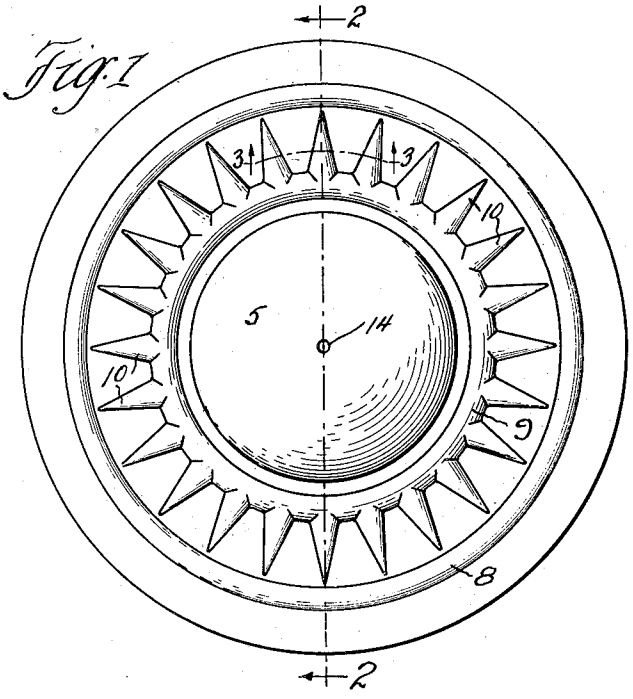
Dec. 10, 1929. A. S. THAYER 1,738,853

DIAPHRAGM FOR TRANSMITTERS AND RECEIVERS

Filed June 29, 1927

Fig. 1



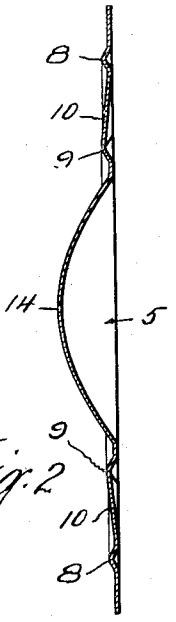


Fig. 2

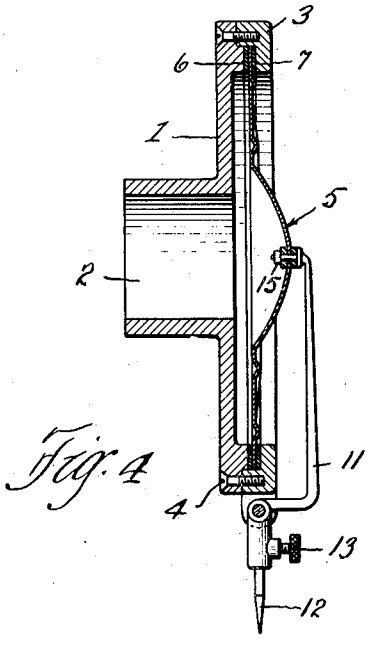


Fig. 4

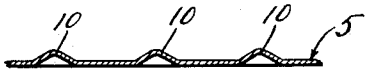


Fig. 3

Inventor

Arthur S. Thayer

By Hull Brock & West

Attorney

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UNITED STATES PATENT OFFICE

ARTHUR S. THAYER, OF LAKEWOOD, OHIO

DIAPHRAGM FOR TRANSMITTERS AND RECEIVERS

Application filed June 29, 1927. Serial No. 202,276.

This invention relates to instruments for recording or reproducing sound waves and particularly to diaphragms for the reproducing and recording heads of phonographs and the like, as well as for radio loud speakers.

The main object of my invention is to provide a diaphragm of the character described and for the purpose set forth which will record or reproduce the most delicate vibrations as well as the natural tone or "timbre" of the sounds transmitted.

Another object of the invention is to provide a diaphragm having a bulging parabolic central portion which thereby enlarges the maximum area of vibration and at the same time properly directs the sound waves and prevents cross vibrations or interference within the central section of the reproducer.

A further object of the invention is to provide a diaphragm having two or more concentric annular ribs or projections thereon which are pressed from the diaphragm in such a manner as to provide on the opposite side of the diaphragm substantially V-shaped notches the inner ends of which are rounded, and in which the central portion of the diaphragm is provided with a central portion bulged outwardly in the shape of a parabola whereby interference and cross vibrations of the diaphragm will be reduced to a minimum and the sound waves will be transmitted to the sound box without materially diminishing the volume or the quality of the tones.

