No. 881,547. PATENTED MAR. 10, 1908.

C. L. CHISHOLM.

REPRODUCER.

APPLICATION FILED APR. 22, 1907.

Fig. 1.

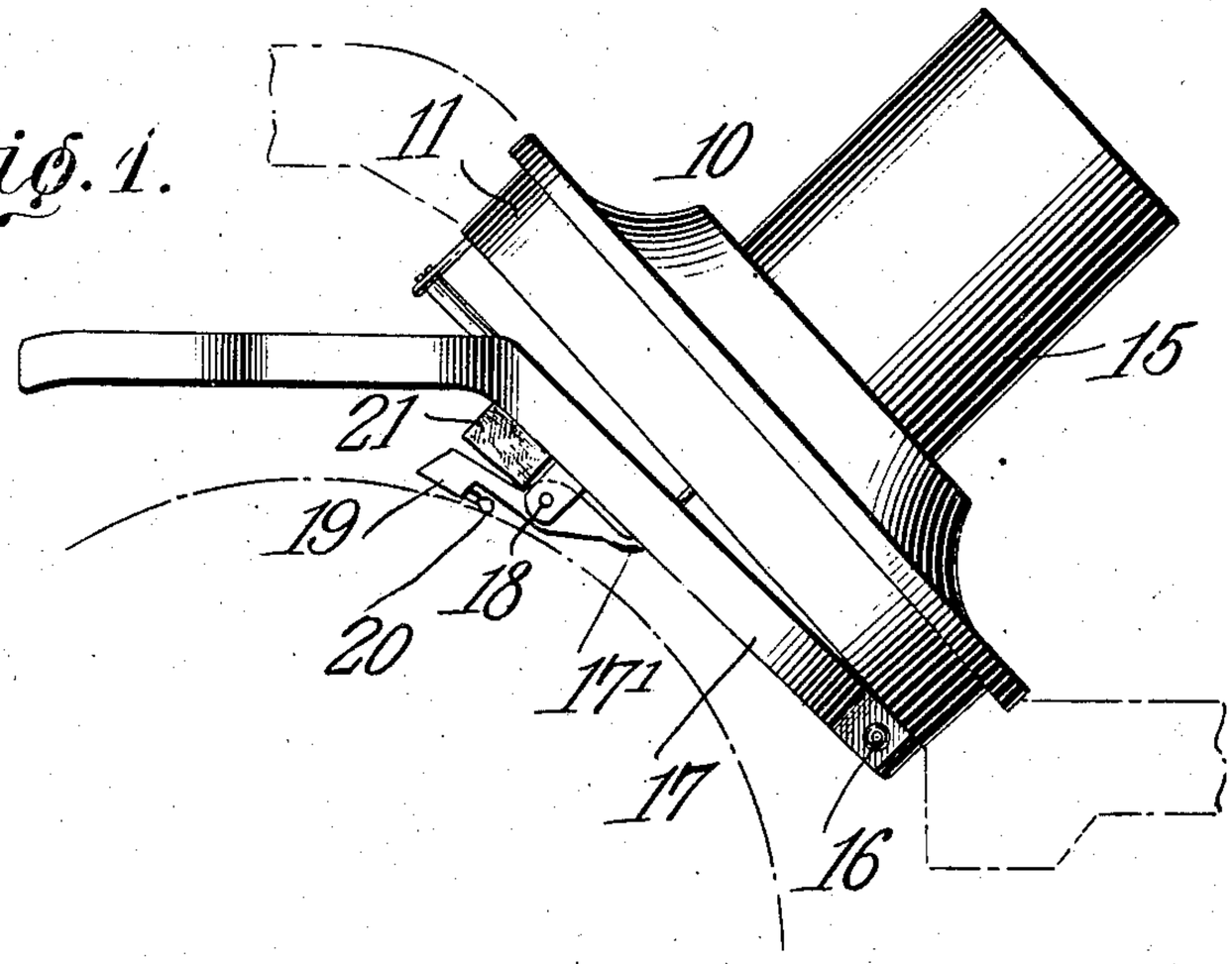


Fig. 2.

