

P. WEBER.
 DIAPHRAGM FOR PHONOGRAPHS.
 APPLICATION FILED MAR. 22, 1907.

975,377.

Patented Nov. 8, 1910.

Fig. 1

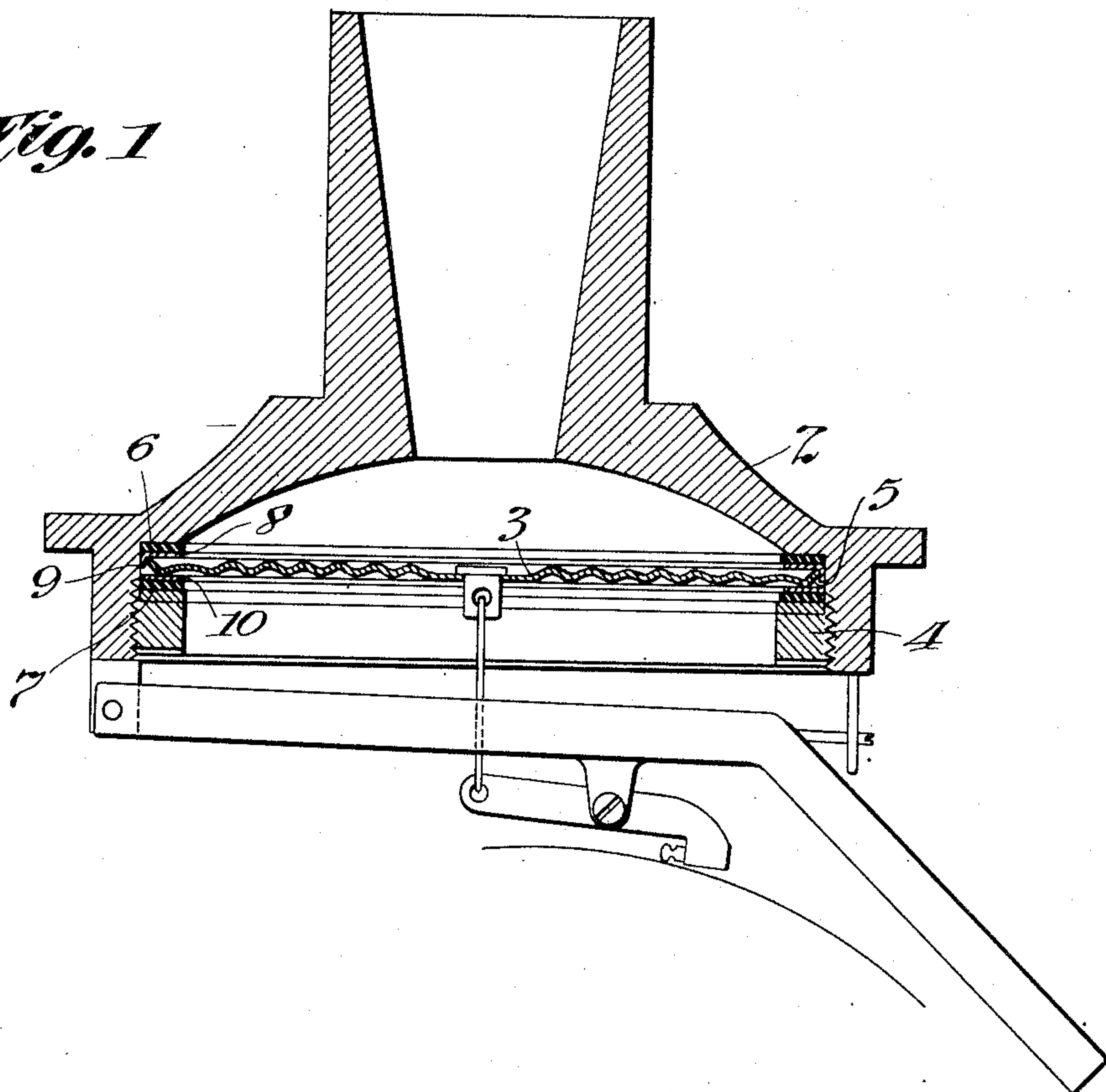
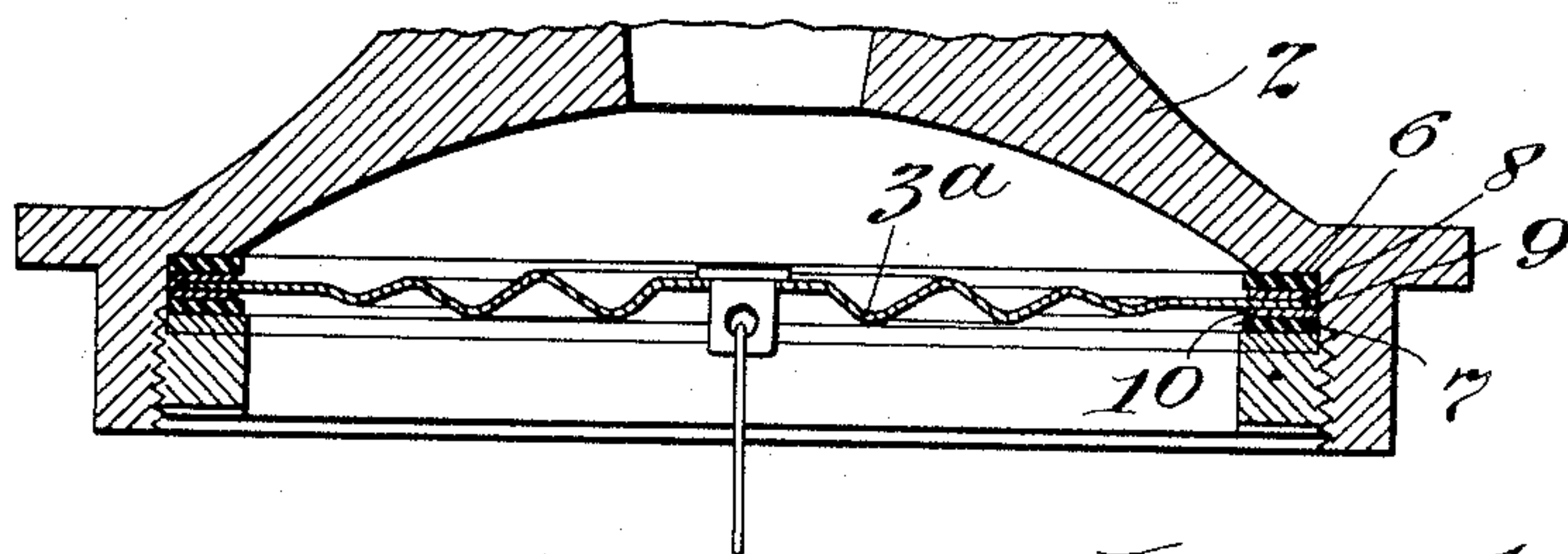


