesirable, for the reason that the diaphragm is provided with relatively extensive flat portions in which independent vibration may take place. On the other hand, if the shallow depressions are arranged so as to occupy the entire surface of the diaphragm, its rigidity would be substantially the same throughout, and hence, the best results would not be obtained.

With my improved diaphragm I secure rigidity of practically its entire surface, except at the outer edge where it is clamped in place and at the center where connection is made with the stylus, and at the same time I obtain gradually increased rigidity toward the center without increasing the weight, so that the diaphragm is extremely sensitive and responsive to the record or sound vibrations.

To this end the invention consists of making the diaphragm of a disk of extremely thin metal, preferably hard rolled copper,

and in forming the main portion thereof with a series of concentric depressions or grooves immediately adjacent to one another and of gradually increasing depth toward the center, whereby the stiffness or rigidity of the diaphragm will be proportionately increased. Outside of the concentric depressions a sufficient surface is provided for accommodating vibratory movement.

Although a diaphragm characterized as described produces better results than previous forms, I find that it is desirable that the diaphragm be additionally stiffened as by indentations extending transversely with respect to the corrugations or grooves, or radially with respect to the diaphragm, and my invention therefore comprises diaphragms embodying this feature.

In order that the invention may be better understood attention is directed to the accompanying drawing in which—

Figure 1 is a plan view on an enlarged scale of the preferred form of diaphragm; Fig. 2 is a section on line 2—2 of Fig. 1, the thickness of the diaphragm being exaggerated; Figs. 3 and 4 are views similar to 1 and 2 respectively of a modified form of diaphragm, and Figs. 5 and 6 are similar views of a second modification.

Referring to Figs. 1 and 2 the diaphragm 1 is formed of a disk preferably of hard rolled sheet copper, about .0025 of an inch in thickness. The outer edge of the diaphragm is left flat to permit it to be clamped in place and to offer a sufficient space in which vibration may take place. The main portion of the diaphragm is formed with a plurality of concentric depressions 2, four of which are shown and which are of progressively increasing depth, so as to provide for gradually increased rigidity, two of said depressions being located within a distance of substantially one-half of the radius of said diaphragm from the center of said diaphragm. These depressions are immediately adjacent, so that in cross-section the diaphragm presents a wave-like line, as shown. By making the depressions immediately adjacent to one another, no flat portions are presented in the body of the diaphragm, in which independent vibration can take place. The central portion 3 is left flat, as shown, to provide a space for the

attachment of or connection with the stylus of a recorder or reproducer. This diaphragm is provided with additional stiffening means in the form of a large number of small indentations 4 which extend transversely with respect to the corrugations or depressions 2. These depressions preferably extend radially of the diaphragm but it is not necessary that their direction be exactly radial, provided it is transverse to the main depressions or corrugations 2.

The diaphragm of Figs. 3 and 4 is exactly similar to that of Figs. 1 and 2 except that the depressions 4 are lacking and the diaphragm is formed near its periphery with two small concentric grooves 5 and 6 connected by radial indentations 7. The diaphragm of Figs. 5 and 6 is exactly the same as that of Figs. 1 and 2 except that the indentations 4 are absent.

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

1. An improved diaphragm comprising a disk, provided for its greater part with closely arranged concentric depressions or grooves of gradually increasing depth toward the center, a plurality of said depressions or grooves being located within a distance of substantially one half the radius of said disk from the center of said disk, substantially as and for the purposes set forth.

2. An improved diaphragm comprising a metallic disk provided for its greater part with concentric depressions adjacent to one another and of gradually increasing depth toward the center, a plurality of said depressions being located within a distance of substantially one half the radius of said disk from the center of said disk, substantially as and for the purposes set forth.

3. An improved diaphragm comprising a disk formed over its greater part with a series of adjacent concentric depressions of gradually increasing depth toward the center, a plurality of said depressions being located within a distance of substantially one half the radius of said disk from the center of said disk, substantially as set forth.

4. An improved diaphragm, comprising a disk having a flat outer portion, and a main portion, consisting of a series of concentric adjacent depressions of gradually increasing depth toward the center, a plurality of said depressions being located within a distance of substantially one half the

radius of said disk from the center of said disk, substantially as and for the purposes set forth.

5. A circular diaphragm provided with concentric depressions of increasing depth toward the center and indentations extending transversely thereto, a plurality of said depressions being located within a distance of substantially one half the radius of said diaphragm from the center of said diaphragm, substantially as set forth.

6. A diaphragm provided with concentric corrugations so closely arranged as to leave substantially no flat portions in the body of the diaphragm, and indentations extending transversely thereto and intersecting the same, substantially as set forth.

7. A diaphragm provided with concentric corrugations so closely arranged as to leave substantially no flat portions in the body of the diaphragm, and radial stiffening means crossing the concentric corrugations, substantially as set forth.

8. A diaphragm provided with concentric and radial stiffening means, both closely arranged and covering substantially the whole surface of the diaphragm except a central portion and a narrow annulus at the extreme edge, the said radial means extending across some of the concentric means, substantially as set forth.

9. A diaphragm provided at its central portion with a plurality of concentric stiffening means adjacent one another and also provided with radial stiffening means extending substantially to the periphery of said diaphragm, the said concentric and radial stiffening means being so arranged as to leave substantially no flat portions in the body of the diaphragm, substantially as set forth.

10. A diaphragm provided at its central portion and adjacent its periphery with concentric stiffening means and also provided with radial stiffening means extending between said central and peripheral stiffening means, the said means being so arranged as to leave substantially no flat portions in the body of the diaphragm, substantially as set forth.

This specification signed and witnessed this 26 day of February 1907.

PETER WEBER.

Witnesses:

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