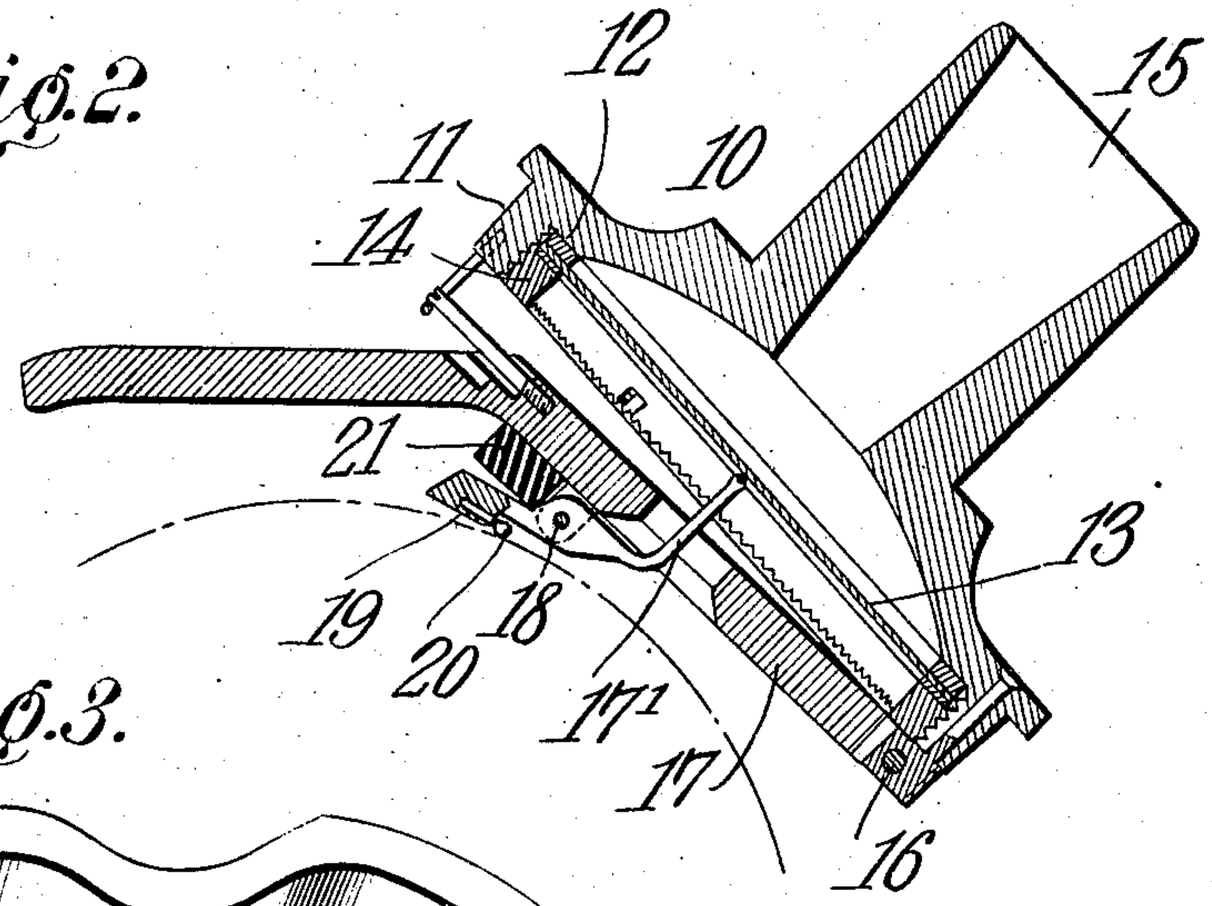
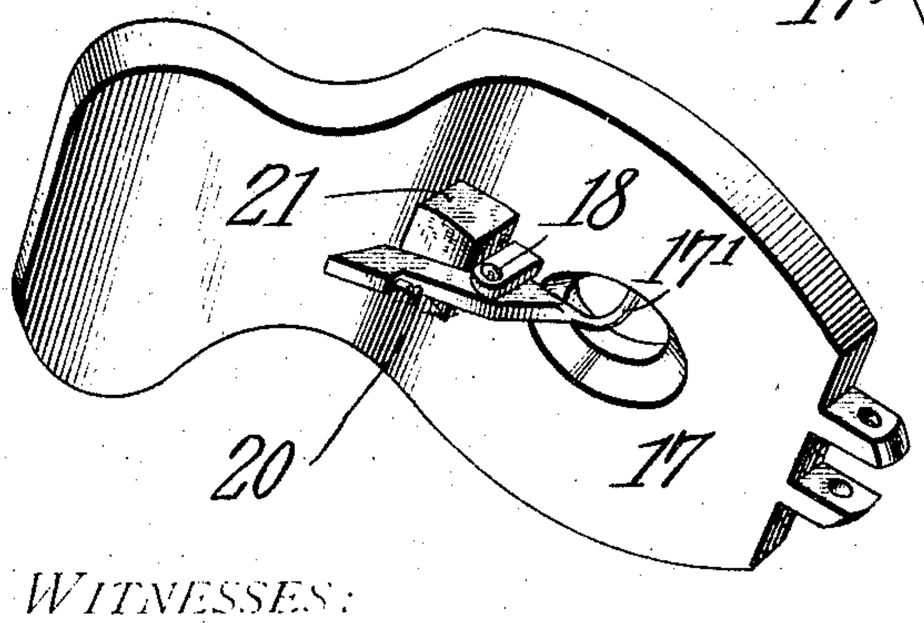


