Oct. 19, 1926. 1,603,841

F. T. D. COE

DIAPHRAGM FOR USE IN TALKING MACHINES AND OTHER ACOUSTIC APPARATUS

Filed April 20, 1926

Fig. 1.

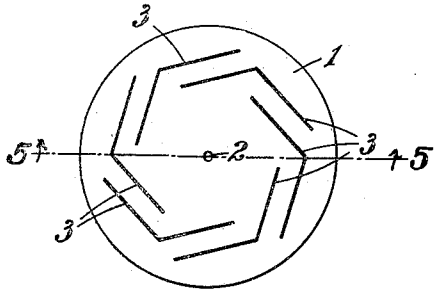


Fig. 2.

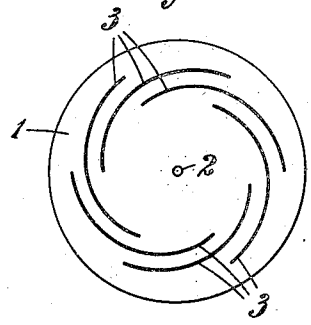


Fig. 3.

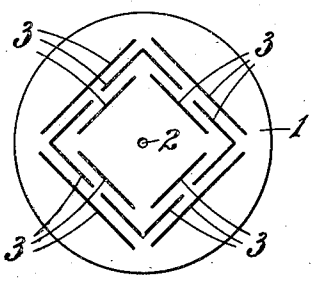
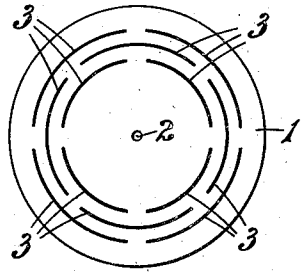


Fig. 4.



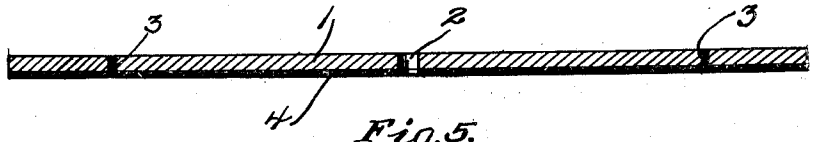


Fig. 5.

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Patented Oct. 19, 1926. 1,603,841

UNITED STATES PATENT OFFICE.

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DIAPHRAGM FOR USE IN TALKING MACHINES AND OTHER ACOUSTIC APPARATUS.

Application filed April 20, 1926, Serial No. 103,223, and in Great Britain September 25, 1924.

The invention consists of improvements in diaphragms which are primarily intended for use in talking machines, more particularly gramophones or disc talking machines, but may be used in the case of other acoustic apparatus.

The invention will, for the sake of brevity, be mainly described in connection with the sound boxes of disc talking machines.

It is generally believed that the lack of clearness of the sounds reproduced by the sound box of a disc talking machine is due to reflex actions in the diaphragm, that is to say the movement of the diaphragm which should obtain as a result of the reproduction of one note is impaired by a reflex movement of the diaphragm arising from the previously reproduced note.

The present invention is based on the above belief and has been devised with the object of eliminating said reflex movement.

In carrying out the invention the diaphragm of a disc talking machine is constructed of sheet aluminum, sheet zinc or other suitable sheet metal or material, preferably sheet aluminum, which has been found to give the best results, and is provided intermediate its centre and its peripheral edge with a plurality of slits, which while allowing the diaphragm to properly vibrate or respond to any note will prevent the purity or clarity of said note being impaired by reflex action in the diaphragm. The slits, which should be as narrow in width as possible, may be variously arranged. In all cases the openings obtaining as a consequence of the slits are closed in any suitable way to prevent escape of part of the air in the sound box, which would impair the volume of the sound given out by the sound box. Said closure may be effected by means of rubber solution pressed into the slits, by applying a layer of rubber solution of suitable thickness to the back of the diaphragm, or by securing to the back or front of the diaphragm a disc of fabric which is impervious to air or a disc of other suitable material.

The invention is illustrated by the accompanying drawings.

Fig. 1 is a front view of a diaphragm provided with one arrangement of slits, while Figs. 2, 3 and 4 are similar views illustrating three other arrangements of slits, all of which arrangements of slits have given good results in practice. Fig. 5 is an enlarged section taken on line 5—5 of Fig. 1.

In all of the figures, 1 are diaphragms, 2 are holes drilled in the centres of the diaphragms to enable stylus bars or levers to be attached thereto, and 3 are slits formed in the diaphragms intermediate the centres of the diaphragms and the peripheral edges thereof.

As shown in Fig. 1, the slits 3 may be disposed in somewhat similar manner to the sides of a hexagon. In this case the slits corresponding to two contiguous sides of a hexagon merge into one another, and the angular slits thus obtained are so disposed that each half or side of an angular slit subtends or is opposite to a side of another angular slit. Alternatively, as shown in Fig. 2, the slits 3 may be somewhat helically disposed. In this case each slit would start in a position opposite to the centre of another slit and terminate opposite the centre of a third slit, and so on. Again, as shown in Fig. 3, three or more sets of slits 3 following the outlines of squares may be used. In this case when three sets of slits are employed, as illustrated, the innermost set of slits may consist of four slits of a length nearly equal to the lengths of the sides of the square to which they conform, the second set of slits may be shaped like a right angle and occupy the four corners of the square to which they conform, and the third set of slits be similar to the first set of slits. Again, as shown in Fig. 4, the slits 3 may be concentrically disposed with respect to the centre of the diaphragm, and consist of three sets of slits. As illustrated in the figure each set of the slits may consists of four separate slits and the centres of the slits in the second and third rows of slits be arranged opposite the centres of the lengths of material obtaining between the slits in the first and second sets of slits respectively.

The slits may be arranged in other ways than those illustrated by the drawings but in all cases the slits must overlap or be staggered or be otherwise so arranged that there shall be no path in a radial direction for vibrations of the diaphragm.

As shown in Fig. 5, the slits are sealed by a layer 4 of rubber or other suitable material applied to the back of the diaphragm.

The improved diaphragm is preferably constructed from a single sheet of material, but may be formed of an annulus of one material and a central part of a different ma-

terial secured in any suitable manner to or moulded on to the inner part of the annulus, the latter being provided with the slits.

Having now described my invention what I have invented and desire to secure by Letters Patent of the United States is as follows:—

1. A diaphragm for acoustic apparatus, comprising a metallic disk having a plurality of slits intermediate the center and the periphery of the disk and extending in a direction substantially transverse to the radii of said disk, so that each radius intersects one or more of said slits, and a rubber solution filling said slits.

2. A diaphragm for acoustic apparatus, comprising a disk having a plurality of overlapping slits extending substantially transverse to the radii of said disk intermediate the center and the circumference of the disk, and a flexible coating covering one face of said disk and filling said slits to make the disk airtight.

In testimony whereof I have signed my name to this specification.

FRANK THOMAS DASHWOOD COE.