Fig. 2



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 Att.

UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed March 22, 1907. Serial No. 363,814.

To all whom it may concern.

Be it known that I, PETER WEBER, a citizen of the United States, and a resident of Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Diaphragms for Phonographs, of which the following is a description.

In order to secure the correct reproduction of sounds by means of a vibrating diaphragm, it is desirable that means be provided for putting the diaphragm to be vibrated under an initial tension. Various means, extraneous to the diaphragm itself, such as springs, weights and the like, have been resorted to for this purpose.

I have discovered that very desirable results may be attained by so mounting the diaphragm in a sound box that it is kept in a state of tension due to the mode in which it is fastened therein, and without resorting to any extraneous tensioning devices.

An object of the present invention is to provide means for thus putting and maintaining the diaphragm under tension. One means which I find to be effectual is to so form the diaphragm that the clamping pressure will be applied to its opposite faces, at different distances from its center. A preferable mode of obtaining this result is to provide the margin of the diaphragm with a flange extending at an angle away from its general surface, so that when the edge of the diaphragm is clamped in place, clamping pressure will be applied on one face of the diaphragm at the outer margin of this flange and on its other face pressure will be applied at the base of the flange. Since the base of the flange is a short distance nearer the center of the diaphragm than its outer edge, this results in a bending stress upon the diaphragm which assumes a position where the bending stress is balanced by the elastic re-action of the diaphragm, which is thus maintained in a state of tension in which it is extremely responsive to any vibration which may be imparted to it. To do away with vibrations not common to the entire diaphragm, I may form my diaphragm with concentric corrugations extending throughout all of its surface except a small space at its center, and the margin thereof. This corrugated portion is quite stiff and vibrates substantially as a whole. The bending of the diaphragm due to its being

clamped on different concentric lines on its different faces, is thus confined to the outer portion and does not extend to the corrugated inner portion. Although I prefer to use a corrugated diaphragm, my invention may be applied to diaphragms of any form.

The material which I have found to be most desirable for use in a phonographic reproducer diaphragm, is hard, rolled sheet copper about .0025" in thickness. To properly secure the diaphragm in place rubber gaskets are commonly used. As, however, the sulfur in the rubber is apt to attack and corrode the copper, I interpose gaskets of material, which will not affect the copper, between the rubber gaskets and the copper diaphragm. I have found that paper is well suited to this use. I have also found that it is desirable to prevent the contact of the metal diaphragm with the metallic body of the sound box, as better results are obtained from diaphragms in which means are provided to prevent such contact. I therefore arrange the paper gaskets in such a way that they not only prevent contact between the copper diaphragm and the rubber gaskets, but also insulate the copper diaphragm from the metal of the sound box body. A preferable way in which to attain this end is to make one of the paper gaskets of the ordinary ring form while the other is made with a marginal flange or cupped portion, this flange serving to keep the edge of the diaphragm from contact with the metal of the sound box body, while the flat portion is interposed between the diaphragm and the rubber gasket.

In order that my invention may be better understood, attention is directed to the accompanying drawings in which—

Figure 1 is a view in central vertical section of a phonograph reproducer embodying my invention, and Fig. 2 is a similar view of a modified construction.

In both of the above views corresponding parts are represented by the same numerals of reference.

In the sound box body 2, the diaphragm 3 is clamped by means of a screw threaded ring 4. This diaphragm, throughout its surface, except at the margin and a small portion near its center, is formed with concentric corrugations by which means it is made quite stiff and at the same time as light as possible. A diaphragm formed in this

manner will not buckle under any ordinary strain. On the outer margin of the diaphragm 3 is formed a flange 5 extending at an angle to its general surface. Immediately inside of this flange a shallow groove is formed upon the opposite side of the diaphragm, in order that when the diaphragm is secured in place, the clamping pressure will be exerted in very narrow regions; on the upper side of the diaphragm, as shown, the pressure being only on the outer edge of the flange, and on the lower surface of the diaphragm the pressure being exerted only within a very narrow region at the base of the said flange. It is evident that with this construction, when the ring 4 is secured in its place, the diaphragm will be placed under tension due to the fact that the clamping pressure is exerted in regions not vertically opposite.

Rubber gaskets 6 and 7 are interposed between the seat in the sound box body 2 and the diaphragm, and between the ring 4 and the diaphragm. Immediately upon each face of the diaphragm 3 and between it and the rubber gaskets, are placed washers 8 and 10 of insulating material, preferably paper. The lower washer 10 as shown, is of the ordinary ring form, while the upper paper washer 8 is provided with a marginal flange 9, which is interposed between the edge of the diaphragm and the metal of the sound box body.

