May 24, 1932. R. P. MAY 1,859,782

ACOUSTIC DIAPHRAGM

Filed June 11, 1929

Fig. 1

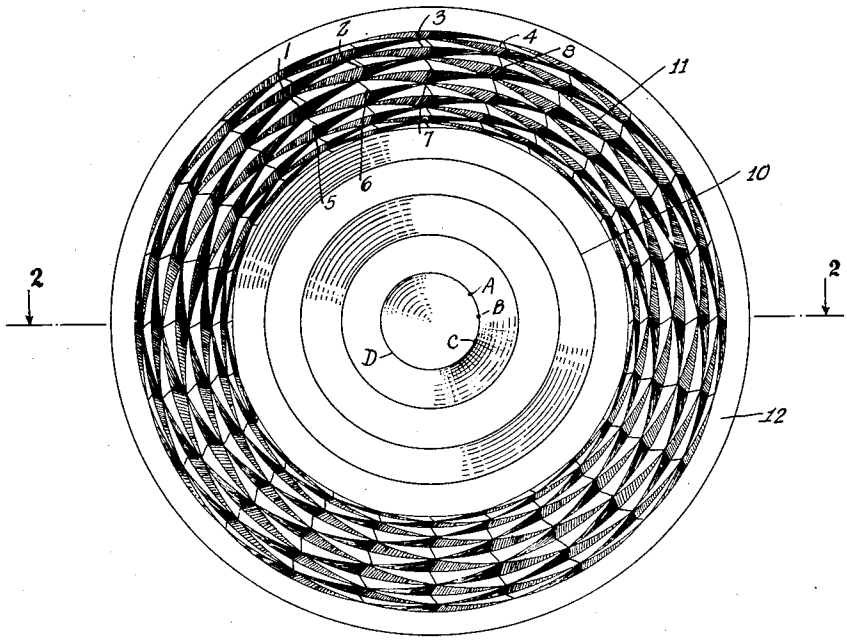
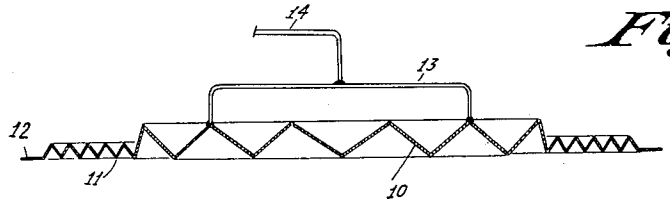


Fig. 2



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ACOUSTIC DIAPHRAGM

Application filed June 11, 1929. Serial No. 369,977.

This invention relates to a diaphragm for acoustic devices. More particularly this invention relates to a metallic diaphragm of the type which is clamped around its periphery and is provided adjacent its periphery with a flexible portion.

The object of this invention is to provide an improved diaphragm which has a relatively rigid central portion, an annular mounting rim and a flexible portion between the rigid portion and the mounting rim.

Another object of the invention is to provide a diaphragm of the type described which is cheaply and easily manufactured by a die stamping process.

Other objects of my invention will become apparent on reading the following specification in connection with the accompanying drawings, in which

Figure 1 illustrates a plan view of a diaphragm made in accordance with my invention, and

Figure 2 is a sectional view of Figure 1.

Referring more particularly to the drawings, the diaphragm is formed from a flat piece of suitable material such as sheet metal, in a manner such that it has a relatively rigid central portion 10, a substantially flexible annular portion 11 surrounding the rigid portion 10 and an annular mounting rim 12 surrounding the flexible portion 11. The central portion is preferably provided with concentric corrugations for the purpose of adding rigidity to this portion. The corrugations are obtained by die stamping and in the preferred embodiment of my invention the corrugations form V shaped grooves. Other types of corrugation, however, may be used for adding rigidity to the central portion of the diaphragm without departing from the spirit of the invention.

