

A. HAYES.  
METHOD OF MOUNTING A VIBRATING DIAPHRAGM.  
APPLICATION FILED MAR. 13, 1913.

1,061,072.

Patented May 6, 1913.

FIG. 1.

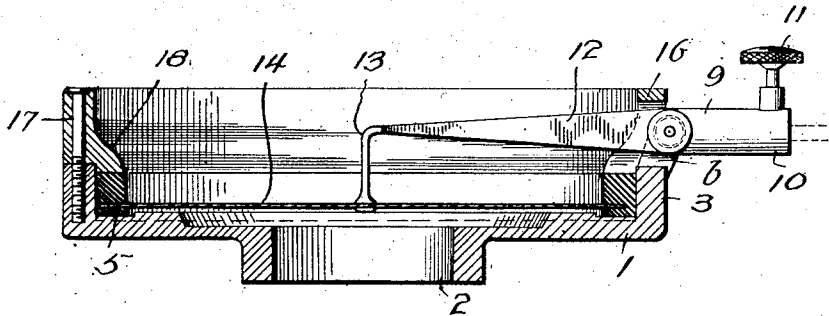


FIG. 2.

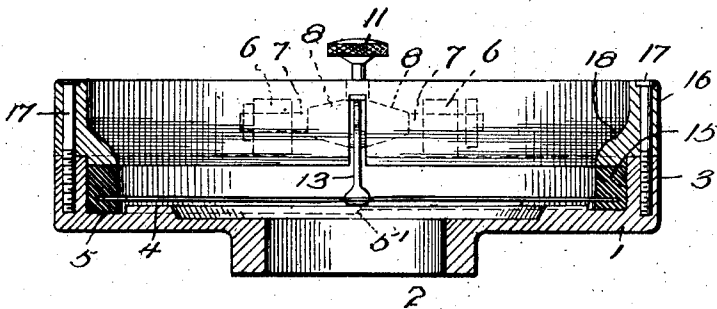
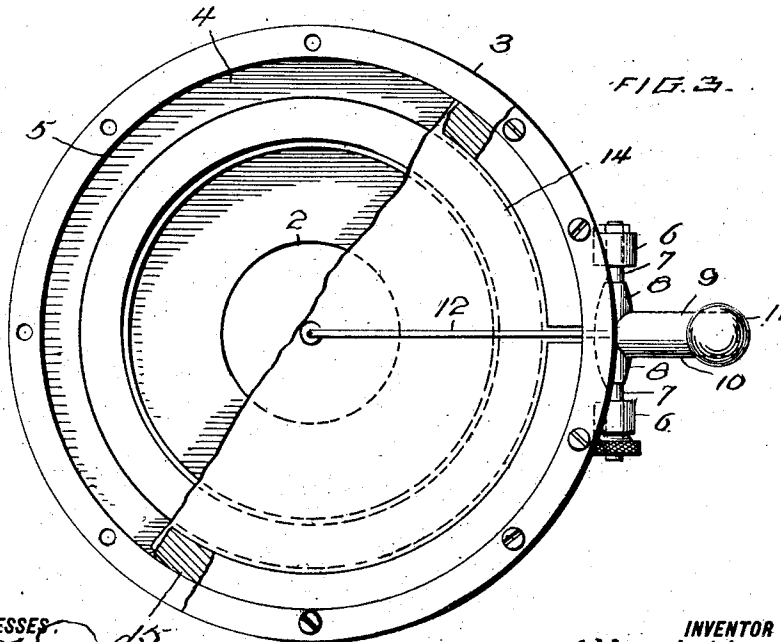


FIG. 3.



WITNESSES.

*H. F. Rapp.*  
*Parker Cook.*

INVENTOR

*Albert Hayes.*

*A. P. Grady*  
ATTORNEY

# UNITED STATES PATENT OFFICE.

ALBERT HAYES, OF SALT LAKE CITY, UTAH.

## METHOD OF MOUNTING A VIBRATING DIAPHRAGM.

1,061,072.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed March 13, 1913. Serial No. 754,063.

*To all whom it may concern:*

Be it known that I, ALBERT HAYES, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake, State of Utah, have invented certain new and useful Improvements in Methods of Mounting a Vibrating Diaphragm, of which the following is a description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to methods of construction and arranging the diaphragm of sound reproducing devices such as the sound boxes of gramophones, graphophones and other devices in which sound is reproduced by the vibration of a diaphragm, and the invention has for its object to increase the sensitiveness of such diaphragms and to thus secure improved results in the reproduction of sounds.

With these objects in view my invention consists in the method hereinafter described and claimed.

Referring to the drawings: Figure 1 is a central vertical sectional view of a sound box adapted to carry out my invention, taken on the line of the lever by which the diaphragm is vibrated; Fig. 2 is a central vertical sectional view on a line at right angles to that on which Fig. 1 is taken; and, Fig. 3 is a plan view of the sound box partly broken away.