A still further object of the invention is to provide a diaphragm for the purpose set forth which is simple in construction, effective in operation and well adapted for quantity production at comparatively low cost.

Further and more limited objects of the invention will appear as the description proceeds and by reference to the accompanying drawing in which Fig. 1 is a top plan view of the diaphragm constructed in accordance with my invention; Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1; Fig. 3 is a sectional view on the line 3—3 of Fig. 1; and Fig. 4 is a vertical sectional view of a reproducer having my improved diaphragm secured therein.

Referring now to the drawings the numeral designates the body or base member of the reproducer having a neck 2 adapted to receive the neck of a loud speaker or horn or other amplifying device. Detachably secured to the body 1 is an annular ring member 3 which is held in place by screws 4 or any other suitable means. Clamped between the ring member 3 and the body 1 is a diaphragm 5 which will be hereinafter more fully described. Suitable packing rings or gaskets 6 and 7 are provided in order that the diaphragm may be firmly secured in place. The diaphragm 5 is shown in detail in Figs. 2 and 3 and consists of a metallic disk the central portion of which is bulged outwardly away from the neck on the base member, as shown most clearly in Figs. 2 and 4, and this bulge is preferably a paraboloidal segment. Within and adjacent to the clamping ring the diaphragm is provided with an outwardly extending annular substantially V-shaped rib or projection 8 which is pressed out of the metal. Within the annular rib 8 and immediately adjacent the periphery of the bulging portion is a second annular substantially V-shaped rib or projection 9. From the opposite side of the diaphragm the ribs 8 and 9 form V-shaped notches the inner ends of which are rounded and do not come to a point. Between the ribs 8 and 9 the diaphragm is provided with a plurality of equally spaced substantially V-shaped projections 10 which intersect the rib 9 at their inner ends and extend radially outwardly toward the rib 8. The ribs 10, however, do not intersect the rib 8. The ribs 10 from the opposite side of the diaphragm appear as V-shaped notches or recesses, the inner ends of which are rounded. These notches are deepest at their inner ends and taper to a point immediately adjacent the out rib 8. These V-shaped notches cooperate with the bulged central portion and the concentric annular ribs to confine the vibration of the disk to one plane and to properly direct the sound waves.

Pivotally mounted on the ring member 3 is a stylus bar 11 having its outer end to receive a needle 12 therein which is held in place by a screw 13. The opposite end of the stylus bar is bent at right angles as shown in Fig. 4 and extends through a central opening 14 in the parabolic bulging portion of the diaphragm and is rigidly secured to the diaphragm by a nut 15. Suitable washers are provided on opposite sides of the opening to prevent rupture of the diaphragm which is very thin, preferably not more than .006 of an inch. The diaphragm is preferably made of aluminum or duralumen although other suitable material having the necessary strength and resiliency may be used. The diaphragm is composed of a single piece of metal of uniform thickness and may be stamped or spun up and the ribs and notches are stamped by a die.

One of the main features of the invention is the parabolic central portion which enlarges the maximum area of vibration and properly directs the sound waves in the same manner as a parabolic reflector diffuses light waves. It has also been found that the parabolic curve of the central portion tends to prevent cross vibration and interference of the sound waves within the central section of the reproducer.

Having thus described my invention, what I claim is:—

1. A diaphragm for transmitting sound waves consisting of a thin sheet of strong resilient material having a pair of concentric annular corrugations about the center thereof, the central portion of said diaphragm being bulged outwardly in the shape of a parabolidal segment and a series of radially disposed corrugations arranged between said first mentioned corrugations and spaced apart.

2. A diaphragm of the class described comprising a thin sheet of resilient material having its central portion bulged outwardly in the shape of a paraboloidal segment, said diaphragm having a plurality of radially disposed substantially V-shaped corrugations disposed about said bulging portion but separated therefrom.

3. A diaphragm as set forth in claim 1 in which said radially disposed corrugations are substantially V-shaped with the inner ends of the same slightly rounded.

4. A diaphragm for transmitting sound waves consisting of an annular disk of thin strong resilient metallic material having an annular corrugation near its outer edge, an annular corrugation within said outer corrugation, a portion of said disk within said inner corrugation being bulged outwardly in the shape of a paraboloidal segment.

5. A diaphragm as set forth in claim 4 having a series of radially disposed corrugations extending between said inner and outer annular corrugations.

In testimony whereof, I hereunto affix my signature.

ARTHUR S. THAYER.