In Fig. 2 I have shown a diaphragm 3^a which is provided with corrugations increasing in depth toward the center, and having a flat margin. This margin has immediately beneath it an insulating washer 10 and immediately above it an insulating washer 8 having a marginal flange 9. These washers serve to prevent contact between the diaphragm and either the rubber gaskets or the metal of the sound box body. In this case, the margin of the diaphragm being flat, the insulating paper washers are in contact with the flat surface of the diaphragm throughout their whole surface.

While it is evident that I may place the paper washer having the marginal flange on either side of the diaphragm, I have shown it above the diaphragm for the reason that the parts may be more readily assembled by first introducing the flanged washer into the sound box body and thereafter positioning the diaphragm upon it, than would be the case if the diaphragm were first introduced upon the plain ring form washer and the flanged washer introduced thereafter.

Having now described my invention, what I claim as new is—

1. In a phonograph, a two part clamp, the clamping surfaces thereof being co-extensive and opposed to one another, and a diaphragm held in said clamp the said diaphragm being of such a conformation in

the neighborhood of its edges that said clamp operates to simultaneously place the diaphragm under tension and hold it in place, substantially as set forth.

2. In a phonograph, a sound box body provided with a clamping surface, clamping means provided with a coöperative clamping surface opposite the clamping surface of the sound box body, a diaphragm provided with a marginal flange interposed between the said clamping surfaces, the clamping pressure being applied to the base of the marginal flange and to the outer edge of the diaphragm respectively, substantially as set forth.

3. In a phonograph, the combination of a sound box body having a clamping surface, a diaphragm having a marginal flange and a shallow groove immediately inside the flange on the opposite side of the diaphragm, and means applied to the base of the said flange and opposite the clamping surface of the body for clamping the edge of the flanged portion of the diaphragm against the sound box body, substantially as set forth.

4. In a phonograph, the combination of a sound box body having a clamping surface, a corrugated diaphragm having a marginal flange and a shallow groove immediately inside the flange on the opposite side of the diaphragm, and means applied to the base of the said flange and opposite the clamping surface of the body for clamping the edge of the flanged portion of the diaphragm against the sound box body, substantially as set forth.

5. In a phonograph, the combination of a sound box body having a clamping surface, a diaphragm having a marginal flange and a shallow groove immediately inside the flange on the opposite side of the diaphragm, and means applied to the base of the said flange and opposite the clamping surface of the body for clamping the edge of the flanged portion of the diaphragm against the sound box body, and soft gaskets interposed between the diaphragm and the sound box body and between the diaphragm and the clamping means respectively, substantially as set forth.

6. In a phonograph, a sound box body provided with a clamping surface, a diaphragm provided with an angular marginal flange and with a groove immediately inside the flange on the opposite side of the diaphragm, forming thereby a sharp base for the flange, and a clamping means provided with a surface between which and said first named clamping surface said diaphragm is clamped at its marginal flange, the clamping pressure being applied by said surfaces to the sharp base and to the outer edge of said flange respectively, substantially as set forth.

7. In a phonograph, the combination of a
sound box body, a copper diaphragm, means
for clamping the diaphragm in the body,
rubber gaskets interposed between the dia-
5 phragm and the body and between the dia-
phragm and the clamping means respec-
tively, and gaskets of insulating material
interposed between the rubber gaskets and
the diaphragm, one of the same being of ring
10 form and one having a marginal flange in-
terposed between the edge of the diaphragm
and the sound box body, substantially as set
forth.

8. In a phonograph, the combination of a
15 sound box body, a corrugated copper dia-
phragm, means for clamping the diaphragm
in the body, rubber gaskets interposed be-

tween the body and the diaphragm and be-
tween the clamping means and the dia-
phragm respectively, a paper gasket be- 20
tween one of the rubber gaskets and the dia-
phragm and a second paper gasket having
a flanged margin, interposed between the
second rubber gasket and the diaphragm
and having its flanged portion interposed 25
between the edge of the diaphragm and the
sound box body, substantially as set forth.

This specification signed and witnessed
this 28th day of February 1907.

PETER WEBER.

Witnesses:

FRANK L. DYER,
FRANK D. LEWIS.