No. 638,246. Patented Dec. 5, 1899.

# H. E. HUSTED & W. S. JONES.

## DIAPHRAGM.

(Application filed Oct. 26, 1898.)

(No Model.)

Fig. 1.

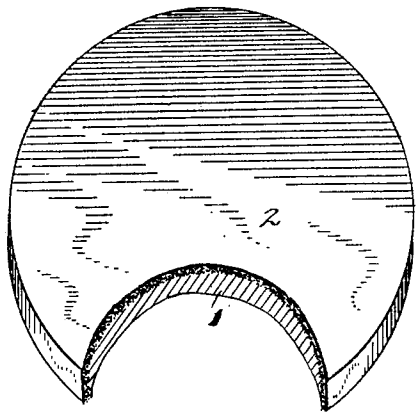



Fig. 2.

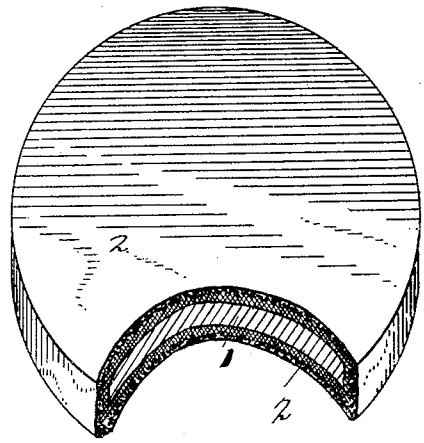



Fig. 3.

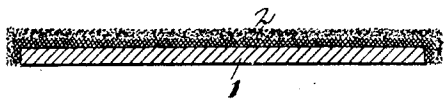
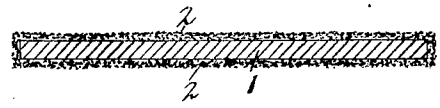



Fig. 4.




WITNESSES:

J. P. Appleman.

A. Logan.

INVENTORS

H. E. Husted.

W. S. Jones.

BY

N. C. Evert & Co.

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

HOSEA E. HUSTED AND WILLIAM S. JONES, OF JEANNETTE, PENNSYLVANIA.

## DIAPHRAGM.

SPECIFICATION forming part of Letters Patent No. 638,246, dated December 5, 1899.

Application filed October 26, 1898. Serial No. 694,639. (No model.)

*To all whom it may concern:*

Be it known that we, HOSEA E. HUSTED and WILLIAM S. JONES, citizens of the United States of America, residing at Jeannette, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Diaphragms, of which the following is a specification.

Our invention relates to certain new and useful improvements in diaphragms.

The invention has for its object to construct a diaphragm adapted for use in telephones, gramophones, graphophones, phonographs, or in like devices employing a diaphragm for the production or reproduction of sound.

Our invention consists of a metallic sheet or disk—such as copper, aluminium, steel, tin, gold, silver, or other metal—of a requisite thickness, and in covering this disk upon one or both of its faces with a coating of metal or metals—such as copper, aluminium, steel, tin, gold, silver, or other metals—it solidifies upon the same, so that when finished the diaphragm as constructed is the equivalent of a single piece.

In the construction of metallic diaphragms heretofore employed it has been customary to form the same of a single metallic sheet or disk or of two or more metallic sheets or disks, which are suitably connected together; but owing to the fact that these separate sheets or disks cannot be connected together in such a manner as to form a solid disk the sound reproduced therefrom is sharp, harsh, and metallic. To successfully overcome this objectionable feature and to construct a diaphragm that will reproduce the sound with all of its clear, full, round, and natural tone is the object of our invention, and we accomplish this result by employing a single metallic sheet or disk, such as steel or other suitable metal, and apply thereto by dipping, submerging, or otherwise a coating of metal or metals, such as molten steel or other suitable metal, to one or both sides thereof, the metal adhering closely to the sheet or disk and solidifying in a manner such as to practically form a solid disk.

Our invention finally consists in the novel combination and arrangement of parts hereinafter more fully described, and particularly pointed out in the claims.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, wherein like numerals of reference indicate corresponding parts throughout the several views thereof and in which—

Figure 1 is a perspective view of a diaphragm constructed in accordance with our invention, partly broken away to show the coating of metal covering one side of the sheet or disk. Fig. 2 is a similar view showing a coating entirely covering the sheet or disk. Fig. 3 is a cross-sectional view of the form of disk shown in Fig. 1. Fig. 4 is a like view of the form of disk shown in Fig. 2.

Referring to the drawings by reference-numerals, 1 indicates a sheet or disk, which may be of any desirable metallic material and of the requisite thickness. To obtain the desired result from our diaphragm, we apply to one or both sides of the metal sheet or disk 1—such as copper, aluminium, steel, tin, gold, silver, or other metals—a coating of one or more metals 2, such as copper, aluminium, steel, tin, gold, silver, or other metals. Where this coating is to be applied to both sides of the sheet or disk, it may be accomplished by submerging the disk into the metal, and where it is desired to apply more than one coating to both sides of the disk it is repeatedly submerged until the desired number of coatings have been obtained. Where it is to be applied to but one side of the metal sheet or disk, it may be accomplished by dipping the one side in metal or otherwise, as various means may be employed for the coating. The coating in its cooling solidifies with the sheet or disk in such a manner as to practically form a solid disk, by means of which the original full, clear, round tone of sound is reproduced.

It will of course be understood that we do not claim any specific means for applying the coating to the sheet or disk, as it will be observed that various processes or methods may be employed for that purpose, and also that

we do not wish to limit ourselves to the exact number of coatings which may be applied to one or both sides of the sheet or disk.

It is a well-known fact that a diaphragm formed of a series of concentric disks cannot be secured together in a manner as to obtain the proper vibration required for reproducing a full, round, mellow, and uninterrupted sound. By this construction of a diaphragm of more than one metal solidified together the proper vibration is obtained and the sound reproduced in an uninterrupted and a natural tone.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A diaphragm comprising a metallic sheet or disk with a coating of metal applied to the exterior surfaces thereof which solidifies and increases the thickness of the same, substantially as set forth.

2. A diaphragm comprising a metal sheet or disk provided with a plurality of coatings of metal on both sides thereof, substantially as set forth.

In testimony whereof we affix our signatures in the presence of two witnesses.

HOSEA E. HUSTED.
WILLIAM S. JONES.

Witnesses:
HARRY BOULLT,
ROBT. M. JONES.