

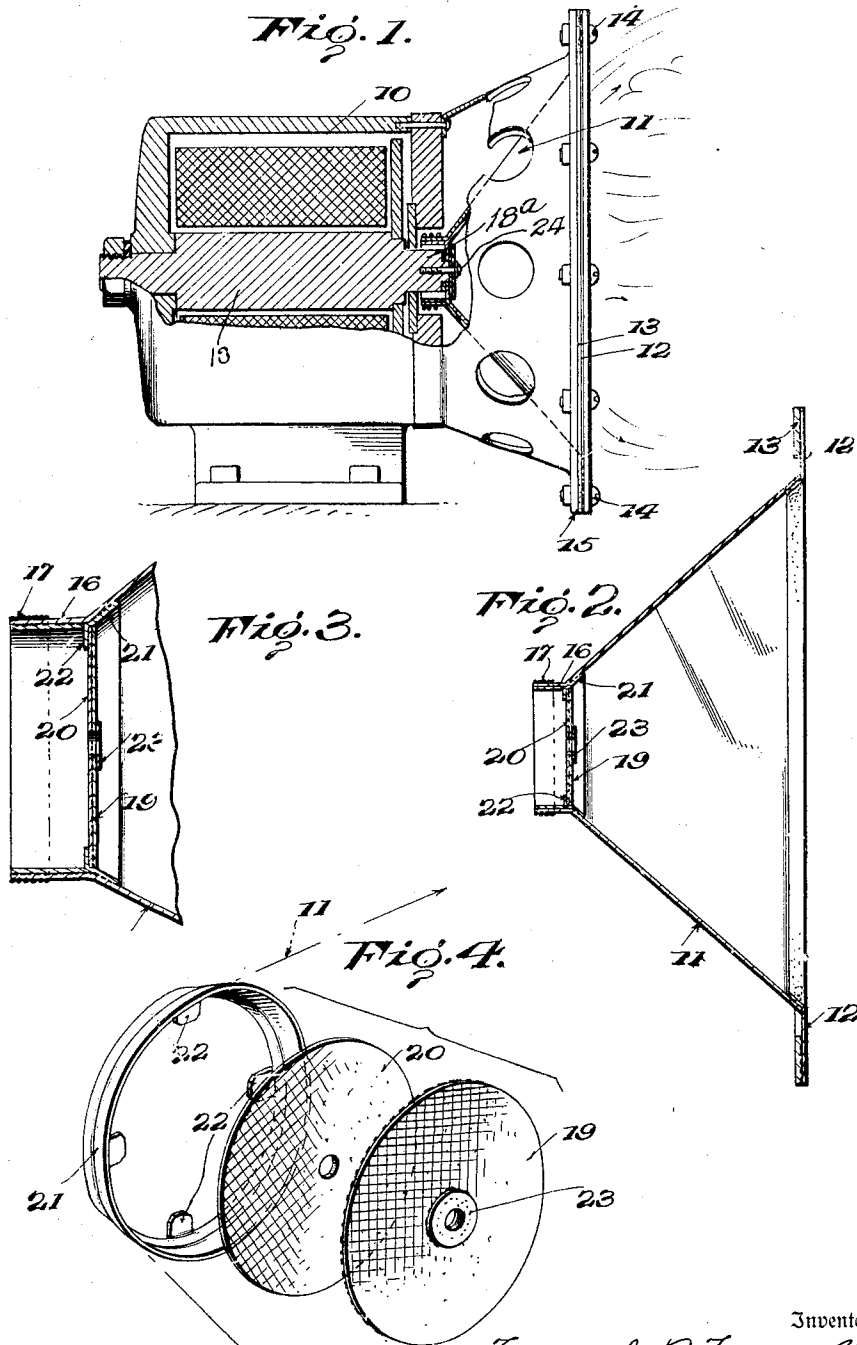
Nov. 10, 1931.

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1,831,235

DIAPHRAGM MOUNTING

Filed April 6, 1929



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UNITED STATES PATENT OFFICE

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DIAPHRAGM MOUNTING

Application filed April 6, 1929, Serial No. 353,091, and in Great Britain February 13, 1929.

This invention relates to acoustic diaphragms and more particularly to means for mounting the same.

It is an object of this invention to provide an improved means for mounting an acoustic diaphragm which is possessed of the requisite flexibility and which at the same time has greater durability under the vibratory impulses imparted to the diaphragm than heretofore obtained with the spider mountings and other devices heretofore employed.

