

C. THOMA, JR. & W. THOMA.
SOUND REPRODUCER OR RECORDER.
APPLICATION FILED MAY 7, 1908.

949,991.

Patented Feb. 22, 1910.

Fig- 1 -

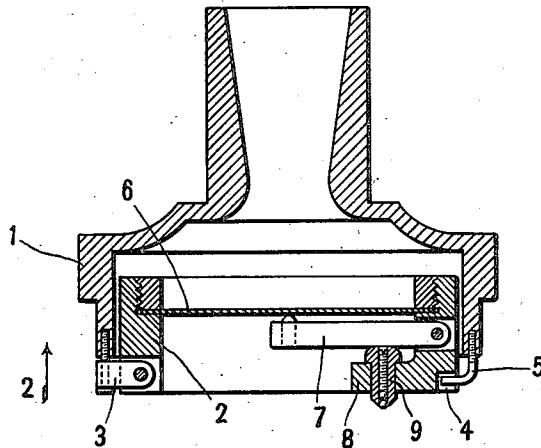


Fig- 2 -

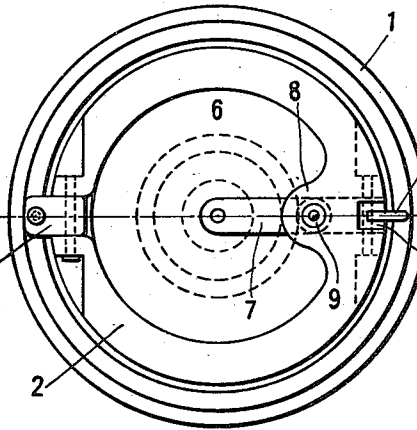


Fig- 3 -

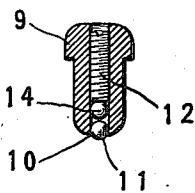


Fig- 5 -

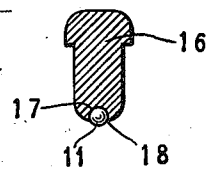


Fig- 4 -

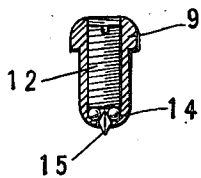


Fig- 7 -

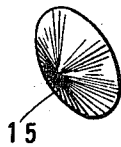


Fig- 8 -

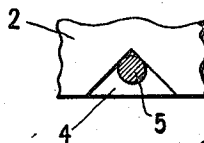
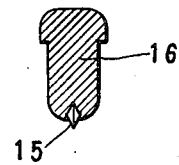


Fig- 6 -



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SOUND REPRODUCER OR RECORDER.

949,991.

Specification of Letters Patent.

Patented Feb. 22, 1910.

Application filed May 7, 1908. Serial No. 431,416.

To all whom it may concern:

Be it known that we, CHARLES THOMA, JR., and WALTER THOMA, citizens of the United States, and residents of Carlstadt, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Sound Reproducers or Recorders, of which the following is a specification.

The present invention relates to sound reproducers or recorders for phonographs, and has for its object, in general, to simplify structures of this kind, to increase their efficiency, and to reduce the cost of manufacture.

One feature of the invention resides in a stylus supporting member having a socket whose mouth is provided with a restricted portion, the stylus being seated in said socket and held in place by the restricted portion aforesaid. This restricted portion may take the form of a plurality of prongs, or, as shown in the drawings, it may be a continuous flange. Preferably the socket is obtained by making the supporting member in the form of a tube whose mouth is restricted and in which there is seated a follower. Between the restricted portion and the follower the stylus is interposed. The stylus is held against longitudinal axial movement in the holder, so as to vibrate in unison with such holder. So far as certain features of the invention are concerned the stylus may be of any shape found useful; but preferably it is provided with a circular contact surface concentric with the center of the stylus. Thus for cylinder machines the stylus will preferably be spherically shaped, and for disk machines the stylus will be in the form of a knife-edge disk. In the preferred embodiment of the invention the stylus will be mounted for rotation around its own axis. This may be effected by any suitable means, but preferably by the socket construction of stylus supporting member above described. By making the stylus rotatable friction is greatly reduced and admits, if desired, of the use of a cheap material as steel in place of precious stones. Furthermore, by the employment of a rotatable stylus a less harsh and more perfect tone can be produced. A non-rotatable stylus has a scraping action as it travels over the record and reproduces not only the recorded sound waves but also minute record-

ed imperfections. These recorded imperfections are so minute that the stylus, if rotatably mounted, will roll over them without being sensibly affected by them. Moreover, by using a rotatable stylus, when recording, these minute imperfections will not be recorded, and hence will not be reproduced.