Fig. 3.



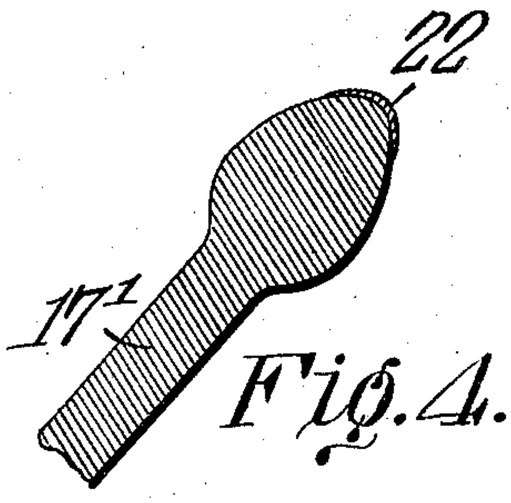


Fig. 4.

WITNESSES:

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C. Bradway.

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UNITED STATES PATENT OFFICE.

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REPRODUCER.

No. 881,547. Specification of Letters Patent. Patented March 10, 1908.

Application filed April 22, 1907. Serial No. 369,607.

To all whom it may concern:

Be it known that I, CHARLES LOGAN CHISHOLM, a subject of the King of England, residing at Marysville, New Brunswick, Canada, have invented a new and useful Reproducer, of which the following is a specification.

The invention relates to talking machines particularly of the phonograph type, and more especially to reproducers, and the object in view is to provide a construction and arrangement of diaphragm and stylus whereby the sound waves or beats affect the diaphragm on truly concentric lines starting from the precise center of the diaphragm and the stylus receives an accurate vibration in accordance with the impressions on the record, and conveys them with the least resistance and a minimum number of parts directly to the diaphragm at its center to avoid false or secondary vibrations in the diaphragm due to untrue vibrations of the conveying means, the diaphragm being supported only at its periphery, being wholly unobstructed on both surfaces, and there being no attachment to the diaphragm of the means by which the vibrations of the stylus are conveyed thereto.

Further objects and advantages of the invention will appear in the following description, and it will be understood that various changes in the form, proportions, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawing:—Figure 1 is a side view of a reproducer constructed in accordance with the invention. Fig. 2 is a sectional view of the same. Fig. 3 is a detail view in perspective of the stylus arm applied in the operative position to the supporting plate. Fig. 4 is a detail sectional view of the contact end of the stylus arm showing the preferred embodiment of the invention.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In the construction illustrated, the invention is shown applied to a reproducer of the Edison type, consisting of a sound box formed of a tube plate 10 having a flange 11, and an interior shoulder or seat 12 upon which the diaphragm 13 is arranged, and in contact with which it is firmly held at its periphery by the ring nut 14. The tube 15 which extends from the tube plate and communicates interiorly with th sound box is of the ordinary outwardly enlarged bore and is designed to be used in connection with a horn of any preferred construction. The sound box is hingedly connected at 16 with the counterbalance 17 and is adapted to be secured in any preferred or the usual manner to the frame of the machine, not illustrated.

