March 10, 1931. C. D. HAIGIS ET AL 1,796,149

STYLUS BAR MOUNTING

Filed June 12, 1926

Fig. 1.

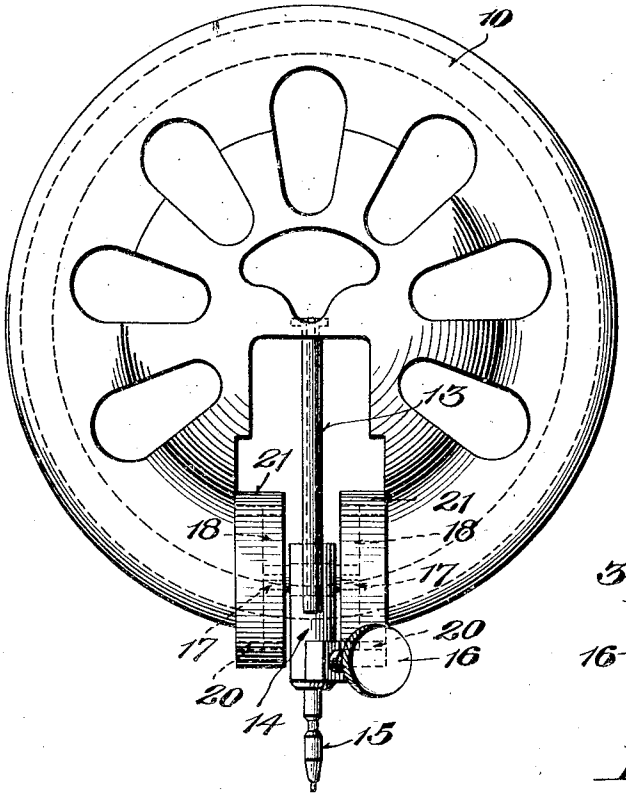


Fig. 2.

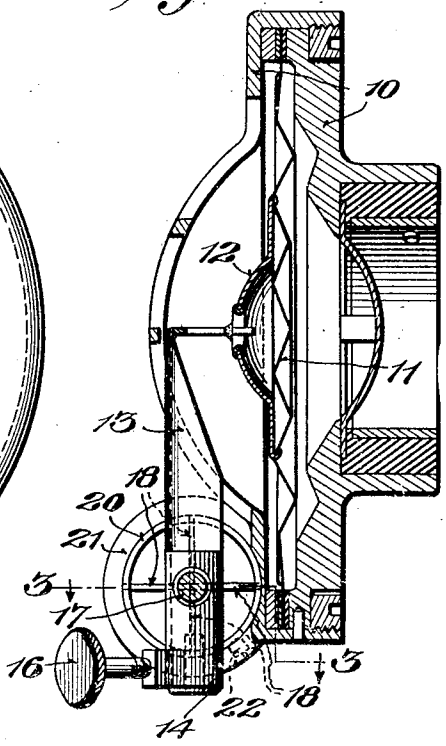


Fig. 5.

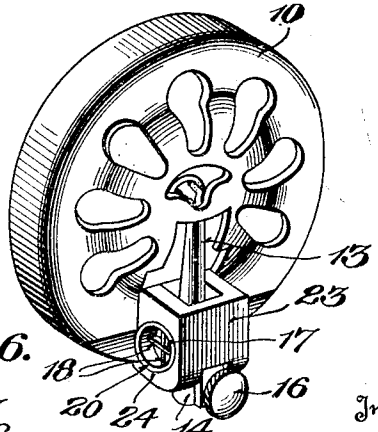


Fig. 3.

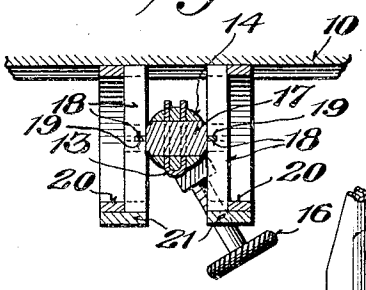


Fig. 6.

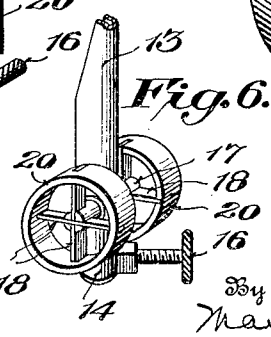
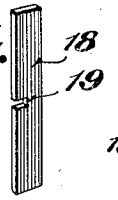


Fig. 4.