The flexible portion of the diaphragm is also formed by die stamping V shaped grooves into the diaphragm material. But in this case the grooves are stamped eccentrically to the first mentioned grooves and only in the annular portion surrounding the rigid central portion. If the centers of the eccentric grooves are located on a circle concentric with the first mentioned grooves and if they are spaced at equal intervals around this circle, the eccentric grooves will form a plurality of small diamond shaped projections in the said annular portion of the diaphragm. As shown in Figure 1 the series of projections 1, 2, 3 and 4 lie on an eccentric groove which is an arc of a circle whose center is at point A on circle D and whose radius is the distance 1—A. The next inner series of projections 5, 6, 7 and 8 lie on an eccentric groove also an arc of a circle whose center is at point B on circle D and whose radius 5—B is equal to the radius 1—A. The eccentric groove forming the next inner series of projections is a circular arc whose center is at point C. By spacing the points A, B, C etc. at equal distances apart on circle D, the diamond shaped projections described are formed. Thus while the eccentric grooves may be circular in shape, the two sides of any groove make an angle with each other which I refer to as V-shaped. This arrangement makes a very flexible portion and as it only requires a few die stampings the resultant diaphragm is easily and cheaply manufactured.

The annular mounting rim is left unstamped. This rim is secured between the supporting or diaphragm clamping portions of the acoustic device.

The annular suspension portion may also be formed by stamping a plurality of spiral grooves about the center of the diaphragm. In such a case the spiral grooves do not extend into the rigid portion of the diaphragm but are only stamped in the annular portion surrounding the rigid central portion.

It is to be understood that I have illustrated and described only a preferred form of my invention and that various modifications and variations can be made without departing from the spirit of the invention. Accordingly I do not desire to be limited by the specific modification illustrated but only by the scope of the appended claims.

In the appended claims the term stamping is used to indicate distorting out of the plane of the original surface.

I claim:

1. A diaphragm comprising a circular me-

tallic sheet provided with central concentric circular stampings and eccentric circular stampings surrounding said central concentric stampings.

2. A diaphragm comprising a circular metallic sheet provided with central concentric stampings, eccentric circular stampings surrounding said central concentric stampings, and an annular unstamped portion surrounding the eccentrically stamped portion.

3. A diaphragm comprising a sheet of suitable material provided with a plurality of stampings for forming a relatively rigid central portion and a second plurality of stampings for forming a relatively flexible portion, said second plurality of stampings consisting of a plurality of intersecting, equal diameter, circular grooves.

4. The method of forming a flexible portion in a diaphragm which consists in stamping the diaphragm with a plurality of intersecting eccentric grooves.

5. The method of forming a diaphragm which consists in stamping one portion of the diaphragm with a plurality of concentric circular grooves and stamping a second portion of the diaphragm with a plurality of intersecting circular grooves eccentric to said concentric grooves.

6. The method of forming a diaphragm which consists in stamping a central portion of the diaphragm with a plurality of concentric V shaped grooves and in stamping an annular portion of the diaphragm with a plurality of intersecting eccentric V shaped grooves.

7. The method of forming a flexible portion in a diaphragm which consists in stamping a plurality of intersecting circular grooves eccentrically around the center of said diaphragm.

8. The method of forming a flexible portion in a diaphragm which consists in stamping a plurality of intersecting circular grooves eccentrically around the center of said diaphragm, each of said grooves being of the same radius as the other grooves.

RUSSELL P. MAY.

CERTIFICATE OF CORRECTION.

Patent No. 1,859,782. May 24, 1932.

RUSSELL P. MAY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 81, beginning with the word "The" strike out all to and including the word "portion." in line 87, and insert instead- The diaphragm may be used as the diaphragm of an ordinary telephone receiver or it may be actuated from a stylus vibrated by a phonograph record. In the former case it is only necessary to form the diaphragm from magnetic material and to place it in a magnetic field in the well known manner. In the latter case a spider member 13 is preferably connected at several points to one of the ridges formed by the concentric V shaped grooves, and a suitable member 14 is provided for connecting the spider 13 with the stylus. The diaphragm may also be dynamically driven. In such a case the diaphragm which need not be of magnetic material is provided with a suitable driving coil in any well known manner.; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of November, A. D. 1932.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)