E. P. MOFFITT.

PHONOGRAPH.

APPLICATION FILED MAR. 15, 1920.

1,386,892.

Patented Aug. 9, 1921.

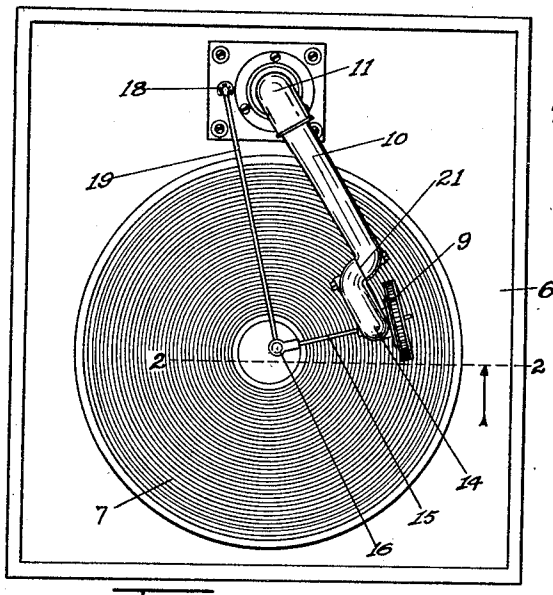


FIG. 1.

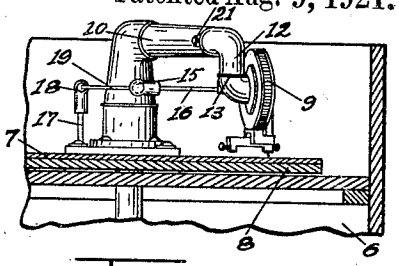


FIG. 2.

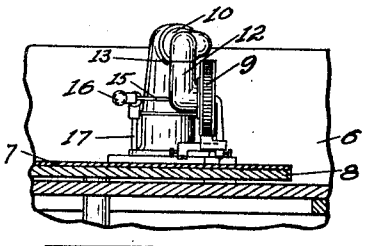


FIG. 4.

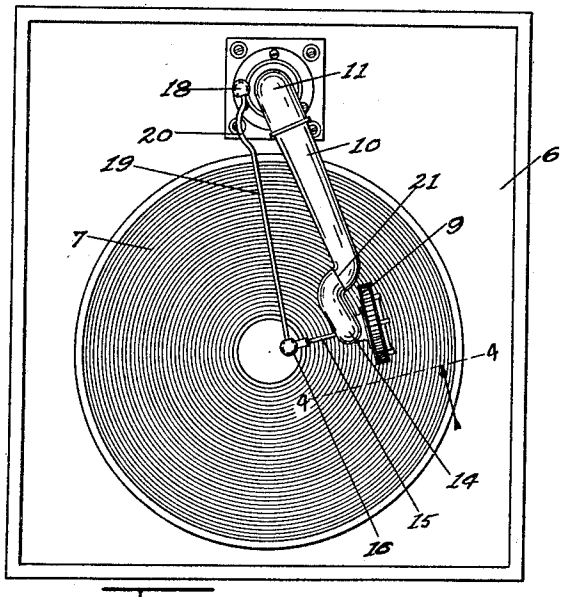


FIG. 3.

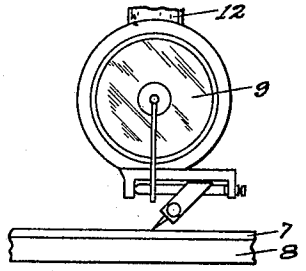


FIG. 5.

INVENTOR.

EDWARD P. MOFFITT

BY A. E. Carlson.

ATTORNEY

UNITED STATES PATENT OFFICE.

EDWARD P. MOFFITT, OF MINNEAPOLIS, MINNESOTA.

PHONOGRAPH.

1,386,892. Specification of Letters Patent. **Patented Aug. 9, 1921.**

Application filed March 15, 1920. Serial No. 365,908.

To all whom it may concern:

Be it known that I, EDWARD P. MOFFITT, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Phonographs, of which the following is a specification.

My invention relates to improvements in sound reproducing devices for phonographs, and the main object is to provide means whereby the direction of the sound reproducing needle or stylus will at all times be maintained in a tangential position to the record groove in which it is engaged. Further objects will be disclosed in the course of the specification and in the accompanying drawing, in which;

Figure 1 is a top view of a phonograph equipped with my invention.

Fig. 2 is a sectional view on the line 2—2 in Fig. 1.

Fig. 3 is a top view of a phonograph equipped with a modified form of my device.

Fig. 4 is a sectional view on the line 4—4 in Fig. 3.

Fig. 5 is an enlarged detail side view of the sound box 9 as seen from the right in Fig. 4.

Referring to the drawing by reference numerals, 6 designates a phonograph of the well known type in which is played the disk style of record, the record 7 being revolved on a turntable 8. It has been customary heretofore to mount the sound box 9 to the tone arm 10 so that when a record is being played, the stylus, in its path across the record always retains a relatively radial direction to the arc which the needle describes when the tone arm 10 swings on its center. It is known however that a more scientifically correct reproduction of the sounds originally recorded on the record may be had if the direction of the stylus is maintained in a tangential relation to the record groove it engages.