In the case of electro-dynamic type loud speakers, for example, wherein is employed a frusto-conical diaphragm having a cylindrical coil secured thereto at the small end, the clearance between the coil and the magnetic poles should be as small as possible without danger of contact, and therefore the diaphragm should be fixedly centered by means which are both highly flexible and very durable. It is an object of this invention to provide a device for mounting the diaphragm at its center which will permit the clearance between the coil and poles to be reduced to a minimum and which at the same time will be highly flexible and yet will not distort, loosen or rupture in service.

In devices of the type referred to, it has been customary to attach the diaphragm at its center to a fixed post, as by a spider secured to the post at its center and to the diaphragm at its periphery, but much difficulty has heretofore been experienced in providing a center attachment which will not deteriorate, loosen and rattle, and ultimately break. It is an object of this invention to provide a center attachment for the diaphragm which is capable of withstanding the vibrations of the diaphragm without the difficulties heretofore experienced with deterioration, loosening and rattling, and ultimate rupture, and which at the same time will have high flexibility so as to offer little restraint to the vibration of the diaphragm.

Other objects of the invention will appear as the description proceeds.

The invention is capable of receiving a variety of mechanical expressions, one of which is shown on the accompanying drawings, but it is to be expressly understood that the

drawings are for purposes of illustration only, and are not to be construed as a definition of the limits of the invention, reference being had to the appended claims for that purpose.

Referring in detail to the drawings, wherein the same reference characters are employed to designate corresponding parts,

Fig. 1 is a more or less diagrammatic elevation of an electro-dynamic type loud speaker embodying the present invention;

Fig. 2 shows an enlarged axial section of the diaphragm, illustrating the centering device of the present invention.

Fig. 3 is an enlarged fragmentary section of the centering device; and

Fig. 4 is a perspective view of the elements of the centering device.

In the structure illustrated, 10 designates the casing of a loud speaker of any suitable construction, provided with a frusto-conical diaphragm 11 of any suitable size, construction and material and flexibly mounted at its periphery in any suitable way, as by an annulus 12 of flexible material such as leather, attached to a ring 13, which may be of fibrous material, by which it may be attached, as by screws 14, to the rim 15 of the casing. The illustrated structure is to be taken, however, as typical of any suitable device employing any suitable diaphragm which is to be centered as hereinafter described.

As usual in structures of this character, the diaphragm is provided at its center, integral therewith or suitably attached thereto, with a generally cylindrical extension 16, upon which is wound the coil 17. To center the diaphragm the usual magnet frame or central pole 18 of the loud speaker may be provided with a fixed post or pillar 18a to which the center of the diaphragm is fixedly attached in any suitable manner.

In the form shown, the centering device for the diaphragm is composed of a pair of discs 19 and 20 of woven material, preferably unbleached muslin, attached together by a suitable cement or adhesive, preferably rubber cement, said discs being preferably so arranged that the threads of one disc are disposed at an angle of substantially 45°

with the threads of the other disc. The adhesive employed is preferably such as to permeate the fibers of the discs as well as attach the discs together.

5 Said discs are attached to the diaphragm at the small end of the cone in any suitable way, either directly or by means of an interposed annulus, such as a ring 21 of suitable material, brown paper for example, which
10 may be attached to the cone by a suitable adhesive or cement, such as ambroid, and which may be provided with a flange, segments or tabs 22 for attachment to the composite disc 19, 20, by any suitable adhesive.
15 The center of the composite disc 19, 20 is provided with an aperture for receiving a screw 24 which is threaded into the outer end of fixed post 18a and rigidly secures said disc at its center to the fixed portion of the
20 loud speaker assembly. A washer 23 of any suitable material, such as paper, is preferably attached to the composite disc for interposition between the head of the screw 24 and said disc.

25 The magnet frame structure including central pole 18 and fixed post 18a, and the use of screw 24 to fixedly secure the center of the diaphragm to a fixed portion of the loud speaker assembly, form no part of the present
30 invention, and may be of any suitable construction, the form shown being acknowledged to be well known in the loud speaker art. For instance, a similar structure is disclosed in Patent No. 1,798,157, in the name of
35 Carleton D. Haigis, which is assigned to the same party as the present invention.

A centering device constructed as heretofore described is very durable and has a long
40 life without deterioration, distortion, loosening or rattling. At the same time it is very flexible and imposes little restraint on the vibration of the diaphragm.

While the embodiment of the invention illustrated on the drawing has been described
45 with considerable particularity it is to be expressly understood that the invention is not restricted thereto as the same is capable of receiving other mechanical expressions, some of which will now readily suggest them-
50 selves to those skilled in the art, while changes may be made in the details of the construction, and material, employed and in the arrangement and proportion of parts, without departing from the spirit of this
55 invention.

