July 5, 1927. 1,634,662

M. M. GRUBER

SOUND REPRODUCING APPARATUS

Filed June 14, 1920

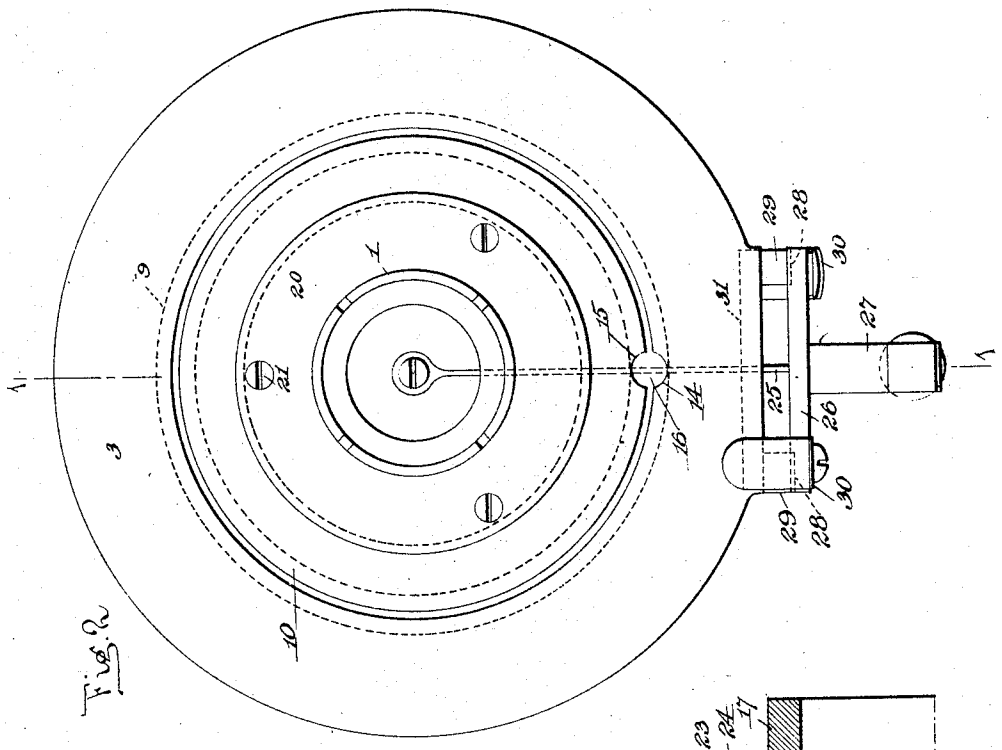


Fig. 2.

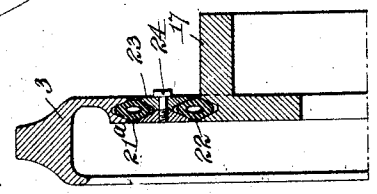


Fig. 4.

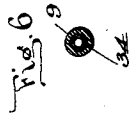


Fig. 6.

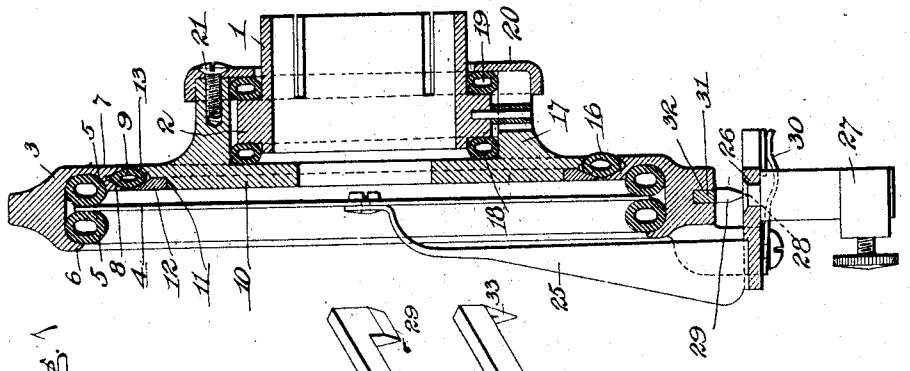


Fig. 1.

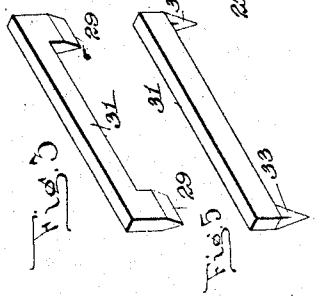


Fig. 3. Fig. 5.

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UNITED STATES PATENT OFFICE.