To provide simple, practical and efficient means for thus retaining the proper position of the stylus I secure the sound box 9 to a downward extension 12 of the tone arm 10, said extension having a vertical pivot joint 13 so that the sound box may swing vertically from a point 14. To the lower part of the extension 12 I secure a rod 15 having a socket 16 at the outer end thereof. Near the base of the tone arm 10 and opposite the point 11 is a post 17 having a socket 18 at its upper end. The socket 18 is so positioned that a vertical plane through its center and through center 11 will be perpendicular to a vertical plane passing through the center 11 and the center of the turntable 8. A link rod 19 is provided with balls at its ends; such balls being adapted to engage and universally connect the two sockets 16 and 18. The distance between the centers of the balls is substantially the same as the distance between the centers 11 and 14, and the distance between the socket 16 and the center 14 is substantially twice as great as the distance between the socket 18 and the center 11.

With the above described construction and proportions the rod 15 will always assume a position substantially parallel to a line between the stylus point and the center of the record. In the present showing this position happens to be that of a radius of the record as the centers 14 and 16 are in the same vertical plane as the stylus point. It may be stated, however, that this parallel relation will also occur even if the stylus point is not in the same vertical plane with the centers 14 and 16, provided of course that said point will describe an arc or curve through the center of the record. And as the forward direction of the stylus is at all times perpendicular to a vertical plane through centers 14 and 16, it must also be perpendicular to the record radii and is consequently tangential to the record groove in which the stylus point engages.

In the modifications shown in Figs. 3 and 4 the distances between the points 14 and 16 and between the points 11 and 18 have been proportionately decreased making it necessary to provide a curved portion 20 in the rod 19 so that the latter will not stop against the vertical portion of the tone arm 10 until the stylus is clear of the turntable 8.

The joint 13, the universal connection 16 and the tone arm joint 21 allow the sound box to be lifted up so that needles and records can be changed when so desired.

I am aware of the many previous attempts which have been made to overcome the objectionable feature of having the stylus point diagonally into the record groove, such for instance as by offsetting the sound box on the tone arm, or using a rod parallel to the tone arm for actuating the sound box,

and of offsetting the swinging center of the tone arm, and a host of other devices, but in no instance have I seen a practical device for uniformly controlling the direction of the needle, as above set forth.

It is understood that the above combinations and construction can be used in a variety of modifications of form and structure if within the scope of the appended claims.

Having now therefore fully shown and described my invention what I claim to be new and desire to protect by Letters Patent is:

1. In combination in a phonograph having a tone arm adapted to swing in an arc over a disk record, a sound box having a stylus adapted to engage the record, said sound box being secured on a vertical pivot joint to said tone arm, and an actuating mechanism operatively connecting said sound box to a stationary part of the phonograph, said mechanism being adapted to change the direction of the sound box relative to the tone arm so that the direction of the stylus will be perpendicular to a line through it and the record center at all times while the stylus engages the record.

2. In combination in a phonograph having a tone arm adapted to swing in an arc over a disk record having grooves therein, a sound box having a stylus adapted to engage said grooves, said sound box being secured to said tone arm on a vertical pivot, and means for causing the direction of the stylus to be constantly retained in tangential relation to the groove engaged, said means consisting of an actuating mechanism operatively connecting said sound box to a rigid part of the phonograph.

3. In combination in a phonograph having a tone arm adapted to swing in an arc over a disk record, a sound box secured on a vertical axis to the free end of said tone arm and having a stylus adapted to engage the record, and an actuating arm pivotally connected at one end to a fixed axis near the swinging center of the tone arm, the other end of said actuating arm being pivotally secured to said sound box at a distance from said vertical axis of approximately twice the distance between the fixed axis and the swinging center of the tone arm.

4. In combination in a phonograph having a tone arm adapted to swing in an arc over a disk record, a sound box secured on a vertical axis to the free end of said tone arm and having a stylus adapted to engage the record, and an actuating arm pivotally connected at one end to a fixed axis near the swinging center of the tone arm, so that a line through the fixed axis and the said tone arm center will be perpendicular to a line through said center and the center of the record, the other end of said actuating arm being pivotally secured to said sound box at a distance from said vertical axis of approximately twice the distance between the fixed axis and the swinging center of the tone arm.

5. In combination in a phonograph having a tone arm adapted to swing in an arc over a disk record, a sound box mounted on a vertical axis on the tone arm, the same having a stylus adapted to engage the record, and an actuating arm pivotally connected at one end to a fixed axis near the swinging center of the tone arm, the other end being pivotally connected to the outer end of a projecting arm of the sound box, said actuating arm assuming a diagonal relation in respect to the tone arm, the distance between the vertical axis and the outer end of the projecting arm being substantially twice that between the fixed axis and the swinging center of the tone arm.

6. In combination in a phonograph having a tone arm adapted to swing in an arc over a disk record, a sound box mounted on a vertical axis on the tone arm, the same having a stylus adapted to engage the record, and an actuating arm pivotally connected at one end to a fixed axis near the swinging center of the tone arm, the other end being pivotally connected to the outer end of a projecting arm of the sound box, said actuating arm assuming a diagonal relation in respect to the tone arm, the distance between the vertical axis and the outer end of the projecting arm being substantially twice that between the fixed axis and the swinging center of the tone arm, and the length of the actuating arm being substantially the same as the distance between the swinging center of the tone arm and the vertical axis supporting the sound box.

In testimony whereof I affix my signature.

EDWARD P. MOFFITT.