

W. W. YOUNG.  
TALKING MACHINE DIAPHRAGM.  
APPLICATION FILED MAY 4, 1909.

982,197.

Patented Jan. 17, 1911.

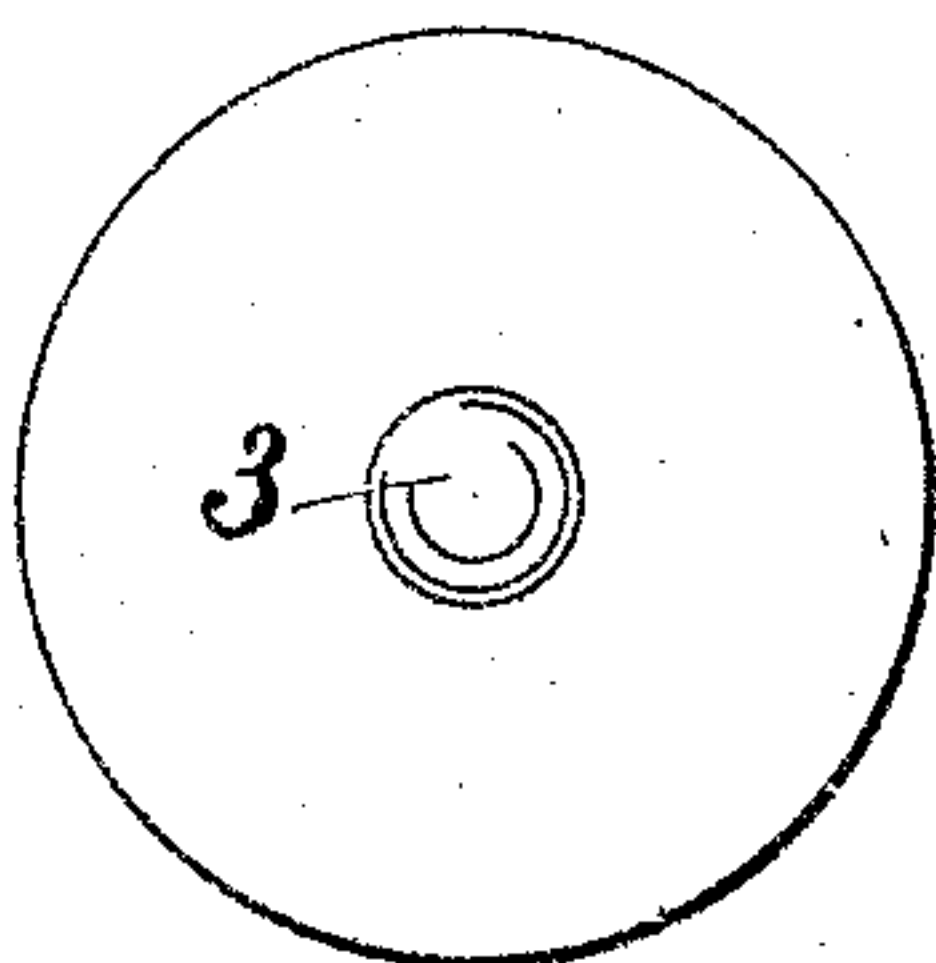


FIG. 1.

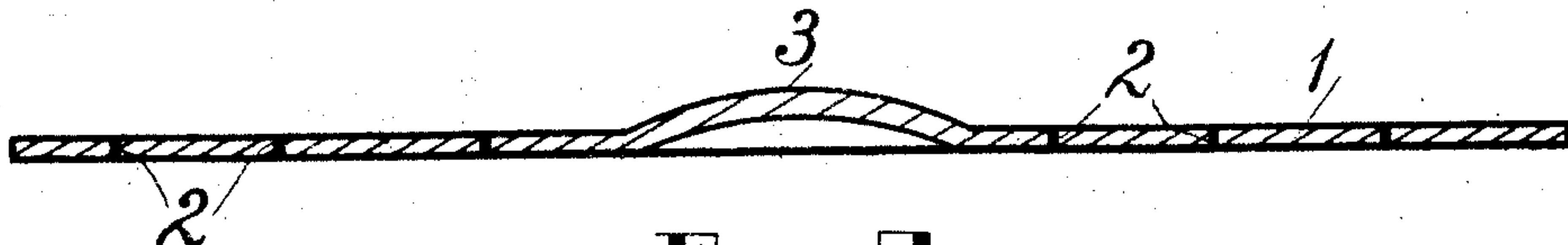


FIG. 2.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## TALKING-MACHINE DIAPHRAGM.

982,197.

Specification of Letters Patent.

Patented Jan. 17, 1911.

Original application filed December 1, 1908, Serial No. 465,474. Divided and this application filed May 4, 1909. Serial No. 493,840½.

*To all whom it may concern:*

Be it known that I, WILLIAM W. YOUNG, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Talking-Machine Diaphragm, of which the following is a specification, the same being a divisional part of an application filed by me in the United States Patent Office on the first day of December, 1908, Serial No. 465,474.

My invention relates to improvements in reproducing diaphragms for talking-machines, and consists of a more or less porous material impregnated and permeated and surface treated with a filling material or materials of suitable character, hardened, and provided with a raised portion or integral protuberance, if desired, all as herein-  
after set forth. This diaphragm is exceedingly compact, hard, and tough, although thin, has smooth and even surfaces, and possesses a uniform thickness throughout excepting in the center where may be located the above-mentioned protuberance.