The diaphragm within its supported periphery is wholly unobstructed as to both surfaces, and the impressions of the record are conveyed thereto by means of a stylus lever 17′ which is pivotally mounted at 18 upon a bracket depending from the supporting plate and is provided with an arm 19 which terminates in a stylus or contact point 20, and while the arm is illustrated and is preferably constructed of very small diameter, it will be noted that from a point near the pivot to the contact point it is arranged almost entirely on a line perpendicular to that portion of the stylus lever which is between the pivot and the stylus point, and which may be termed the body portion of the structure, so that the lever while being light and sensitive is not strained in use on a transverse line, but on a substantially longitudinal line to avoid any tendency of flexing. Beneath the body portion of the stylus lever, and preferably close to the stylus point, is arranged a yielding cushion 21, which may be of soft rubber or any other resilient or spring material, or even a spring, adapted to yield under a very slight pressure and yet respond promptly to hold the stylus point in the desired contact and with the requisite stress against the record.

By this means the impressions of the record are conveyed directly to the contact point which is in contact with the diaphragm by a single member, so that there is no loss of vibration due to either lost motion or yielding or springing of the member itself, and in order to prevent any possible "screeching" between the contact point of the stylus lever and the diaphragm the said point of contact is provided with an interposed layer of some elastic or semi-elastic substance, indicated at 22. This cushion should be so thin as to have no appreciable damping effect and yet prevent screeching between the diaphragm and the stylus lever. The cushion is film-like in thinness and may be made of gutta percha or any other substance that will not stick to the diaphragm, and is ap-

plied to the end of the stylus lever so that the area of contact with the diaphragm amounts to but little more than a geometrical point. It has been found in practice that by means of this single element which contacts with, but which is not attached in any way to the diaphragm, the sound waves are conveyed to the diaphragm with a faithfulness which results in an accurate reproduction without the setting up of those false vibrations which constitute the disadvantages of reproducers in which the connection between the stylus lever or arm and the diaphragm includes a member attached to and sometimes through the diaphragm, so that the diaphragm is not only impelled in one direction by a push applied to the stylus connections, but is also pulled so that the vibrations interfere with each other.

I claim:—

1. A reproducer having a peripherally supported but otherwise superficially unobstructed diaphragm, and a stylus carrier unconnected with the diaphragm but having a contact point provided with a film-like cushion in contact but not connected with the surface of the diaphragm at the center.

2. A reproducer having a peripherally supported but otherwise superficially unobstructed diaphragm, and a yieldingly-supported stylus carrier provided with a contact point provided with a film-like cushion which is in contact but not connected with the surface of the diaphragm at its center.

3. A reproducer having a peripherally supported but otherwise superficially unobstructed diaphragm, and a stylus carrier mounted for pivotal movement and having its extremity opposite to the stylus point constructed to form a contact point for contact with the surface of the diaphragm at its center, and cushioning means under that portion of the stylus carrier which is adjacent to the stylus point.

4. A reproducer having a peripherally supported but otherwise superficially unobstructed diaphragm, and a pivotal stylus carrier having a substantially non-damping, cushioned contact point for contact with the diaphragm at its center.

5. A reproducer having a peripherally supported but otherwise superficially unobstructed diaphragm, and a pivotally mounted stylus carrier terminating at one end in a stylus point and at the other end in a contact point, a cushion of film-like thinness on the contact point of the stylus carrier, and a cushioning device arranged in operative relation with the stylus end of the stylus carrier to yieldingly impel the same toward the record.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CHARLES LOGAN CHISHOLM.

Witnesses:

E. B. EDWARDS,

LOUIS MADDRE.