In the art, as practiced at the present time, the impulse transmitting means between the stylus supporting member and the diaphragm is secured to the diaphragm and exerts a positive pull and push in both directions on the latter. One feature of this invention resides in having the impulse transmitting means disconnected from the diaphragm, and adapted to have an intermittent vibratory contact with the said diaphragm. By this means the impulse transmitting means will flex the diaphragm in one direction only, the diaphragm returning by its own weight or flexibility. This has the effect of producing a more rounded and mellow tone.

In the preferred embodiment, the stylus supporting member is seated in a guide in which it reciprocates in a rectilinear path, and has vibratory contact with the impulse transmitting means. The impulse transmitting means, in the present instance, is in the form of a pivoted lever disconnected both from the stylus supporting member and diaphragm.

The general arrangement of the parts constitutes in itself a new and useful invention. In this general arrangement, the diaphragm, impulse transmitting means, and stylus supporting member are all mounted on a frame supported on a universal joint in the casing so as to always occupy the same relative position when the frame shifts by reason of discrepancies between the grooves of the record and the threads of the feed screw. In connection with this construction is employed a centering device which always tends to center the frame when in its lowermost position.

Other features will appear as the specification proceeds.

In the accompanying drawings the invention is embodied in a concrete and preferred form, but changes of construction may be made without departing from the legitimate and intended scope of the invention. Furthermore the several features of the invention may be used, one independently of the other or others.

In the said drawings Figure 1 is a vertical sectional view on the line 1—1 of Fig. 2, showing a sound reproducer or recorder, embodying the invention. Fig. 2 is a plan view of Fig. 1 looking in the direction of the arrow 2 in Fig. 1. Figs. 3, 4, 5, and 6 show various forms of stylus supporting members and stylus. Fig. 7 is a perspective view of one form of stylus. Fig. 8 is a detail of the centering device.

Similar characters of reference indicate corresponding parts in the several views.

1 indicates a casing of any suitable construction in which is mounted the supporting frame 2 by means of the universal joint 3. Opposite to this joint the frame is provided with an inverted V-shaped slot 4 adapted to receive a member 5 carried by the casing. Whenever the sound reproducer is lowered into engagement with the record, the member 5 will center the supporting frame.

6 indicates the usual diaphragm of copper or other material mounted in the supporting frame. Underneath this diaphragm there is pivoted, on the frame 2, the impulse transmitting lever 7 whose free end is adapted to have an intermittent vibratory contact with the diaphragm.

8 indicates a guide in the frame 2 in which is seated the stylus supporting member 9. This stylus supporting member has a reciprocating motion in a rectilinear path and has intermittent vibratory contact with the impulse transmitting lever. The stylus supporting member is preferably constructed as shown in Fig. 3, in which it is in the form of a tube having a restricted mouth 10 on which rests the rotatable stylus 11 here shown in the form of a sphere. Seated in the tube is a follower 12 which is adjustable, and between this follower 12 and the stylus may be interposed an antifriction ball 14. The stylus is thus mounted in a socket whose restricted mouth holds it in place.

In Fig. 4 the stylus is in the form of a knife-edge disk 15 rotatably supported, and in this instance provided with two antifriction balls 14.

In Fig. 5 the stylus is shown in the form of a sphere but is non-rotatable and is held in a solid stylus supporting member 16 having a socket 17 whose mouth is restricted by the flange 18.

In Fig. 6 is shown the same stylus as that in Fig. 4. In this instance, however, it is non-rotatably supported in the socket of the stylus supporting member.

What is claimed is:—

1. A stylus supporting member consisting of a tube whose mouth is provided with a restricted portion, a stylus seated in said tube and resting against the restricted portion aforesaid, and a follower seated in said tube for holding the stylus against the re-

stricted portion aforesaid and serving to prevent longitudinal movement of the stylus in the tubular supporting member.

2. A stylus supporting member having a socket whose mouth is provided with a restricted portion, and a stylus mounted for rotation around its own axis seated in said socket and held in place by the restricted portion aforesaid the stylus and supporting member being arranged to vibrate in unison.

3. A stylus supporting member having a socket whose mouth is provided with a restricted portion forming a pivotal support, and a stylus seated in said socket held against longitudinal vibration therein and rotatably mounted on the pivotal support afforded by the restricted portion.

4. A stylus supporting member having a socket whose mouth is provided with a restricted portion, and a stylus having a circular contact surface concentric with the center of the stylus, seated in said socket and held in place by the restricted portion aforesaid, the stylus being held against vibration in said socket.

