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M. HÖNIG

1,939,447

DIAPHRAGM FOR ACOUSTIC DEVICES

Filed July 8, 1932

Fig 1.

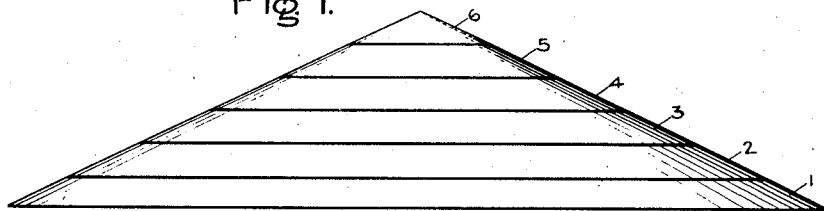


Fig 2.

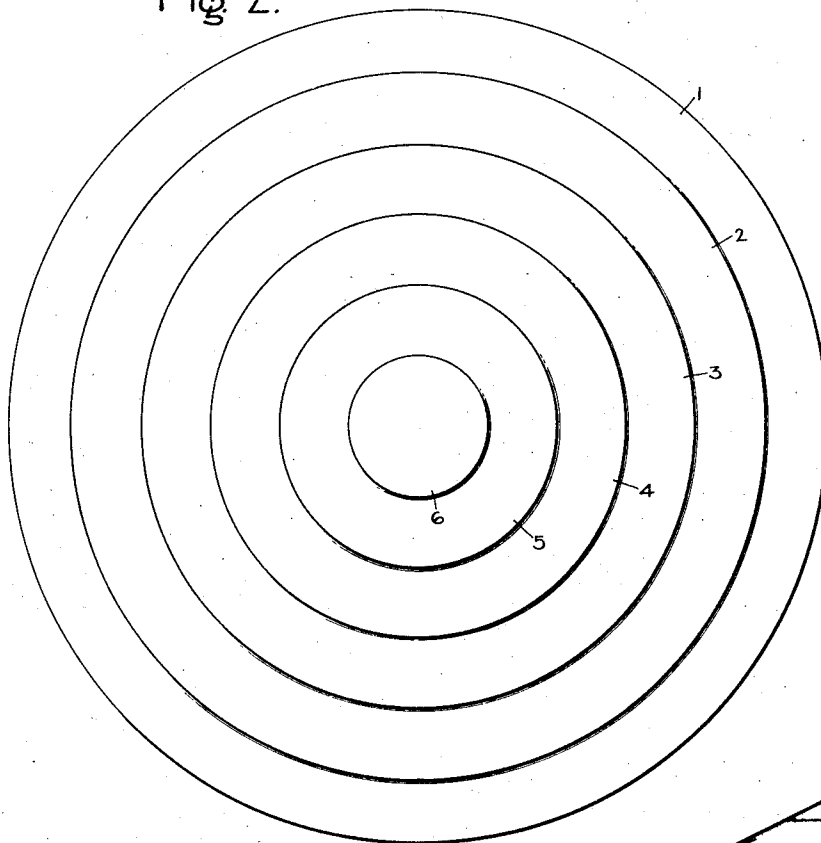
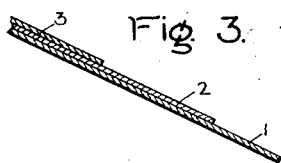


Fig 3.

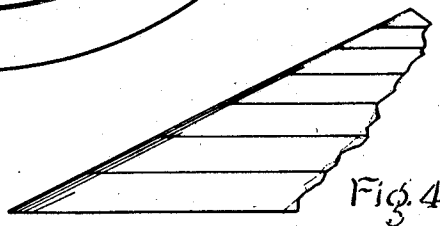


Fig 4.

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UNITED STATES PATENT OFFICE

1,939,447

DIAPHRAGM FOR ACOUSTIC DEVICES

Martin Hönig, Berlin, Germany, assignor to General Electric Company, a corporation of New York

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5 Claims. (Cl. 181—32)

My invention relates to diaphragms for acoustic devices, particularly to large area cone diaphragms for loud speakers, and its object is to provide a diaphragm of this type strengthened uniformly from apex to circumference whereby sound transmission of uniform fidelity over a wide band of sound frequencies is insured.

