Dec. 26, 1922.

1,440,180

H. T. SCHIFF.
SOUND REPRODUCING MACHINE.
FILED MAR. 22, 1920.

2 SHEETS-SHEET 1

Fig. 1.

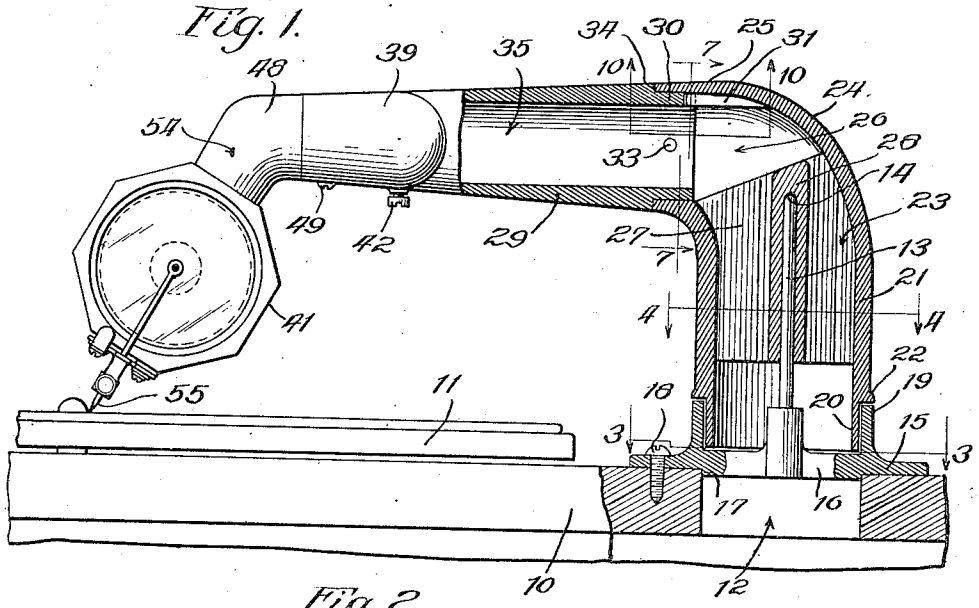


Fig. 2.

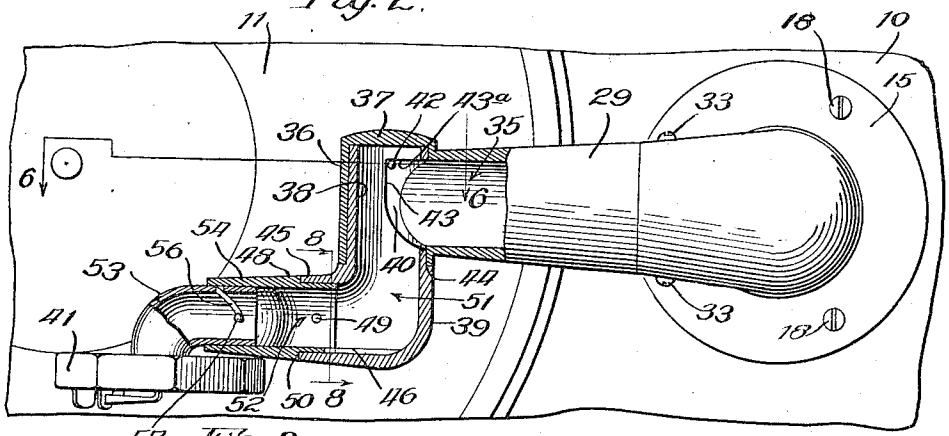


Fig. 3.

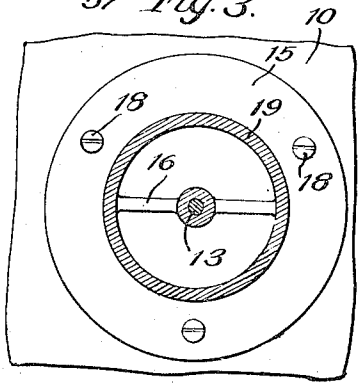
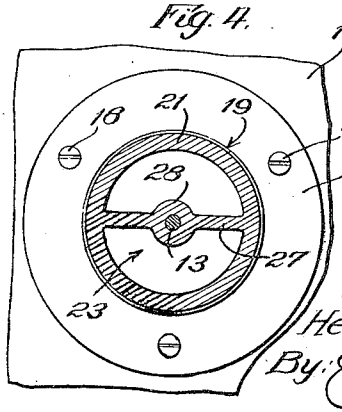


Fig. 4.