5. A stylus supporting member having a socket whose mouth is provided with a restricted portion, and a spherically shaped stylus seated in said socket and held in place by the restricted portion aforesaid and means holding the stylus against longitudinal movement in the socket.

6. A stylus supporting member having a socket whose mouth is provided with a restricted portion, and a stylus having a circular contact surface concentric with the center of the stylus mounted for rotation around its own axis in said socket and held in place by the restricted portion aforesaid the stylus being held against longitudinal axial movement in the socket member.

7. A stylus supporting member having a socket whose mouth is provided with a restricted portion, and a spherically shaped stylus mounted for rotation around its own axis in said socket and held in place by the restricted portion aforesaid and means to prevent longitudinal movement of the stylus in the supporting member.

8. A stylus supporting member consisting of a tube whose mouth is provided with a restricted portion, a stylus mounted for rotation around its own axis seated in said tube and resting against the restricted portion aforesaid, and a follower seated in said tube for holding the stylus against the restricted portion aforesaid to prevent longitudinal movement of the stylus.

9. A stylus supporting member consisting of a tube whose mouth is provided with a restricted portion, a stylus having a circular contact surface concentric with the center of the stylus seated in said tube and resting against the restricted portion aforesaid, and a follower seated in said tube for holding

the stylus against the restricted portion aforesaid.

10. A stylus supporting member consisting of a tube whose mouth is provided with a restricted portion, a spherically shaped stylus seated in said tube and resting against the restricted portion aforesaid, and a follower seated in said tube for holding the stylus against the restricted portion aforesaid.

11. A stylus supporting member consisting of a tube whose mouth is provided with a restricted portion, a stylus having a circular contact surface concentric with the center of the stylus mounted for rotation around its own axis in said tube and resting against the restricted portion aforesaid, and a follower seated in said tube for holding the stylus against the restricted portion aforesaid.

12. A stylus supporting member consisting of a tube whose mouth is provided with a restricted portion, a spherically shaped stylus mounted for rotation in said tube and resting against the restricted portion aforesaid, and a follower seated in said tube for holding the stylus against the restricted portion aforesaid.

13. In a sound reproducer or recorder, a diaphragm, a stylus supporting member having a rectilinear reciprocating motion, and impulse transmitting means between the stylus supporting member and diaphragm.

14. In a sound reproducer or recorder, a casing a supporting frame mounted in said casing so as to have play both in a vertical and horizontal direction, a diaphragm, a stylus supporting member, and an impulse transmitting means, all mounted on the supporting frame.

15. In a sound reproducer or recorder, a diaphragm, a stylus supporting member having a rectilinear reciprocating motion, and an impulse transmitting lever pivotally supported interposed between the diaphragm and stylus supporting member.

16. In a sound reproducer or recorder, a diaphragm, a stylus supporting member having a rectilinear reciprocating motion, and impulse transmitting means disconnected from the diaphragm and adapted to have an intermittent vibratory contact with the diaphragm.

17. In a sound reproducer or recorder, a casing, a supporting frame mounted in said casing so as to have play both in a vertical and horizontal direction, a stylus supporting member adapted to reciprocate in a guide on the frame, a diaphragm carried by said frame, and an impulse lever, pivotally mounted in the frame above the stylus supporting member, whose free end engages the diaphragm.

18. In a sound reproducer or recorder, a casing, a supporting frame, pivotally supported in the casing so as to have a universal movement, and carrying a diaphragm, impulse transmitting means and a stylus supporting member, and means for centering the supporting frame when in its lowermost position.

19. In a sound reproducer or recorder, a diaphragm, a stylus supporting member, an impulse transmitting lever interposed between the diaphragm and stylus supporting member, and a freely rotatable stylus carried by the stylus supporting member.

20. A supporting member, a spherical stylus mounted for rotation in all directions in said member but held against longitudinal axial movement therein.

21. In a sound reproducer or recorder, a stylus, and a socket member supporting the stylus, extending below the axis thereof and having confining means for the stylus, the stylus being held against longitudinal movement in the socket member.

22. In a sound reproducer or recorder, a diaphragm, a stylus supporting member, an impulse transmitting means disconnected from both the stylus supporting member and diaphragm and adapted to have intermittent vibratory contact with both, a casing, and a supporting frame mounted on a universal joint in the casing and carrying the diaphragm, stylus supporting member and impulse transmitting means.

Signed at Brooklyn, in the county of Kings and State of New York this 6th day of May, A. D. 1908.

CHARLES THOMA, Jr.
WALTER THOMA.

Witnesses:

FRED. H. MCGAHIE,
G. W. A. MURRAY.