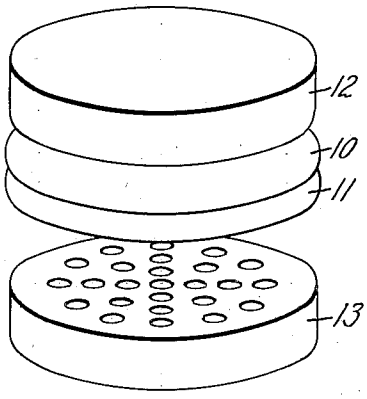
Feb. 9, 1932. N. H. HOLLAND 1,844,123

ACOUSTIC DIAPHRAGM

Filed June 12, 1926

Fig. 1.



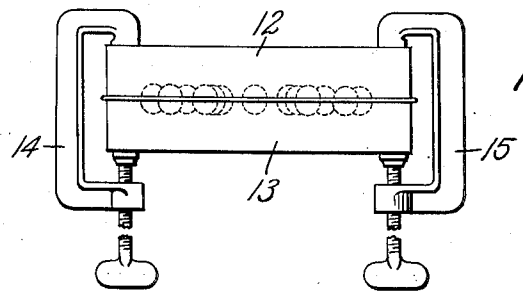


Fig. 2.

Fig. 3.

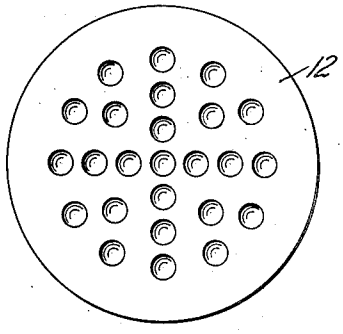
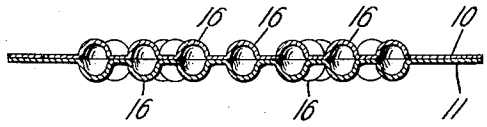


Fig. 4.



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UNITED STATES PATENT OFFICE

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ACOUSTIC DIAPHRAGM

Application filed June 12, 1926. Serial No. 115,473.

This invention relates to acoustic diaphragms and a method of producing diaphragms and more particularly to diaphragms for use on phonographs or in loud speakers as sound radiators.

Usually the main requirement in diaphragms for the above purpose is that there shall be high elastic reactance and low mass. Large numbers of diaphragms have been made with reenforcing pieces or sections in order to obtain high elastic reactance and low mass. In general, however, the addition of the reenforcing members increases the mass. Other diaphragms have been made by forming a portion of the material into corrugations or ridges, which imparts a certain amount of stiffness.

This invention contemplates a composite reenforced diaphragm, the stiffness of which may be made very great and the reenforcing of which does not increase the mass.

In accordance with this invention such a diaphragm is attained by constructing it of two elements of sheet material at least one of which has distended portions. A preferred form is one in which the sheets are of metal foil and each has distended portions. This form of diaphragm and the method of producing it are described hereinafter in connection with the attached drawings in which; Fig. 1 illustrates sheets of foil and dies, between which they are to be clamped, previous to the distending action, Fig. 2 shows the arrangement of the foil sheets and dies clamped ready for the distending process, Fig. 3 is a view of the face of one of the dies and Fig. 4 is a cross section of the finished diaphragm.

Referring particularly to Fig. 1 two sheets of metal foil 10 and 11, such as copper or aluminum, or other material, are cut to the size and shape desired. A substance such as sulphur, which oxidizes to a gas, or a substance which will generate gas upon the application of heat, is introduced between the sheets, and the peripheries of the sheets hermetically sealed. Two dies 12 and 13, one of which is illustrated in Fig. 3, are then tightly clamped on the sheets of the foil by any suitable means such as clamps 14 and 15.

As shown in Fig. 3 there is a large number of circular holes in the faces of the dies. It is not intended, however, to limit the invention with respect to the shape of the openings in the dies, which may be any desired shape, or the faces of the dies may have grooves of any desired form, such as radial, spiral, circular, etc.

After clamping the dies to the sheets, the whole is subjected to heat. The material between the sheets will thereupon form a gas, the pressure of which will force the foil into the holes or grooves in the dies. The foil takes a permanent set in this form and when cooled and the dies removed, the finished diaphragm will be as shown in Fig. 4, the distended portions 16 taking the shape of the holes or grooves in the dies 12 and 13.

What is claimed is:

1. An acoustic diaphragm, comprising two thin sheets of elastic material each of which has a plurality of distended portions registering with corresponding distended portions in the other to form hollow chambers.

2. An acoustic diaphragm, comprising two sheets of metal foil, each sheet having a plurality of distended portions containing gas under pressure.

3. An acoustic diaphragm comprising two thin sheets of flexible material juxtaposed and sealed together totally at their peripheries to form a hermetically sealed chamber containing confined gas under pressure.

In witness whereof, I hereunto subscribe my name this 10th day of June, A. D. 1296.

NEWMAN H. HOLLAND.