Sept. 18, 1923. 1,468,224

B. B. BLOOD

TONE ARM FOR PHONOGRAPHS

Filed Jan. 16, 1919

Fig. 1.

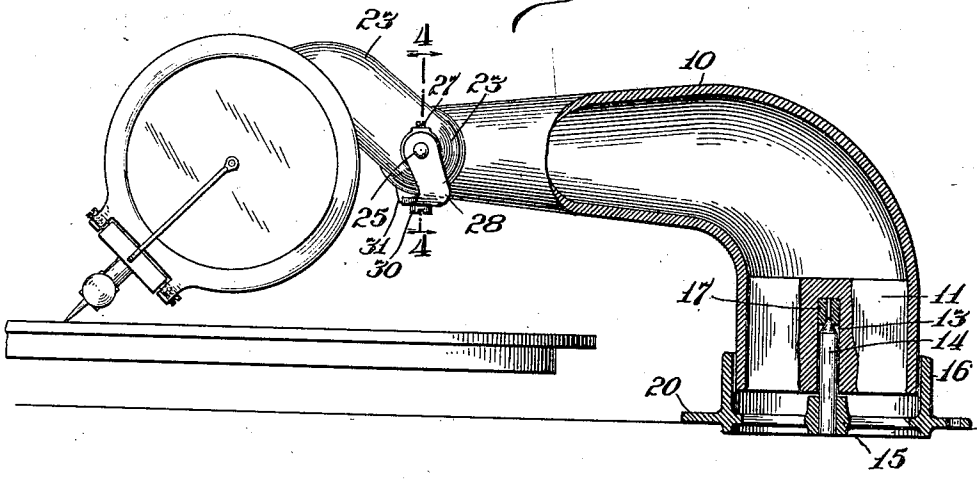


Fig. 2.

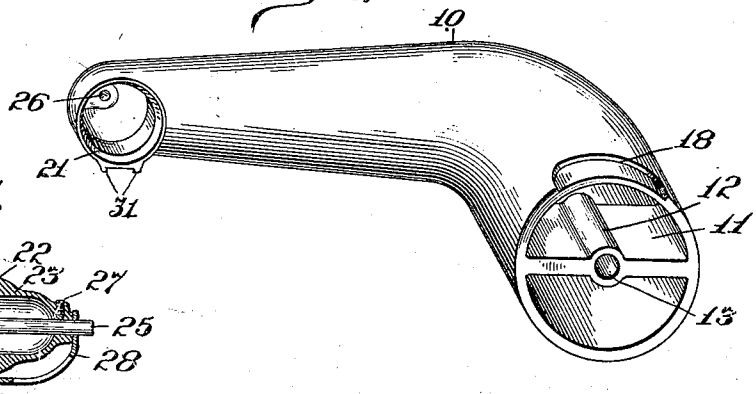


Fig. 4.

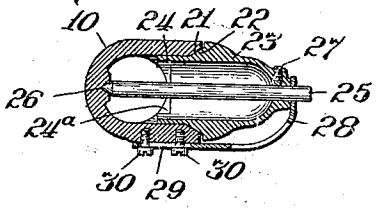


Fig. 3.

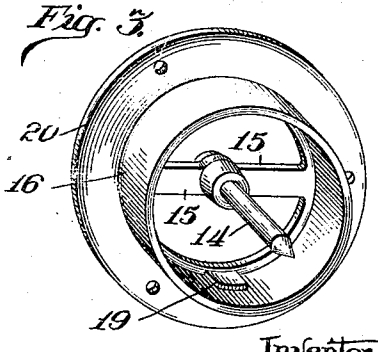
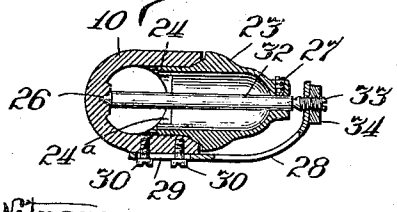


Fig. 5



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UNITED STATES PATENT OFFICE.

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TONE ARM FOR PHONOGRAPHS.

Application filed January 16, 1919. Serial No. 271,376.

To all whom it may concern:

Be it known that I, BURR B. BLOOD, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tone Arms for Phonographs, of which the following is a description, reference being had to the accompanying drawing, which forms a part of my specification.

My invention relates to tone arms adapted for use in connection with phonographs provided with tone chambers; that is, in connection with phonographs wherein the tone or sound is conveyed from the reproducer through the tone arm and thereby transmitted into the tone chamber usually formed in the phonograph cabinet beneath the record-holding turn-table.