Inventor:
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2 SHEETS-SHEET 2

Fig. 5

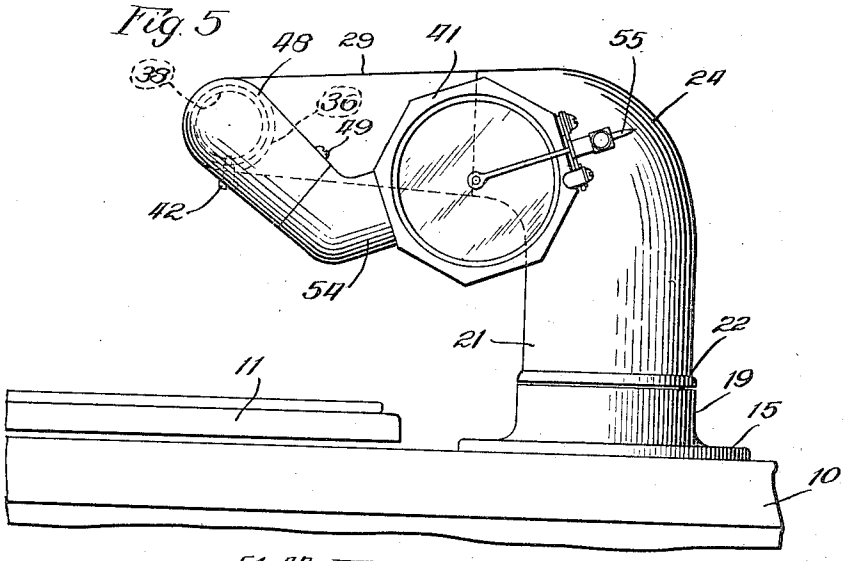


Fig. 6

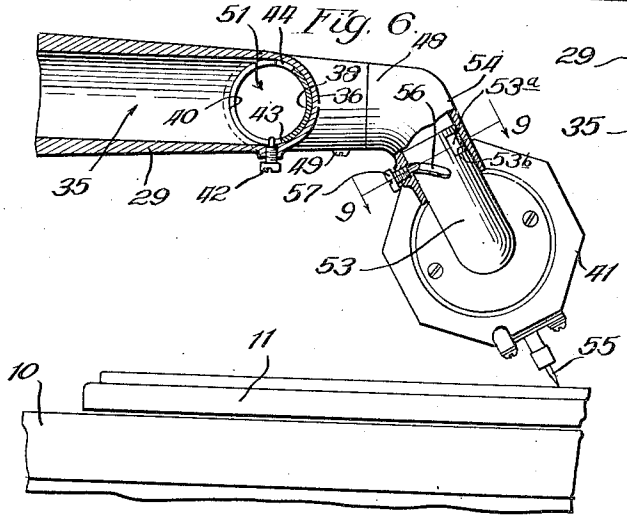


Fig. 10.

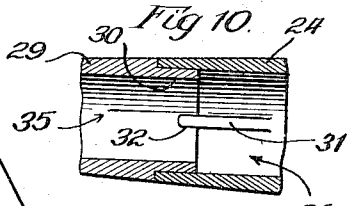


Fig. 11.

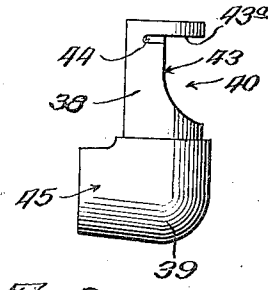


Fig. 7

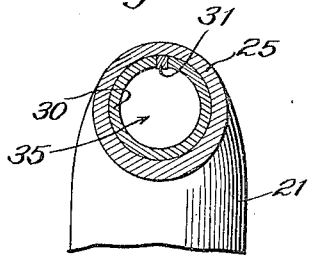


Fig. 8.

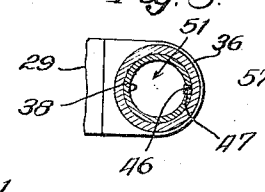
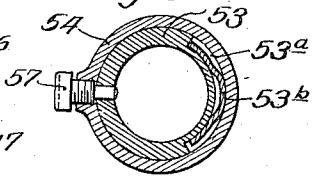


Fig. 9.



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Patented Dec. 26, 1922. 1,440,180

UNITED STATES PATENT OFFICE.

HENRY T. SCHIFF, OF CHICAGO, ILLINOIS, ASSIGNOR TO VITANOLA TALKING MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SOUND-REPRODUCING MACHINE.

Application filed March 22, 1920. Serial No. 367,600.

To all whom it may concern:

Be it known that I, HENRY T. SCHIFF, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sound-Reproducing Machines, of which the following is a specification.