In order to obtain the utmost fidelity in the reproduction of speech and music it is necessary that the loud-speaker diaphragm transmit as wide a frequency band as possible, from the lowest frequencies corresponding to the deepest tones to the highest frequencies corresponding to the highest tones and overtones, the sound transmission throughout the range being uniformly good. To achieve this result with a single diaphragm it has already been proposed that the diaphragm should be strengthened uniformly or gradually from inside to outside or from center to circumference. However, no entirely satisfactory results have hitherto been obtained in this manner with the materials previously employed.

It is therefore proposed, in accordance with my invention, that such loud-speaker diaphragms, particularly loud-speaker diaphragms of the cone type, should be manufactured from several cones of hard paper of slight thickness gummed inside of or over each other and with graded covering length. The paper may be impregnated with artificial resins, particularly with condensation products of phenol and formaldehyde, which at the same time serve as cementing or gumming material for connecting the individual diaphragms. The steps of different thickness thus obtained in the diaphragm may be varied in length in a given case in accordance with acoustic requirements.

My invention will be better understood from the following description when considered in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

Referring to the drawing, Figure 1 is a side elevational view of a loud-speaker diaphragm in accordance with my invention, Fig. 2 is a top plan view of the diaphragm shown in Fig. 1, Fig. 3 is a sectional view of a portion of the diaphragm shown in Figs. 1 and 2, and Fig. 4 is a fragmental side-elevational view of a modification of the invention.

The loud-speaker diaphragm shown in Figs. 1 and 2 consists of six different individual diaphragms 1 to 6, each of the individual diaphragms being formed of suitable material, preferably thin hard paper approximately 0.1 mm. thick. The

individual diaphragms are preferably of different covering length, the innermost component diaphragm 1 being the largest, over which the other individual diaphragms 2 to 6 are laid in turn, their covering lengths preferably decreasing uniformly. The component diaphragms are cemented or gummed together in a well known manner, pressure and heat being utilized in the process, the condensation products of phenol and formaldehyde serving as impregnating and binding materials.

As shown more clearly in Fig. 3, the complete diaphragm is thus given a thickness which decreases gradually from inside to outside or from apex to circumference.

Instead of a uniform graduation of several thicknesses of the diaphragm a graduation into thicknesses of varying length may be employed in a given case, as shown in Fig. 4.

It will be observed that the use of bakelized hard paper for the individual diaphragms 1 to 6 makes possible a finely graded subdivision of the complete diaphragm into portions of different thickness without inadmissible thicknesses of the finished diaphragm being obtained.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. A cone diaphragm of the large area type the thickness of which increases from outside to inside comprising a plurality of individual cone diaphragms of the order of six formed of hard paper of approximately 0.1 mm. thickness throughout, said individual diaphragms being of graded covering length and impregnated and cemented one over the other by a resin material.

2. A composite cone diaphragm of the large area type the thickness of which increases from outside to inside comprising a plurality of individual cone diaphragms of the order of six formed of hard paper material of approximately 0.1 mm. thickness throughout, said individual cones being of graded covering length and cemented one over the other by a resin material, the steps of different thickness thereby formed in said composite diaphragm being of the same length.

3. A composite cone diaphragm of the large area type the thickness of which increases from outside to inside comprising a plurality of individual cone diaphragms of the order of six formed of hard paper material of approximately 0.1 mm. thickness throughout, said individual diaphragms being of graded covering length and cemented one over the other by a resin material, the steps of different thickness thereby formed

in said composite diaphragm being of different lengths.

4. A composite cone diaphragm of the large area type the thickness of which varies from outside to inside comprising a plurality of individual cone diaphragms of the order of six formed of hard paper of approximately 0.1 mm. thickness throughout impregnated and cemented one over the other by a condensation product of phenol and formaldehyde, said individual diaphragms being of graded covering length to form steps of different thickness in said composite diaphragm, said steps being of the same length.

5. A composite cone diaphragm of the large area type the thickness of which varies from outside to inside comprising a plurality of individual cone diaphragms of the order of six formed of hard paper of approximately 0.1 mm. thickness throughout impregnated and cemented one over the other by a condensation product of phenol and formaldehyde, said individual diaphragms being of graded covering length to form steps of different thickness in said composite diaphragm, said steps being of different length.

MARTIN HÖNIG.

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