One object of my invention is to provide a tone arm wherein the reproducer receiving end or elbow is provided with a pivotal connection which will enable the proper movement of the reproducer across the record; permitting the reproducer to have the desired freedom during its travel and yet at the same time provide a connection which will not interfere with the tone quality and will not produce a "blast" or permit any "chatter," so often encountered with tone arms and connections at present employed. The means employed for providing the pivotal connection just referred to is of such nature as to take up any slight differences in formation or dimensions, within a given range, that may occur between the reproducer-receiving end or elbow and the main portion of the tone arm.

Another object of my invention is to provide the tone arm with a pivotal support at the base end, on the cabinet adapted to receive the entire weight of the arm without permitting any binding effect but allow a free swing or oscillation of the tone arm and thus provide a construction responsive to the delicate power of force applied to the stylus or needle by the shallow grooves of the record. The invention at the same time contemplates a construction wherein the tone arm proper may be easily and quickly lifted or disconnected from its base or pivot providing portion.

The above enumerated objects, as well as the advantages inherent in the construction, will be more fully comprehended from the following detailed description of the drawing, wherein:—

Figure 1 is a side elevation of my improved tone arm shown provided with a reproducer, the stylus whereof is shown in contact with a portion of a disc record; the main portion of the tone arm and its base being shown in longitudinal section to disclose the pivot-forming elements.

Figure 2 is a perspective view of the main portion of the tone arm in inverted position, that is looking at the bottom thereof, to disclose the interior construction at the ends.

Figure 3 is a perspective view of the base or pivot-forming portion of the tone arm turned up on its side.

Figure 4 is a sectional view, taken on the line 4—4 of Figure 1, looking in the direction of the arrows.

Figure 5 is a detail sectional view of a modified form of the pivotal connection between the main portion of the tone arm and the reproducer-receiving end or elbow.

In the particular exemplification of my invention as shown in the drawing, the main portion of the tone arm shown at 10 is preferably flared toward the base thereof and given a substantially right angular bend at a point intermediate of its ends whereby the reproducer-receiving end will be maintained at proper elevation. The lower or base end of the arm is provided with an internal web 11, preferably of comparative width and thickness, which may be "sweated" or otherwise secured to the tone arm, as more clearly shown in Figure 2. The web 11, in its preferred form as shown in the exemplification, is disposed diametrically of the tone arm, with the central part thereof enlarged or formed with a hub-portion as shown at 12 and provided with a longitudinal socket 13 coincident with the vertical axis of the base portion of the tone arm. The socket 13 is of length sufficient to receive a pivot-pin 14 disposed upwardly from the spider or web 15 of the base portion or collar 16 which latter is made separate from the tone arm proper. The pivot pin 14 is, of course, disposed at the vertical axis of the base portion of the tone arm and is provided with a tapered end or point as clearly shown in Figures 1 and 3,

which extends into a tapered or flared socket formed in the bushing 17 placed at the upper end of the longitudinal socket in the hub or enlarged portion 12 of web 11. As the tone arm and its web 11 are usually made out of stamped or cast metal, I prefer to employ a bushing 17 of sufficient hardness to provide a pivotal bearing which will not be affected by the constant oscillations of the tone arm.

The outer perimeter of the main portion of the tone arm 10, at the lower end thereof adjacent its orifice, is provided with a segmental slot or depression, as at 18, see Figure 2, which is intended to receive a boss 19 formed on the interior of the base portion or collar 16, see Figure 3; it being understood that the lower end of the main portion of the tone arm extends into the base portion or ring 16, as shown in Figure 1, but with sufficient play to permit free oscillatory movement of the tone arm and at the same time convey the tones or sounds into the tone-chamber not shown. The base portion 16 is intended to be secured to the top of the phonograph cabinet about the throat or orifice leading to the tone chamber and is therefore provided with the horizontally disposed flange 20 which may be secured by means of screws or otherwise to the cabinet.

The smaller or outer end of the main portion 10 of the tone arm is shown bent or curved laterally in a direction substantially at right angles to the longitudinal axis of the main portion of the tone arm. The orifice at this end is preferably made beveled or flared, as shown at 21 in Figures 2 and 4, to receive the beveled shoulder or portion 22 of the reproducer-receiving connection or elbow 23 of the tone arm and thus enable a smooth, flush connection to be provided between the main portion of the tone arm and said elbow which will permit vertical oscillatory movement of said elbow or reproducer holder connection 23 of the tone arm. The end of the elbow portion 23 beyond the beveled portion or shoulder 22 is adapted to extend into the main portion of the tone arm, as shown at 24 in Figure 4, so as to provide sufficient bearing or purchase and also ensure transmission of all pulsations or vibrations from the reproducer to the main portion of the tone arm; the tones or sounds being ensured free passage by providing said end portion 24 with a cut-away portion, as shown in Figure 4 at 24^a, which is disposed toward the main part of the tone arm when the elbow 23 is in playing position.