As is well-known, it is not possible to obtain the best results with reproducing diaphragms made of mica or sheet-metal, these especially the former being the kind commonly used in talking-machines, and besides the mica disks or diaphragms are extremely fragile and also expensive because of the waste incident to procuring disks of the proper size, and the primary object of my invention is to produce a substitute for mica, sheet-metal, and other varieties of diaphragms, which substitute possesses the necessary or desirable features outlined in the preceding paragraph, and in addition is resilient and resonant, is impervious to moisture and unaffected by climatic changes, and is capable of giving out clear, loud, and distinct tones of great depth and volume, of evenly distributing the sound waves and quickly, completely, and perfectly recovering its stable equilibrium, and of lessening to a great extent, if not eradicating altogether, all alien and discordant noises such as blasts and scratching sounds which are so frequent with the ordinary diaphragm. I attain this object by the means illustrated in the accompanying drawings, in which—

Figure 1 is a side view of a diaphragm which embodies my invention, and, Fig. 2, a

cross-section, on a large scale, of said diaphragm.

Similar figures refer to similar parts in the two views.

As a base material for my diaphragm, I find that a disk 1 of pure, hard-finished bristol-board which is quite thin answers better than anything else so far tried, especially if the same be perforated before it is filled, although almost any fibrous material or fabric, which is sufficiently porous to take up an adequate amount of filling material or materials, may be employed, such as leather, paper, or cloth, for example.

The perforations or holes in the disk 1 are represented at 2. These should be very fine, quite frequent, and extend through said disk from side to side. The perforations or holes 2 are for a two-fold purpose: first, to open numerous ways into the interior of the disk 1 so as to enable the filling to penetrate and permeate all parts of the disk structure and to become thoroughly and evenly distributed therein and therethrough, thus insuring that the diaphragm shall have practically no unfilled portions; and, second, to afford means for producing a diaphragm having a structure of different materials, or a structure that is broken up or divided into unlike parts as to texture.

The filling for the texture of the disk 1, whether or not said disk be perforated, preferably consists of one or more minerals held in solution in water by an alkali, together with an inert or neutral mineral that will mix with water and form with the other solution when combined therewith a suitable compound, mixture, or emulsion. Silicate of soda or silicate of potash and oxid of zinc are what I prefer to use, since the solution or compound resulting from the combination in the manner just stated of such ingredients readily and thoroughly unites with the disk 1 by entering the texture of the same and imparts to such disk the required properties. The disk 1 is filled with the aforesaid solution or compound, is coated with a dry powder such as oxid of zinc and with the filling solution or compound, and is compressed and dried. During the course of treatment to which the disk is subjected, a portion in the center thereof may be left in a less dense and compact condition, and consequently will be raised slightly so that



there is a protuberance 3 on one or both sides. This protuberance may be produced by having openings in the centers of the devices used in compressing the disk, and thus leaving the center of the disk practically free while the remainder of the disk is being compressed; or the protuberance may be produced by providing compression devices with male and female parts, but in this last event the raised portion of the disk would be of the same density as the other parts and would not be any thicker as it is in the other case.

The qualities of the diaphragm are not affected by the position of the protuberance 3, that is, whether it be on one side or the other of said diaphragm or whether it be upon both sides, therefore said position in this respect is immaterial. The protuberance 3 not only reinforces the diaphragm by assisting in keeping the diaphragm from getting out of shape or warping and at the same time by increasing the strength, durability, and endurance of the same, but enhances the sound reproducing qualities of the diaphragm in a most marked degree, and is especially efficacious in causing the sound waves to be evenly distributed and the diaphragm to make a quick and perfect recovery thereafter. This protuberance is not built up out of other materials or parts, but is an integral part of the diaphragm itself, therefore it cannot work loose and so produce a rattling sound or blast as it otherwise would be liable to do. As already noted, the protuberance may be omitted.

The compressing and heating to which the disk, filled and coated with the deposit from the mineral solution or compound, is sub-

jected, sets the ingredients and renders the finished diaphragm hard and fit for use.

The diaphragm made of the materials and in the manner hereinbefore described possesses certain characteristics that approach those of metal or glass, such as hardness, resiliency, resonance, and smoothness, and is in all respects suitable for the purpose for which it is intended.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. As a new article of manufacture, a diaphragm, for talking-machines, having a less dense center than the surrounding portions.

2. As a new article of manufacture, a diaphragm, for talking-machines, having a raised central portion which is less dense than the surrounding part.

3. As a new article of manufacture, a diaphragm, for talking-machines, consisting of a one-piece filled and hardened disk having a center of less compactness than the surrounding portions of said disk.

4. As a new article of manufacture, a diaphragm, for talking-machines, consisting of porous material and a non-volatile deposit from a silicate, alkali, and neutral mineral solution.

5. As a new article of manufacture, a diaphragm, for talking-machines, consisting of a one-piece disk of porous material which has perforations therein outside of the center and has been filled and coated with a non-volatile deposit from a silicate, alkali, and neutral mineral mixture.

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Witnesses:

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A. C. FAIRBANKS.