In the drawings 1 indicates the body of the sound box having central opening 2 in which is received the end of the horn or sound tube (not shown). This body 1 has at its periphery a flange 3. Within the chamber formed by the flange 3 concentric with the opening 2 is a ring 4, the face of which is dressed off and is throughout in the same plane, which plane is at right angles with the axis of the body 1.

Between the ring 4 and the flange 3 is a depressed annular channel 5 which is so formed that it is deeper, relative to the plane of the face of the ring 4, on one side of the axis of the sound box than on the other so that portions of the bottom of the annular channel 5 are in two different planes with a shoulder 5' between them with the result that when the disk is forced down as hereinafter described a kink or bend will be formed in it on the line of the shoulders 5'.

On one side the flange is cut away and is

provided at the ends of the cut away portion with lugs 6, each of which is provided with an inwardly extending bearing point 7, preferably adjustable in the lugs, to form the bearings for the trunnions 8 of a lever 9, the outer arm 10 of which is provided with a socket to receive the needle or stylus (not shown) a set screw 11 being provided for holding the needle in position. The inner arm 12 of lever 9 extends into line with the center of the opening 2 and at its inner end is bent toward said opening as shown at 13. To the inner end of the arm 13 is rigidly secured a disk 14, preferably of mica, of a diameter slightly less than the interior diameter of the flange 3, and provided on its periphery with a ring 15 of semi-hard rubber, that is rubber which has been vulcanized sufficiently to make it harder than soft rubber. This ring 15 envelops the periphery of the disk so as to form a somewhat compressible ring above it and below it.

16 indicates a clamping ring secured to the flange 3 by screws 17 and having an inwardly extending annular shoulder 18 adapted to fit over and upon the ring 15 to force it downward so that the portion of the ring below the periphery of the disk 14 will be pressed firmly against the bottom of the annular channel 5 throughout its two portions so that the disk 14 will be so forced or distorted out of a plane parallel with the dressed face of ring 4 that one portion will be lower than the other and a link or bend will be formed in it on the line of the shoulders 5'.

The lever 9 being rigidly held by the bearing points 7 against any twisting, and the end of the arm 13 being rigidly secured to the center of the diaphragm disk, and the periphery of the diaphragm disk being lower on one side than on the other it necessarily follows that the center portion of the disk will be bowed or distorted as shown in Fig. 2. By reason of this bowing or distortion of the diaphragm it is not only stiffened but it is given a considerable resilience so that when acted on by the lever 9 to cause it to vibrate it will return quickly to normal position and will aid in restoring the lever to normal position or state of rest. The action of the groove of the record on the needle or stylus is thus aided by the spring of the diaphragm. No such spring

action is possible where the diaphragm is so held at its periphery as to be free to be vibrated bodily as in the ordinary arrangement. In the arrangement herein shown and described the diaphragm disk being  
 5 firmly held at its periphery the only movement permitted is a vibration of the central portion of the disk and this movement of the vibration is permitted only by reason of  
 10 the kink, bend or offset given to the disk as above described as a flat disk clamped at its periphery could not be vibrated to a satisfactory extent by force applied at its center.

15 It will, of course, be understood that the disk 14 is not at any time in contact with the dressed face of ring 4.

The trunnions 8 are rigidly held by the bearing points 7 against any lateral or vertical movement so that the forcing of the  
 20 periphery of the disk 14 into a plane out of that parallel to the face of the ring 4 cannot cause any distortion of the lever 9.

By reason of the projection of the ring  
 25 4 above the plane of the bottom of annular channel 5 the lower portion of the compressible ring 15 is held against inward expansion where pressure is brought to bear upon the ring.

30 It will, of course, be understood that I do not desire to be limited to the precise construction and arrangement shown and described as it will be obvious that my method may be carried out by apparatus differing

from that shown and described in details 35 of construction and arrangement.

It will also be understood that I do not herein claim the construction of sound box herein shown and described as that is  
 40 claimed in a separate application filed by me on March 8, 1913, Serial No. 732,885.

Having thus described my invention what I claim is:

1. The herein described method of mounting a vibrating diaphragm which consists  
 45 in clamping a diaphragm at its periphery against a surface one portion of which is out of the plane of another portion so that a part of the central portion of the diaphragm is forced out of the plane of another  
 50 portion of said central portion along a diametrical line, and applying vibrating means to the central portion of the diaphragm.

2. The herein described method of mounting a vibrating diaphragm which consists  
 55 in so clamping a diaphragm at its periphery that one portion thereof will be out of the plane of the other portion with a kink, bend or upset between the two portions extending across the central portion of the dia-  
 60 phragm and applying vibrating means to the center of the diaphragm.

This specification signed and witnessed this 13th day of March A. D. 1913.

ALBERT HAYES.

In the presence of—  
 A. M. PARKINS,  
 PARKER COOK.