While it is preferred to construct the centering device in the manner heretofore described, some of the advantages of the inven-
60 tion can be obtained by using other woven materials such as fine wire screen, or other materials such as collodion or the like for permeating or securing the discs together, or
65 by arranging the discs with their threads at other angles, etc. Additional discs may be employed if desired and even a single disc has

been found to give improved results over devices previously in use. While the invention has been described as embodied in a center attachment, the invention may also be employed in a peripheral attachment for dia-
70 phragms. The invention may also be employed with other types of diaphragms and in other types of structures than those illustrated, and also as a center attachment to vibratory as well as non-vibratory parts.
75 Reference is therefore to be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In combination with a diaphragm, attaching means at the center of the diaphragm comprising woven material peripherally se-
80 cured to the diaphragm.

2. In combination with a diaphragm, attaching means at the center of the diaphragm comprising unbleached muslin secured at its
85 periphery to the diaphragm.

3. In combination with a diaphragm, attaching means at the center of the diaphragm comprising a plurality of discs of woven ma-
90 terial secured together and peripherally secured to the diaphragm.

4. In combination with a diaphragm, attaching means at the center of the diaphragm comprising a plurality of discs of unbleached
95 muslin secured together and peripherally secured to the diaphragm.

5. In combination with a diaphragm, attaching means at the center of the diaphragm comprising a plurality of discs of woven ma-
100 terial attached together with cement and peripherally secured to the diaphragm.

6. In combination with a diaphragm, attaching means at the center of the diaphragm comprising a plurality of discs of woven ma-
105 terial secured together with their threads at substantially 45° and peripherally secured to said diaphragm.

7. In combination with a diaphragm, attaching means at the center of the diaphragm comprising a plurality of discs of unbleached
110 muslin secured together by cement and peripherally secured to said diaphragm.

8. In combination with a diaphragm, attaching means at the center of the diaphragm comprising a plurality of discs of unbleached
115 muslin secured together with their threads at substantially an angle of 45° and peripherally secured to said diaphragm.

9. In combination with a diaphragm, attaching means at the center of the diaphragm comprising a plurality of discs of unbleached
120 muslin cemented together with cement with their threads disposed at substantially an angle of 45° to each other and peripherally
125 secured to said diaphragm.

10. The combination of a diaphragm, a support for said diaphragm, and means for
130 fixedly mounting the center of said diaphragm on said support comprising at least

one disc of woven material peripherally attached to the diaphragm and centrally attached to said support.

11. The combination of a diaphragm, a support for said diaphragm, and means for fixedly mounting the center of said diaphragm on said support comprising at least one disc of unbleached muslin peripherally attached to said diaphragm and centrally attached to said support.

12. The combination of a diaphragm, a support for said diaphragm, and means for fixedly mounting the center of said diaphragm on said support comprising a plurality of discs of woven material secured together by cement and peripherally secured to said diaphragm, said discs being centrally attached to said support.

13. The combination of a diaphragm, a support for said diaphragm, and means for fixedly mounting the center of said diaphragm on said support comprising a plurality of discs of woven material secured together with their threads at substantially an angle of 45° and peripherally secured to said diaphragm, said discs being centrally attached to said support.

14. The combination of a diaphragm, a support for said diaphragm, and means for fixedly mounting the center of said diaphragm on said support comprising a plurality of discs of unbleached muslin secured together by cement and peripherally secured to said diaphragm, said discs being centrally attached to said support.

15. The combination of a diaphragm, a support for said diaphragm, and means for fixedly mounting the center of said diaphragm on said support comprising a plurality of discs of unbleached muslin secured together with their threads at substantially an angle of 45° and peripherally secured to said diaphragm, said discs being centrally attached to said support.

16. The combination of a diaphragm, a support for said diaphragm, and means for fixedly mounting the center of said diaphragm on said support comprising a plurality of discs of woven material cemented together with their threads at substantially an angle of 45°, said discs being peripherally attached to said diaphragm and centrally attached to said support, and a washer between said discs and the center attaching means.

17. In combination with a diaphragm, means for mounting said diaphragm comprising layers of woven material secured together.

18. In combination with a diaphragm, means for mounting said diaphragm comprising layers of unbleached muslin secured together.

19. In combination with a diaphragm, means for mounting said diaphragm comprising layers of woven material secured to-

gether with their threads substantially at 45°.

20. In combination with a diaphragm, means for mounting said diaphragm comprising layers of unbleached muslin cemented together with cement.

21. In combination with a diaphragm, means for mounting said diaphragm comprising layers of unbleached muslin secured together with their threads substantially at an angle of 45°.

22. In combination with a diaphragm, means for mounting said diaphragm comprising layers of woven material cemented together with cement.

In testimony whereof I have signed this specification.

FREDERICK R. FARROW, JR.

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