July 2, 1929. N. H. HOLLAND 1,719,472

ACOUSTIC DIAPHRAGM

Filed June 12, 1926

Fig. 1.

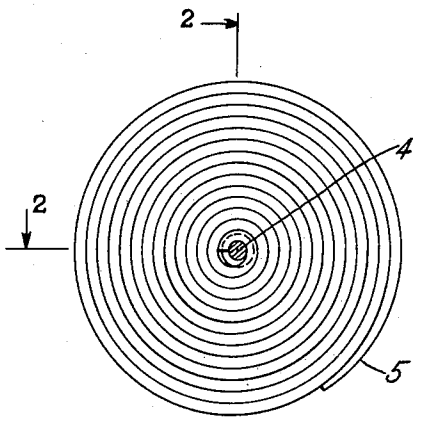
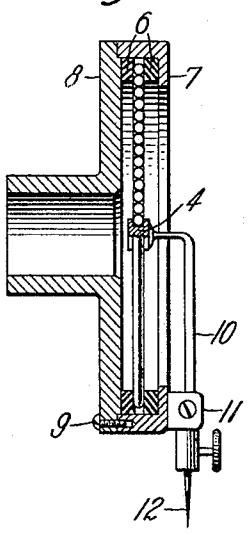


Fig. 2.



Inventor:
Newman H. Holland
by Jas. A. Palmer, Atty.

Patented July 2, 1929.

1,719,472

UNITED STATES PATENT OFFICE.

NEWMAN H. HOLLAND, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO BELL TELEPHONE LABORATORIES, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ACOUSTIC DIAPHRAGM.

Application filed June 12, 1926. Serial No. 115,476.

This invention relates to acoustic diaphragms, and more particularly to such diaphragms for use in phonographs or loud speakers as sound radiators.

An object of this invention is to provide a diaphragm which will have high elastic reactance and low mass.

Such a diaphragm is attained, in accordance with the invention in a specific aspect, by winding a light tubular material in the form of a flat spiral, the adjacent convolutions of which are held in contact by an adhesive substance.

A preferred form of the invention is shown on the attached drawing in which Fig. 1 is a front view and Fig. 2 a view in partial section of the diaphragm mounted in a phonograph sound box.

As illustrated, one end of a piece of light tubular material, such as straw, is attached to a small spool-shaped piece 4, which may be of metal, and is then wound in the form of a flat spiral substantially as shown. The spirals may be made by any of the well known methods of coiling or bending tubular materials. When tubular straw is used it may be coiled by the method employed in making straw hats of similar material. Tubular straw has the advantage of lightness over metal tubes although it is more difficult to wind owing to the tendency of the straw to kink or collapse at intervals especially when the radius of the bend is small. However any kinks that occur do not noticeably affect the operation of the diaphragm. During the winding process a small amount of adhesive material, such for example as a moisture proof cement, is introduced so that adjacent convolutions are held together. The outside end of the tubular material may be tapered as shown at 5 either by cutting the end of the tube on the bias or collapsing it.

When applied to a phonograph sound box the diaphragm is clamped between rings 6 of a resilient material such as rubber by a cap 7 which is attached to the main body 8 of the sound box by means of a number of screws 9. The pressure of the rings 6 on the diaphragm should only be sufficient to insure an air-tight joint.

The stylus arm 10, attached to spool 4 and pivotally supported at 11, has a needle 12 held therein which cooperates with a phonograph record, not shown. The vibrations of the record are transmitted to the diaphragm through the needle and stylus arm.

What is claimed is:

1. An acoustic diaphragm comprising light tubular material wound in the form of a spiral.

2. An acoustic diaphragm comprising a plurality of convolutions of a light tubular material.

3. An acoustic diaphragm comprising a plurality of convolutions of a tubular material, the adjacent convolutions being in contact.

4. An acoustic diaphragm comprising a plurality of convolutions of straw.

5. An acoustic diaphragm comprising a plurality of convolutions of straw, adjacent convolutions being held in contact by an adhesive substance.

In witness whereof, I hereunto subscribe my name this 10th day of June A. D., 1926.

NEWMAN H. HOLLAND.