MORRIS M. GRUBER, OF EAST ORANGE, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SONORA PHONOGRAPH COMPANY, INC., A CORPORATION OF NEW YORK.

SOUND-REPRODUCING APPARATUS.

Application filed June 14, 1920. Serial No. 388,968.

My invention relates to sound-boxes for talking machines, and has for its object to improve the quality of the reproduction.

A further object of the invention is to reduce to a considerable degree the needle scratch.

A further object of the invention is to produce a device of the character described, simple in construction, inexpensive to manufacture and neat and attractive in appearance.

I have found that by constructing a sound-box with a groove or recess at or near the lower extremity, in which groove there is set a steel or other metal bar having at each extremity a knife edge, and by making this bar of one piece, that the knife edges are always kept in alignment. This is impossible with the construction of the sound-box now on the market, as the knife edges are set in recesses or sockets with no connecting member. By the use of my invention, the edges of the knife points are properly hardened, whereas, with the old type this is impossible, as the knife edges when inserted into metal are softened by the heat of the solder and hence their temper is lost. It is also impossible to keep the knife edge bearings in the old style construction in alignment, as there is always more or less play in the sockets, whereas, with my device, when the knife edge bearings are joined by a solid bar any play of the bar will move both knife edges in the same direction and to the same extent.

A further improvement of the reproduction is obtained by the fact that in my invention the knife edges being connected, the same degrees of vibration are submitted to both, so as to result in a uniform vibration and a better reproduction.

I find as a fact that if two knife edges of the same material are inserted in separate sockets, without having a connecting member, as in my invention, inferior tonal effects are produced.

I have found in the devices of the prior art which employ a rigid back, the vibrations from the diaphragm striking such back tend to produce and magnify the needle scratch.

A further object of the invention is to provide means to lock the back against rotation.

With these and other objects in view to be more fully set forth hereinafter, the invention consists in the novel construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter described in the specification and illustrated in the accompanying drawings considered together or separately.

The inventive idea involved is capable of receiving a variety of mechanical expressions, some of which for the purpose of illustrating the invention, are shown in the accompanying drawings.

The invention will be first described in connection with the accompanying drawings illustrating several embodiments of my invention, wherein similar reference characters are used to designate corresponding parts throughout the several views, and then more specifically defined and indicated in the appended claims.

I have illustrated one embodiment of my invention in the accompanying drawings in which like parts are designated by similar characters of reference, and in which

Fig. 1 is a longitudinal sectional view of a sound box or reproducer provided with my invention.

Fig. 2 is a rear elevation of the same.

Fig. 3 is a detail perspective view of one form of knife edge bar,

Fig. 4 is a detail sectional view of a modification,

Fig. 5 is a detail perspective view of a form of bar employing bearing or pivot points, and

Fig. 6 is a detail sectional view of a further modification.

In carrying out my invention, I provide a sleeve 1 by means of which the reproducer is applied to any preferred form of tone arm (not shown). The sleeve is provided with the usual peripheral flange 2.

The sound box or reproducer proper comprises an annular frame member or casing 3 within which a diaphragm 4 is positioned between tubular gaskets 5, 5 as is common. The annular member is provided with an inwardly projecting flange 6 at the front thereof to retain the front gasket 5 in position.

The rear face of the member 3 is provided with an inwardly projecting flange 7 and the interior periphery of the said flange is formed with a peripheral groove 8. Carried within the groove 8 is tubular gasket 9.

The back of the sound box 1 comprises a circular plate 10 having a shoulder 11 extending around its periphery. An annulus 12 is adapted to fit against the shoulder 11, and when in position forms a part of the back plate 10. The outer periphery of the annulus is coextensive with the periphery of the plate, and the diameter of the back, as a whole, is somewhat less than that of the opening in the flange 7. A groove 13 similar in shape to the groove 8 is formed in the periphery of the back. Half of the groove 13 is formed in the plate 10, and half in the annulus 12. That portion of the gasket 9 which projects beyond the edge of the flange 7 is positioned within the groove 13.

In assembling the parts just above described the gasket 9 is placed within the groove 8. The plate 10 is placed in position with its portion of the groove 13 resting against the gasket. The annulus 12 is inserted from the front and positioned on the shoulder 11. The groove member on the annulus will bear against the gasket. The annulus may be secured to the plate 10 in any desired manner.

A notch 14 is formed in the rear face of the frame member 3, and a similar notch 15 is formed in the rear face of the plate 10. When the member 1 and the plate are assembled with the notches 14 and 15 in opposition a circular recess will be formed and offer communication from the grooves 8 and 13 through the back of the sound box.