In order to properly secure the reproducer holding end or elbow 23 to the main portion of the tone arm, I provide a pivot member or pin 25, adapted to extend through the side wall of the elbow portion 23 and into contact with the inner or far side of the main portion of the tone arm; where the pin 25 is preferably tapered or pointed and extends into a suitable bore or hole provided on the inner wall of the main portion of the tone arm, as shown at 26 in Figure 4. In order to maintain the proper pivot relation between the pin 25 and the inner wall of the main portion of the tone arm at the point 26, I provide the elbow portion 23 with a set-screw 27 disposed transversely to pin 25 and adapted to have binding relation with pin 25 when set-screw 27 has been sufficiently screwed down into place. The pin 25 extends beyond the outer wall of the elbow portion 23 so as to receive the end of a bowed strap 28. The opposite end of strap 28 is preferably provided with an elongated slot 29 adapted to receive screws 30, 30 which screw into threaded apertures in the wall of the main portion 10 of the tone arm. By providing strap 28 with the elongated slot 29, it is apparent that adjustment of the strap in a direction lengthwise of pin 25 may be made so as to compensate for slight differences in construction or thicknesses of metal when the respective parts of the tone arm are being assembled. In order to prevent any sidewise movement of the bracket 28, I show the outer end of the main portion 10 of the tone arm provided with lugs or shoulders 31, see Figure 2, spaced apart a distance sufficient to receive the strap 28 therebetween. The strap 28 receiving the outer end of pin 25, as shown in Figure 4, will maintain the portions of the tone arm in proper pivotal relation and also provide proper support for the vertically oscillating portion or elbow 23; while the shoulders 31 will prevent sidewise movement of the strap 28. At the same time, the strap 28 will provide proper support or rest for the elbow portion 23 when the reproducer has been lifted and swung back into inoperative position.

In Figure 5 I illustrate a slight modification so far as the pivotal connection between the elbow or reproducer holding portion of the tone arm and the main portion of the tone arm is concerned. In this modified form, the main portion 10 of the tone arm is provided with a flared orifice the same as in the construction shown in Figure 4, adapted to receive the beveled shoulder adjacent the end of the elbow portion 23; and the elbow portion is provided with a pin 32, preferably removably secured therein and disposed lengthwise of the end of elbow portion 23 so as to contact with the inner wall at the opposite or far side of the main portion of the tone arm. The pin 32 is shown held in place by means of a set-screw 27 which prevents movement of the pin in a direction lengthwise thereof and the outer end of the pin 32 is substantially flush with the outer wall of the elbow portion 23; with this outer end of the pin provided with a

socket coincident with the longitudinal axis thereof adapted to receive the point of pivot-forming screw or member 33 which is disposed through a suitable nut or washer 34 and an aperture in the bowed end of bracket 28. Bracket 28 is secured to the main portion 10 of the tone arm by the slot and screw connection as in the construction shown in Figure 4. This construction differs from that disclosed in Figure 4 in that the actual pivot for the reproducer receiving end or elbow portion 23 is formed by means of pin 32 and pivot screw 33; whereas in the construction shown in Figure 4 the pivotal connection for said sections of the tone arm is formed by the pin 25 and the inner wall of the tone arm section 10.

The construction shown in Figure 5 permits of adjustment of the pivotal connection without necessitaing the release of set-screw 27 in its binding relation with the pin. Both constructions, however, enable a firm pivotal connection being formed between the respective sections of the tone arm so as to eliminate any "chatter" or vibration between the parts and yet at the same time permit free vertical oscillations of the tone arm section or elbow to which the reproducer is connected.

I have shown and described what I believe to be the simplest and best adaptations of my invention, but modifications may be possible without, however, departing from the spirit of my invention.

What I claim is:—

A phonograph tone arm comprising a main section having an outer laterally disposed end, the inner wall of said end, at the axis thereof, being provided with a socketed boss while the lower outer surface is provided with a pair of parallel spaced lugs, a reproducer receiving end or elbow having a reduced portion adapted to extend into the laterally disposed end of the main section, the elbow portion of said end being externally provided with an apertured boss in axial alignment with the socket on the inner wall of the main section, a pivot pin disposed through said aperture in the elbow, with the inner end of the pin tapered and seated in the socket on the inner wall of the main section, means secured to said elbow for holding the pin against longitudinal movement and to induce said pin to rotate with the elbow, a bowed strap secured between said spaced lugs on the lower surface of the main section in adjustable relation with said section so as to permit adjustment lengthwise of the strap, the other end of the strap being bent upwardly across the axis of said pivot pin, and a pivot providing member carried by said strap and engaging with the outer end of said pivot pin.

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