This invention relates in general to improvements in sound reproducing machines but more specifically the invention relates to improvements in the tone arm therefor, and one of the objects of the invention is to provide an improved tone arm adapted for a lateral swinging movement with respect to the record supporting table and which arm is supported by a single point suspension or bearing which carries the weight of the tone arm and sound box and which bearing will at the same time reduce friction, thereby permitting ease and freedom of movement of the arm.

A further object is to provide an improved tone arm and sound passage therethrough of a stepped formation, the passage increasing in size from the sound box to the point at which the tone arm connects with the amplifying horn, the respective stepped portions of the passageway being of uniform diameter throughout their lengths.

A further object is to provide an improved tone arm of this character which is of a sectional construction, the adjacent ends of the respective sections telescoping and having means forming guides for directing or guiding the sections into their proper relative positions when assembling the parts.

A further object is to provide an improved tone arm of this character having a sound box pivotally connected thereto for movement toward and away from the record, and improved means forming a stop for supporting the sound box when the same is thrown back into an inoperative position.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed as shown in the accompanying drawings illustrating this invention in which

Figure 1 is a view partly in side elevation, partly broken away and partly in vertical section of a sound reproducing machine having a tone arm applied thereto which is constructed in accordance with the principles of this invention.

Figure 2 is a view partly in top plan and partly in horizontal section of the parts shown in Figure 1.

Figure 3 is a detail horizontal sectional view taken on line 3—3 Figure 1.

Figure 4 is a horizontal sectional view taken on line 4—4 Figure 1.

Figure 5 is a side elevation of the tone arm showing the sound box swung back and into an inoperative position.

Figure 6 is a detail view partly in section and partly in elevation taken on line 6—6 Figure 2.

Figure 7 is a sectional view on line 7—7 Figure 1.

Figure 8 is a sectional view on line 8—8 Figure 2.

Figure 9 is a sectional view on line 9—9 Figure 6.

In the drawings the numeral 10 designates a portion of the framework of a sound reproducing machine having the usual rotatable record supporting table 11 and sound passage 12 with which passage the usual amplifying horn is connected.

Supported by a fixed portion of the casing is an upright bearing member 13 having a rounded upper extremity 14 and a base 15 provided with openings 16 therethrough. This base 15 is provided with a projecting shoulder portion 17 of a size to fit within the passage 12 and the base is secured in position by means of suitable fastening screws 18. The base is provided with an upwardly projecting flange 19 and compassing the opening 16 to receive the reduced end 20 of the tone arm section 21, the latter being provided with a circumferential shoulder 22 projecting over and standing in close proximity to the upper edge of the flange portion 19 of the base 15.

The interior diameter 23 of the tone arm section 21 is substantially uniform throughout the length of the section to a point 24 where the arm curves to form a lateral projecting portion 25 and the passage 26 in the portion 25 of the section 23 is also of a substantially uniform diameter throughout its length.

Arranged within the section 21 is a web 27 having a bearing portion 28 of some con-

siderable length and which bearing portion 28 is arranged intermediate the ends of the section 23 and is preferably spaced for a considerable distance above the lower end of the section 21. This bearing portion 28 is located centrally of the section 21 and is provided with an opening extending through the lower end thereof and which opening is adapted to receive the upright bearing or spindle 13 so that when the tone arm section is placed in position the section will be supported entirely by the end of the upright bearing element 13 resting upon the bottom of the opening in the bearing portion 28 so that the tone arm is adapted for a free and easy pivotal movement in a direction laterally or across the record supporting table 11. The bearing portion 28 as well as the upright bearing element 13 is of some considerable length so as to maintain the tone arm against the vertical pivotal movement with respect to the record supporting table.

The tone arm is of a sectional construction embodying a section 29 having a reduced end 30 adapted to telescope into the adjacent end of the section 21, and in order to guide the section 29 in the proper position when assembling, there is provided within the passageway 26, a guide 31 while the end 30 of the section 29 is provided with a recess 32 opening through the end of the section and into which recess 32 the end of the guide 31 is adapted to enter.

These sections may be secured together in any suitable manner such as by means of suitable fastening devices or screws 33 passing into registering openings in the sections. The periphery of the reduced end 30 of the section 29 is shaped to form a shoulder 34 which stands adjacent the end of the portion 25 of the section 21 so that the adjacent portion of the two sections will be flush. The section 29 is provided with an opening or tone passage 35 extending therethrough connecting with the passage 26, the passage 35 being of a uniform diameter throughout its length and of a size slightly less than the size of the passage 23 in the section 21.

The periphery of the section 29 is preferably tapered as shown to form a continuation of the portion 25 of the section 21 and which latter is also provided with a tapered periphery.