When the gasket 9, which is normally circular in cross section, is forced into the grooves 8 and 13 its cross sectional shape will be altered. It will become flattened. That portion of the gasket opposite the notches 14 and 15 will not be confined at that point but will be forced into the recess formed by the notches and form a projection 16 which will prevent relative rotation of the member 3 and the plate 10.

The back of the plate 10 is provided with an annular flange 17 within which the flanged end 2 of the sleeve 1 engages. A gasket 18 is disposed between the flange 1 and the plate 10, and a similar gasket 19 is disposed between the opposite side of the flange 1 and a cap 20 secured in place over the end of the flange 17. The usual means are provided for preventing relative rotation of the back 10 and the sleeve 1.

In Fig. 4 I have shown a modification in which two gaskets 21^a and 22 are disposed between the member 3 and the plate 10. In the modification a two part annulus 23 is interposed between the member and the plate, and, in effect forms a part of the plate. The members of the annulus 23 are secured together to retain the gaskets in position by means of screws 24 or otherwise.

In Fig. 5, I have shown a modified form of a bar 31 which may be secured by solder or otherwise in the groove 32, formed in the underside of the flattened extension of member 3. Instead of the knife edges, as shown in Fig. 3, I, in this case, employ pivot or bearing points 33, 33, such pivot or bearing points being integral with the bar, and likewise kept in perfect alignment.

In Fig. 6, I have illustrated a detail sectional view of a modified form of gasket which may be utilized between the members 3 and 10, 3 and 4, and the sleeve 1 and the frame. This gasket comprises a hollow tubular member, as before, within which is inserted a stiffening core 34. The insertion of said core will prevent the collapsing of the tubular gasket, and hence retain the same always in an expanded condition, so as to firmly and securely retain and hold the members in relative position. The core 34 may be in the form of a helical spring, as shown, or it may be of a length of wire which will fill the bore of the tubular gasket.

The second feature of my invention is the manner in which the stylus arm 25 is pivoted on the member 3. The stylus arm is secured at its lower end to the usual yoke 26 which in turn carries the usual socket 27 for receiving the stylus (not shown). The ends of the yoke are provided with the usual angular grooves 28 for the reception of the knife edges 29, 29 carried by the member 3 whereby the stylus arm is pivoted on the member 3 with the minimum of friction. The usual springs 30 are provided for holding the yoke in engagement with the knife edges.

The knife edges 29 are formed on a bar 31 which is secured by soldering or otherwise, in a groove 32 formed in the underside of a flattered extension on the member 3. The knife edges being integral with the bar 31 may be made in perfect alinement. The downturned ends of the bar forming the knife edges may be hardened, or the entire bar may be hardened. The bar 31 being, as it is, of considerable bulk may be soldered or brazed in the groove 32 and the heat of the solder will not be sufficient to draw the temper of the knife edges.

In operation the back plate of the sound box may move relatively to the member 3 due to air vibrations set up by the diaphragm. The back plate may move away from the member 3 due to the cushioning effect of the gaskets 9, 18 and 19, or the ring 3 may be moved away from the back due to the flexibility of the gasket 9. In either case scratchy tones will be eliminated.

Instead of the hollow gaskets plastic rubber may be employed.

In accordance with the provisions of the patent statutes, I have described the principle of my invention together with the apparatus which I now consider to represent the best embodiment thereof, but I desire it understood that my invention is not confined

to the particular form of apparatus herein shown and described, the same being merely illustrative, and that the invention can be carried out in other ways without departing from the spirit of my invention, and, therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which objects of my invention are attained, and the new results accomplished, as herein set forth, as it is obvious that the particular embodiment herein shown and described is only one of many that can be employed to attain these objects and accomplish these results.

Having now described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In a sound box, a supporting member, a supported member mounted upon the perimeter of said supporting member, tubular cushioning spacing rings interposed between said members, means for compressing said rings in an axial direction whereby said rings will be expanded in a diametrical direction, recesses in the adjacent peripheral surfaces of said members, permitting expansion of portions of said rings into said recesses whereby said members are locked against relative rotation.

2. In a sound box, a plate, a casing surrounding said plate, said casing having a minimum diameter greater than the maximum diameter of said plate, annular means between the plate and the casing, comprising grooves in their adjacent faces, and resilient, tubular means seated in the grooves, and means for compressing said tubular means to illiptical cross-section.

3. In a sound box, a plate, a casing surrounding said plate, said casing having a minimum diameter greater than the maximum diameter of said plate, annular means between the plate and the casing, comprising grooves in their adjacent faces, and resilient, tubular means seated in the grooves, and means contacting with said tubular means to compress the same.

This specification signed this 28th day of May, 1920.

MORRIS M. GRUBER.