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E. H. MOBLEY.

DIAPHRAGM FOR TRANSMITTING SOUND WAVES.

APPLICATION FILED SEPT. 17, 1903.

Fig. 1.

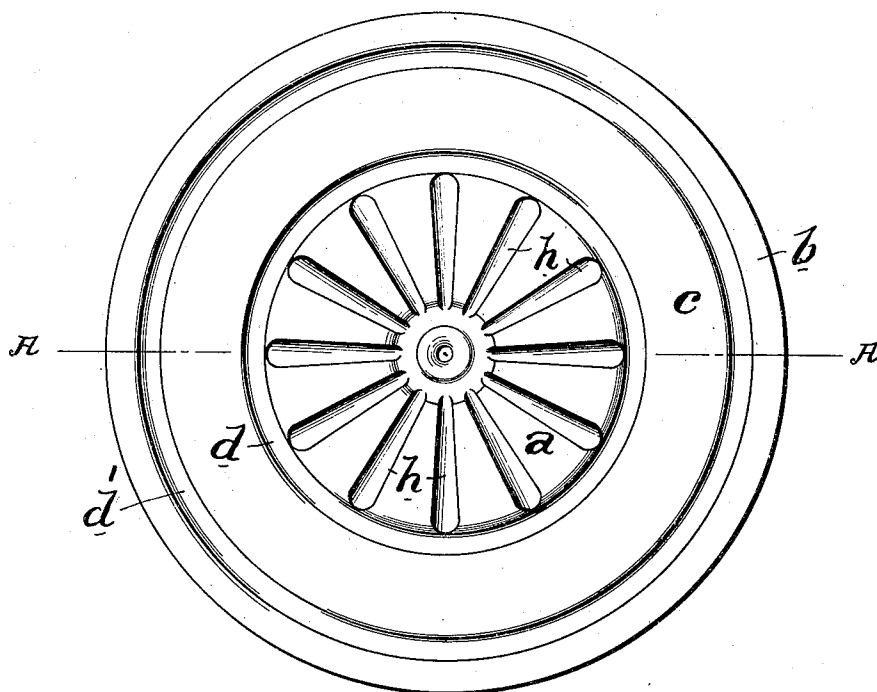
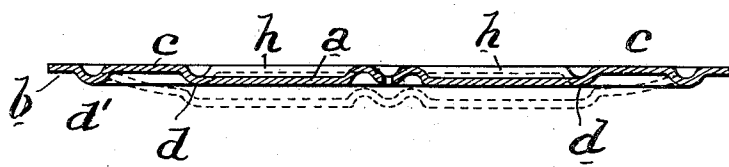


Fig. 2.



WITNESSES:

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EDWIN H. MOBLEY, OF MORTON, PENNSYLVANIA.

DIAPHRAGM FOR TRANSMITTING SOUND-WAVES.

No. 834,629.

Specification of Letters Patent.

Patented Oct. 30, 1906.

Application filed September 17, 1903. Serial No. 173,501.

To all whom it may concern:

Be it known that I, EDWIN H. MOBLEY, of Morton, Delaware county, State of Pennsylvania, have invented an Improvement in Diaphragms for Transmitting Sound-Waves, of which the following is a specification.

One of the difficulties which has been met in preserving the clearness and distinctness as well as the natural tone or "timbre" of sounds transmitted by vibratory diaphragms has been due to the fact that, owing to the construction of the diaphragm, it assumes a more or less curved or arched position while vibrating under the action of the sound-waves, which results in the deflection of the sound-waves and their consequent interference with one another.

If the diaphragm, or that portion of it which is effective in the transmission of the sound-waves, vibrates in the plane of its surface, or without curvature in the diameter of its plane, the waves will not be deflected, but will be transmitted in direct lines. While this result can and possibly has been obtained in diaphragms of special construction where the central vibratory portion has been connected with the clamping edge or outer support by separate connecting-springs, such constructions are unsatisfactory not only because of their complicated and expensive construction, but also because the openings afforded by these spring connections permit a portion of the sound-waves to pass through without acting on the diaphragm. Not only are such sound-waves lost, but the openings permit air-currents to pass through, which affect the sound-waves transmitted by the vibrations of the diaphragm.

It is the object of my invention to provide a diaphragm composed of a single integral sheet without openings or attenuated portions in which the central part may vibrate under the action of the sound-waves without appreciable curvature in the lines of its diameter or plane of its surface.

The diaphragm is formed of a thin sheet of strong resilient material, having its central portion united with the clamping edge by an integral, continuous, and unattenuated spring portion of substantial width, so that the central portion is strengthened or stayed against curvature and the radial movements necessary to permit the vibrations are taken up in the integral uniting spring portion.

The diaphragm may be used in any instru-

ment for transmitting sound-waves, such as the reproducing and recording heads of phonographs, graphophones, and gramophones, and the sound-boards and tympana of musical instruments.

In the drawings, Figure 1 is a plan view of a diaphragm embodying my invention. Fig. 2 is a transverse section of the same.

The diaphragm is composed of a thin disk or sheet of metal or other suitable material having the necessary strength and resiliency. It is of uniform thickness throughout the body, and the central portion *a*, by which the vibrations are transmitted, is connected with the outer edge *b*, by which the diaphragm is clamped in place, by an integral spring portion *c*. This spring portion *c* is of substantial width, so as to allow for sufficient movement during the vibration of the central portion to enable the said central portion to maintain a flat uncurved surface. This is illustrated in dotted lines in Fig. 2, from which it will be seen that the radial motion is taken up entirely in the portion *c*, and the central operative part *a* is not arched or bent, as is the case with integral diaphragms as they have heretofore been constructed. The practical effect of thus maintaining the central portion of the diaphragm in a flat uncurved condition during its vibrations is to transmit the sound-waves at right angles to the face of the diaphragm and not to deflect them laterally, as would be the case if they were transmitted by a curved or arched surface. By reason of this the sounds transmitted are more clear and distinct and their natural quality or timbre is more perfectly preserved.

d is an annular corrugation about the center of the diaphragm at a substantial distance from the outer edge, and *h* represents a series of radial corrugations extending from the center of the diaphragm to said annular corrugation. These radial corrugations form the central stiffened vibratory portion, and the spring portion *c* is between the annular corrugation *d* and the outer edge. A second annular corrugation *d'* may be formed near the outer edge, the spring portion *c* being the flat uncorrugated annulus between said corrugations *d* and *d'*.

Attention is particularly directed to the fact that the diaphragm is composed of a single integral piece of uniform thickness and that the spring connection between the central portion and supporting edge, which pre-

serves the flat position of the central portion during the vibrations, is formed without weakening or reducing the metal.

The diaphragms may be stamped or spun up.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. A diaphragm for transmitting sound-waves consisting of a thin sheet of strong resilient material, having an annular corrugation near the outer edge, a smaller annular corrugation within said outer corrugation, and a series of radial corrugations extending from the center of the diaphragm to said smaller annular corrugation, said small annular corrugation and radial corrugations forming a central stiffened vibratory portion, and the annular portion between said annular

corrugations forming a resilient connecting portion between the stiffened center and the outer edge

2. A diaphragm for transmitting sound-waves consisting of a thin sheet of strong resilient material having an annular corrugation about the center at a substantial distance from the outer edge, and a series of radial corrugations extending from the center of the diaphragm to said annular corrugation, said corrugations forming a central stiffened vibratory portion.

In testimony of which invention I hereunto set my hand.

EDWIN H. MOBLEY.

Witnesses:

ERNEST HOWARD HUNTER,
M. J. EYRE.