Inventor

Carlton D. Haigis

and Lloyd Y. Squibb

By Mauro, Cameron, Lewis & Herkamp

Attorneys

Patented Mar. 10, 1931 1,796,149

UNITED STATES PATENT OFFICE

CARLETON D. HAIGIS, OF HADDONFIELD, AND LLOYD Y. SQUIBB, OF CAMDEN, NEW JERSEY, ASSIGNORS TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY

STYLUS-BAR MOUNTING

Application filed June 12, 1926. Serial No. 115,545.

This invention relates to sound recording and sound reproducing machines and, more particularly, to means for oscillatably mounting the stylus bar of sound reproducing or recording instrumentalities.

It is an object of this invention to provide improved means for mounting the stylus bar so that said stylus bar is adapted to oscillate about a transverse axis without lost motion and without undue resistance to oscillation.

Another object of this invention is to provide novel means for mounting the stylus bar whereby the stylus bar is free to oscillate about a transverse axis and yet is rigidly restrained against any movement at right angles to said axis so that all movement of said stylus bar is a turning about a true fulcrum without lost motion due to transverse vibration at the fulcrum.

The invention is capable of receiving a variety of mechanical expressions and it is therefore to be expressly understood that the embodiments shown on the accompanying drawings are for purposes of illustration only and are not to be construed as a definition of the limits of the invention, reference being had to the appended claims for that purpose.

Referring in detail to said drawings, wherein the same reference characters are employed to designate corresponding parts in the several figures,

Fig. 1 is a front elevational view of a sound box embodying the present invention;

Fig. 2 is an axial section of said sound box;

Fig. 3 is a transverse section on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged perspective view of one of the resilient members;

Fig. 5 is a perspective elevation, on a smaller scale, of a slightly different construction embodying the present invention; and

Fig. 6 is a perspective view, on an intermediate scale, of the stylus bar and its mounting elements detached from the sound box.

In the form shown, the invention is illustrated as embodied in a sound box of the mechanical type, but the invention is equally applicable to sound reproducing and recording instrumentalities of the electrical or electromagnetic types. A sound box casing 10 of any suitable size, shape, material and construction, and which may be either a recording or a reproducing sound box, is provided with a diaphragm 11, of any suitable size, shape, material and construction, mounted in said sound box in any suitable way. Operatively connected to said diaphragm 11, as by a spider 12, is a stylus bar 13, 14 of any suitable construction and carrying at its outer end any suitable stylus 15 retained therein in any suitable way, as by a set-screw 16. As the elements so far referred to constitute no part of the novelty of the present invention and may be of any suitable character and construction, further detailed description thereof is deemed to be unnecessary.

In conformity with the present invention said stylus bar 13, 14 is oscillatably mounted on said sound box casing by means of a plurality of flexible members, which preferably extend radially with respect to the axis of oscillation of said bar and in a common plane transversely of said axis, on each side of said stylus bar. Said members are preferably symmetrically disposed around said axis of oscillation and extend from a transverse member on said stylus bar like the spokes of a wheel, being suitably connected to said casing at their outer extremities.

In the form shown, said stylus bar 13, 14 is provided with a transverse member 17, integral with or attached thereto, which extends at each side thereof in a direction parallel to the general plane of the diaphragm. Each end of said member 17 is connected to a plurality of flexible members 18 which extend radially from said member 17 and which are preferably symmetrically disposed around the axis thereof. Said members 18 may be of any suitable size, construc-

tion and material, being preferably made of flexible material which is possessed of a substantial degree of resiliency, like soft steel, although spring material may be employed if desired, and are shown as webs or flat strips disposed at right angles to each other and connected to each end of said member 17 at the middle of their length. Said flexible members 18 at each end of the member 17 preferably extend radially like spokes in a common plane transversely of the axis of oscillation, and to this end each of said members is preferably notched mid-way of its length, as shown at 19, for one-half its depth, so that a pair of said members may be rigidly inter-engaged, as by a close fit in said slots, and if desired be suitably retained in this relation, as by welding. Said members 18 are mounted in the ends of said member 17 in any suitable way, each end of said member 17 being preferably provided with a pair of diametrical slots in which the members 18, when inter-engaged as heretofore described, may have a sliding fit or they may be secured therein in any suitable way, as by soldering.

