W. D. GANS.

DIAPHRAGM FOR PHONOGRAPHS, &c.

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1,355,600 Patented Oct. 12, 1920.

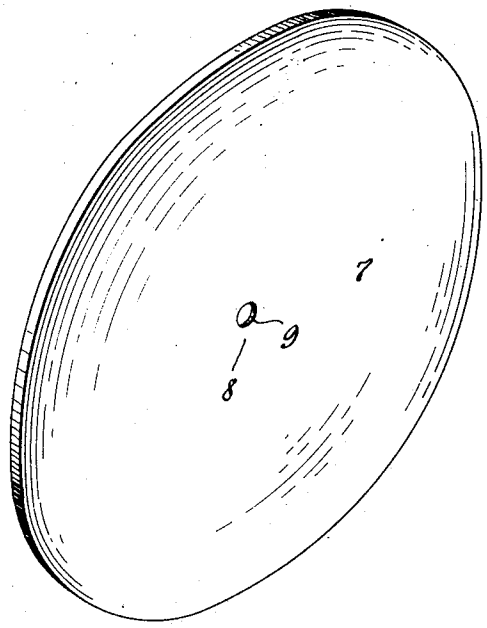


Fig. 1.

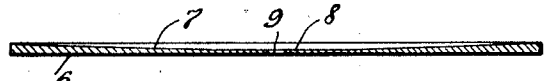


Fig. 2.

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UNITED STATES PATENT OFFICE.

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DIAPHRAGM FOR PHONOGRAPHS, &c.

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To all whom it may concern:

Be it known that I, WILLIAM D. GANS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Diaphragms for Phonographs, &c., of which the following is a specification.

This invention relates to diaphragms and has for its object to produce an improved diaphragm particularly adapted and intended for use in the sound boxes of phonographs, but capable of use in microphones or other situations requiring a diaphragm of improved acoustic properties. Ordinary diaphragms made of mica or other materials have certain objections with respect to the nature of the tone produced and to the reproduction of the sound of various instruments.

By the present invention a diaphragm is produced having superior qualities of tone, resonance and resiliency, and capable of reproducing the sounds of various instruments, even when assembled or playing at the same time, in such a manner that the tone and quality of each is clearly brought out.

The invention is illustrated in the accompanying drawings, in which Figure 1 is a perspective view of the diaphragm. Fig. 2 is a section thereof.

The diaphragm is made primarily of wood selected for its acoustic properties, preferably high grade spruce pine. This is cut to form a disk, the part selected being such that the coarsest grain is at the center, and the finer grain toward the circumference. The disk is smoothly surfaced to a thickness of about one sixteenth of an inch. One side is left flat, as indicated at 6, and the other side is beveled regularly and inwardly from the circumference toward the center, as indicated at 7, and within a radius of about one half an inch of the center the concave side of the disk is made flat as indicated at 8, forming a central circular part of uniform thickness and about an inch in diameter and much thinner than the circumferential part of the disk. The usual hole 9 may be made at the center for the attachment of the needle holder or lever.

The disk thus made of wood is then treated to stiffen the same and make it moisture proof. This treatment consists first in impregnating the disk with a very thin high grade shellac. Three or four coats are applied, depending on the porosity of the wood. The central part of the disk being more deeply impregnated than the peripheral part. This is done by applying more coats at the central part, which coats are dried in the presence of heat, causing the shellac to soak into the wood.

The disk is next coated with high grade carving wax which is very pure, in which has been incorporated a preparation of float-mica. This is spatulated into the disk with a hot instrument which fills up the grain or surface irregularities and makes the surface smooth. The disk is then burnished, with a felt wheel or cone, the friction of which produces heat and causes the wax to penetrate the wood. The wax combines with the shellac and becomes resinified by oxidation due to heat making a new insoluble compound in the pores of the wood. The surface is then cleaned and polished. The disk has then the appearance of tough parchment at the central part where it is quite thin, at which part the vibrations are received and communicated to the outer parts of the disk.

It is found that the decreased thickness of the disk toward the center enables it to transmit the vibrations in a superior manner, reproducing and bringing out the tones of assembled instruments and giving an improved tone quality and resonance to the reproduction of single instruments and of the voice.

Chemical action between the shellac and the wax follows from the fact that the wax is an ester of monohydric alcohol and with the shellac becomes resinified by oxidation, due to heat, which makes a new compound, a solid, amorphous, vitreous mass, insoluble in water and acids, proof of which is available, since upon heating these two ingredients and passing the same through lime-water a milky white precipitate is formed, with an indication of carbon dioxid being formed, thereby demonstrating that a chemical action has taken place.

I claim:

1. A diaphragm comprising a wooden disk gradually decreased in thickness from the periphery to the central part.

2. A diaphragm comprising a wooden disk decreased in thickness from the periph-

ery toward the center and having a relatively thin central part of uniform thickness.

3. A diaphragm comprising a wooden disk having one plane surface and the other surface beveled gradually from the periphery toward the center, producing a relatively thin central part.

4. A diaphragm comprising a wooden disk impregnated first with shellac and then with wax.

5. A diaphragm comprising a disk of wood impregnated first with shellac and then with wax and heated to combine the shellac and wax.

In testimony whereof I do affix my signature in presence of two witnesses.

WILLIAM D. GANS.

Witnesses:
MELVIN B. GANS,
JOHN A. BOMMHARDT.