The free end of the section 29 is provided with a transversely disposed bearing 36 the end 37 of which is closed and forms a socket or bearing for the end 38 of a tubular arm 39 which fits loosely therein, the open end of the portion 38 of the arm 39 being closed by the end 37 and the arm is provided with a cutaway portion 40 registering with the passage 35, and is spaced from the free end of the portion 38 to form a shoulder 43^a. This cut out portion 40 is of such a size as to permit the arm 39 to be rotated in the bearing 36 when the sound box 41 which is connected with the arm is moved toward or away from the record supporting table 11. In order to limit this rotary movement of the arm 39 there is provided a stop pin 42 which is adapted to engage the edge 43 of the cut out portion 40 when the arm is moved in one direction and enters a slot 44 to engage the end thereof when the sound box is moved into the position shown in Figure 5 and serves to support the parts in this position. The stop 42 also cooperates with a shoulder 43^a, and which shoulder is of a considerable length, to maintain the end 38 of the section 39 against a longitudinal movement in the bearing 36 and serves to maintain these parts against separation. This stop 42 may be of any desired construction but is preferably removable so as to permit the parts to be separated. The periphery of the portion 38 of the arm 39 adjacent the bearing 36 is reduced to form a shoulder 44 which abuts the end of the bearing 36. The other end 45 of the arm 39 is arranged preferably at a right angle to the end 38 and is provided with a projecting rib 46 therein which forms a guide similar to the guide 31 adapted to enter a groove 47 which opens through the end of the section 48 of the tone arm which is telescoped into the end 45, these parts being held together by suitable fastening devices 49. The periphery of the section 48 adjacent the arm 39 is reduced to form a shoulder 50 which abuts the end of the arm.

A passage 51 in the arm 39 is of a substantially uniform diameter throughout its length and a passage 52 in the section 48 is also of a uniform diameter throughout its length but is of a size slightly less than the diameter of the passage 51.

The sound box 41 has connected therewith a tubular portion 53 the free end of which telescopes into the section 48, the end 54 of the section 48 being deflected downwardly to receive the same. The telescoping extremity of the portion 53 and the section 48 form a pivot about which the tone arm 41 may be rotated so as to place the stylus 55 in the proper position to play the record upon the table 11. Inasmuch as it is necessary that the stylus 55 be maintained in a fixed relative position with respect to the base of the tone arm or the section 21, means must be provided whereby the section 53 which is connected with the tone arm 41 will move into or out of the end of the section 48 according to the direction of the movement of the sound box with relation thereto. To that end, the tubular section 53 is provided with an inclined slot 56 into which a pin 57 carried by the section 48 projects so that when the tone arm is rotated with respect to the sec-

tion 48 this pin and slot connection 56 and 57 will operate to cause the end of the section 53 to move into or out of the section 48.

With this improved construction it will be manifest that the tone arm and sound box is supported from a single point, that is they are supported by the end of the bearing element 13 resting against the bottom of the bearing 28 and inasmuch as these bearing elements are of considerable length, the tone arm will be held against vertical movement while at the same time the tone arm will swing freely in a lateral direction and without friction.

The sound box may be swung about the pivot formed by the bearing 36 and the end 38 of the arm 39 and will be supported in this adjusted position by means of the pin 42 entering the slot 44, the slot being of such a length as to maintain the holder in a convenient position for the insertion of the stylus 55. The pin operates in conjunction with the edge 43 of the curved portion 40 of the arm to prevent the sound box and stylus from becoming injured by dropping down too far with respect to the tone arm.

By the construction of the tone arm provided with stepped passages, the steps of which are of a substantially uniform diameter throughout their length, it will be manifest that the sound waves will advance with a regular, steady, and natural increase in their waves as they pass from one of the steps to the other, thereby greatly improving the tonal qualities of the arm. Furthermore by the construction of the tone arm in sections assembled together, the expense of manufacturing will be considerably reduced and as means are provided for guiding the parts in proper relative relation it will be manifest that skilled labor will not be necessary in the assembling of the parts.

The tubular extension 53 of the sound box 41 is provided near its extremity with a recess 53^a to receive a flat spring 53^b, and by means of which spring the sound box is frictionally held in its adjusted position with respect to the tone arm.

What is claimed as new is:—

A tone arm having a bearing at one end arranged transversely of said end, a sound box, a tubular section connected with the sound box, one end of said section being deflected laterally and journaled in said bearing, a portion of said end being cut away to form communication between the said section and the passage in the tone arm, said sound box being movable about the bearing toward and away from the record support, and a stop device carried by the tone arm and adapted to be engaged by the edge of said cut away portion to limit the pivotal movement of the sound box with respect to the arm, the said stop device also serving to hold the said end of the said tubular section from longitudinal movement in the bearing in any position to which the sound box has been moved with respect to the arm.

In testimony whereof I have signed my name to this specification, on this 17 day of March, A. D. 1920.

HENRY T. SCHIFF.