The outer ends of the members 18 are attached to the sound box casing in any suitable way. In order to facilitate mounting and demounting the stylus bar the outer extremities of said members at each side of the stylus bar are preferably attached to an annular member 20, each member 20 being illustrated as slotted at points 90° removed to receive the extremities of the members 18, and said members being retained in said slots in any suitable way, as by solder. Said annular members 20 may be mounted on the sound box casing in any suitable way. In the form shown in Figs. 1, 2 and 3, a ring-like projection 21 is formed on or suitably attached to the casing 10 at each side of the stylus bar, and each member 20 is retained in the corresponding ring-like projection 21 in any suitable way, preferably detachably, as by means of a set-screw 22, to facilitate the mounting and demounting of the stylus bar.

In the form shown in Fig. 5 the front of the casing is provided with a box-like projection 23 having circular apertures 24 at each side thereof in which the rings 20, to which the outer extremities of the members 18 are attached, may be suitably mounted and retained.

In operation the members 18, owing to their fixed attachment to the sound box casing at their outer extremities and to the stylus bar at the center of their lengths, provide a balanced flexible suspension for the stylus bar which is rigid at right angles to the axis of oscillation because all movement in such a direction is resisted by the tension of one or more of the members 18 as well as by the compression of one or more of said members on the opposite side of said axis. The stylus bar may turn about said axis with the proper degree of freedom, however, because of the flexibility of said members 18. Therefore this mounting for the stylus bar obviates any possibility of lost motion and at the same time affords a flexible mounting for said stylus bar which offers no undue opposition to its oscillation so that in reproducing, for example, large amplitudes in the record trace may be followed by the stylus. When the flexible members are composed of webs with their width in the direction of axis of oscillation, all movement of the stylus bar in the direction of said axis is also effectively prevented. Many of the advantages of my invention may be secured however if said flexible members are made from round or other stock.

While the flexible members have been shown as arranged parallel to and at right angles to the plane of the diaphragm, this is not essential as the flexible members 18 may be so mounted on the transverse member 17 that when assembled with the sound box casing they are in angular relationship to the plane of the diaphragm; for example all of the members 18 may be disposed at an angle of 45° to the plane of the diaphragm. Furthermore, while the transverse member 17 has been shown as disposed at the center of the rings 20, with all of the flexible members 18 projecting equal distances from the transverse member 17, this is not essential, as said member 17 may be disposed eccentrically within the rings 20, the members 18 projecting unequal distances at opposite sides of said member 17.

It will therefore be perceived that a novel mounting for a stylus bar has been provided which is relatively simple and inexpensive in construction, which employs no rubbing surfaces to wear, and which obviates lost motion without undue opposition to oscillation. This mounting also possesses the advantage that it has no natural period of vibration of its own because of the relation of the flexible members to the axis of oscillation. The members 20 are preferably so mounted on the casing that the flexible members 18 exert no initial stress on the diaphragm, but if desired, said members 20 may be rotatably adjusted in their supports, and retained in adjusted position in any suitable manner as by friction, soldering, set screws, etc., to set up a desired initial stress in the diaphragm.

While the embodiments of the invention illustrated on the drawings have been described with considerable particularity, it is to be expressly understood that the invention is not restricted thereto, as the same is capable of receiving a variety of mechanical expressions, some of which will now readily suggest themselves to those skilled in the art, while changes may be made in the details of construction, arrangement and proportion of parts, and certain features used without

other features, without departing from the spirit of this invention. While the invention has been shown and described as embodied in a sound reproducing or recording instrumentality employing a diaphragm it is to be expressly understood that the invention is not restricted thereto as the invention is of equal applicability to sound reproducing or recording instrumentalities wherein, for example, the diaphragm is replaced by the vibratory element of electro-magnetic devices used in the electrical reproduction of records. Reference is therefore to be had to the claims hereto appended for a definition of the limits of the invention.

What is claimed is:

1. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of flexible members operatively united with said stylus bar and casing and extending radially of the axis of oscillation between the stylus bar and casing and disposed in a common plane transverse to said axis.

2. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of flexible members operatively united with said stylus bar and casing at each side of said stylus bar the flexible members at each side of said stylus bar extending radially of the axis of oscillation of said stylus bar between the stylus bar and casing and disposed in a common plane.

3. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of angularly-related flexible members disposed in laterally spaced planes transverse to the axis of oscillation of said stylus bar and each plane common to a plurality of said members, said members being connected to said stylus bar and casing and adapted to transmit tension and compression.

4. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of angularly-related flexible members disposed in a common plane transverse to the axis of oscillation of and at each side of the stylus bar and connected to said stylus bar and casing and adapted to transmit tension and compression therebetween.

5. In sound reproducing and recording instrumentalities in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of flexible members extending transversely of the axis of oscillation of said stylus bar and connected to said casing at their ends and to said stylus bar intermediate their length.

6. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of flexible members extending transversely of the axis of oscillation of and at each side of said stylus bar connected thereto intermediate their lengths and connected to said casing at their extremities.

7. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of flexible members connected to said casing at their ends and to said stylus bar intermediate their length, said flexible members being disposed in a common plane transverse to the axis of oscillation of said stylus bar.

8. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of flexible members at each side of said stylus bar connected thereto intermediate their length and connected to said casing at their extremities, the flexible members at each side of said stylus bar extending in a common plane transverse to the axis of oscillation of said stylus bar.

9. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of separately formed and individually mounted flexible members symmetrically arranged around the axis of oscillation of said stylus bar and extending in a common plane from said stylus bar to said casing.

10. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of flexible members symmetrically arranged with respect to the axis of oscillation of said stylus bar and operatively united with said stylus bar and casing at each side of said stylus bar, the flexible members at each side of said stylus bar extending in a common plane.

11. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar and a plurality of angularly-related, separately formed and individually mounted flexible members extending in a common radial plane angularly related to the axis of oscillation of said bar from each end of said transverse member to said casing.

12. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably

mounting said stylus bar including a member extending transversely of said stylus bar to define its axis of oscillation and symmetrically arranged, separately formed individually mounted flexible members extending in a common plane angularly related to the axis of oscillation from each end of said transverse member to said casing.

13. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar and a plurality of radially-extending flexible members operatively connected to each end of said transverse member intermediate their length and connected to said casing at their ends.

14. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar and a plurality of flexible webs connected to said member intermediate their length and extending from each end thereof in a common plane transverse to said member, said webs being connected at their extremities to said casing.

15. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar and four flexible webs disposed at right angles to each other and extending from each end of said transverse member to said casing.

16. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar, a plurality of angularly-related flexible spokes connected to said member at each end thereof, annular members to which the ends of said spokes are attached, and means for mounting said annular members on said casing.

17. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar, a plurality of symmetrically arranged flexible spokes extending from each end of said member, rings to which the extremities of said spokes are attached, and means for mounting said rings on said casing.

18. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar, a plurality of flexible webs connected to each end of said member intermediate their lengths, rings to which the extremities of said webs are attached, and means for mounting said rings on said casing.

19. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar, a plurality of flexible webs connected to each end of said member intermediate their lengths, annular members to which the extremities of said webs are attached, and means for detachably and adjustably mounting said annular members on said casing.

20. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar and a plurality of separately formed and individually mounted resilient strips extending at an angle with respect to each other in a common plane at each end of said transverse member.

21. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar, a plurality of symmetrically arranged resilient members connected to each end of said transverse member, annular members to which the ends of said members are attached, and means for mounting said annular members on said casing.

22. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a plurality of radial web-like members operatively united with said stylus bar and casing at each side of said stylus bar, said web-like members being adapted to bend to provide oscillation of said stylus bar on its axis but to resist all movement transversely and longitudinally of said axis by reason of the stiffness of said web-like members.

23. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said stylus bar, and a plurality of angularly related flexible members at each end of said transverse member extending radially from said transverse member to said casing and fixed thereto, said flexible members being disposed on opposite sides of said transverse member to oppose movement thereof in all directions transversely of the axis of oscillation.

24. In sound reproducing and recording instrumentalities, in combination with a casing, a stylus bar, and means for oscillatably mounting said stylus bar including a member extending transversely of said bar and means mounting said member on said casing

for oscillation about its own axis, said last named means comprising a plurality of intersecting spokes at each end of said member extending in a common plane transverse to said member and secured to the latter at their point of intersection, the extremities of said spokes being operatively connected to said casing.

In testimony whereof we have signed this specification.

CARLETON D. HAIGIS.
LLOYD Y. SQUIBB.