

A. J. SWING.
 TONE ARM APPARATUS FOR TALKING MACHINES.
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1,349,636.

Patented Aug. 17, 1920.

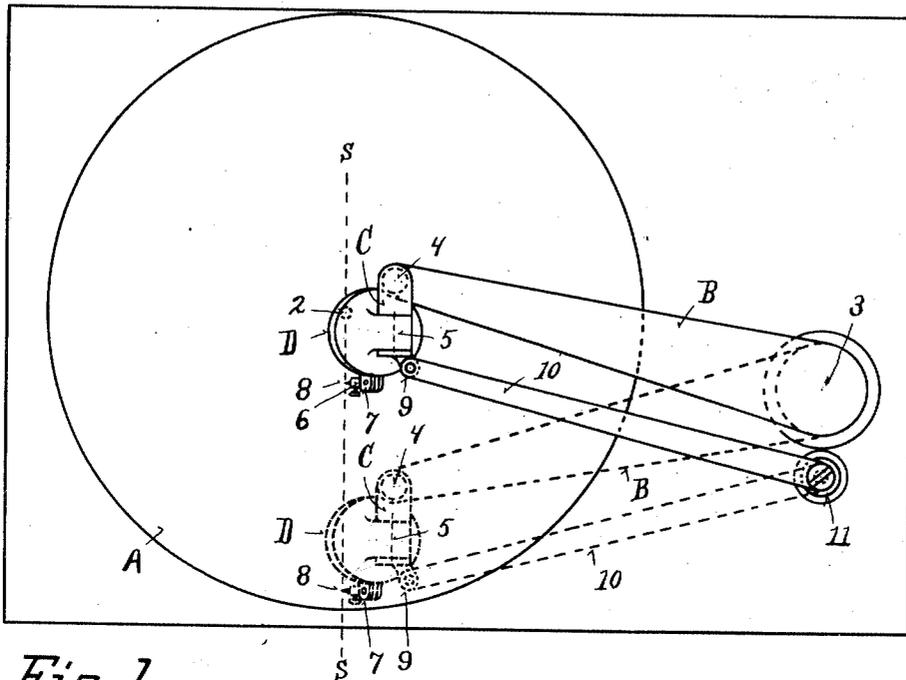


Fig. 1.

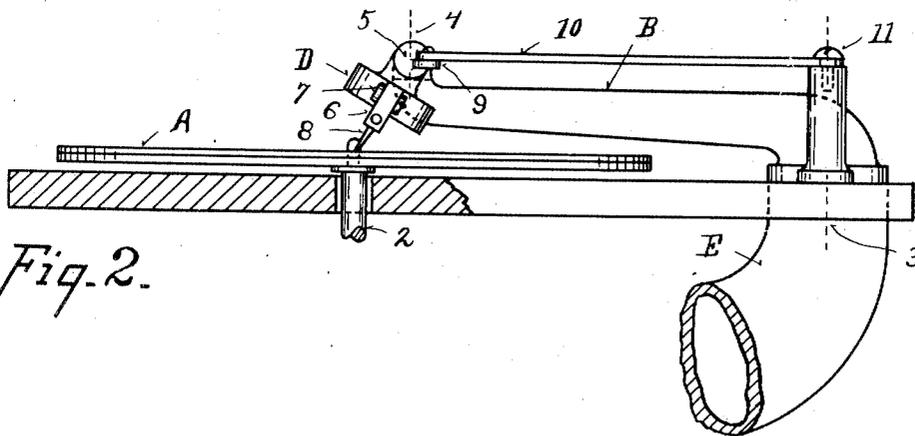


Fig. 2.

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5 TONE-ARM APPARATUS FOR TALKING-MACHINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALFRED J. SWING, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Tone-Arm Apparatus for Talking-Machines, of which the following is a specification.

My invention relates to improvements in apparatus for recording and reproducing sound. One of its objects is to provide an improved arrangement and means to support and guide the sound box and stylus with reference to the record both in cutting or producing the records, and in reproducing the vibrations therefrom. Another object is to provide for guiding the sound box and pivotally supported stylus carrying member along a substantially radial path across the face of the disk record, and preserving the same relative, angular or axial position or relation of the stylus carrying member with reference to the record and the point of contact of the stylus therewith at the various positions of the stylus on the record. Another object is to provide improved mechanism to support and retain the sound box and stylus carrying member in proper relation to the record in its various positions. My invention also comprises certain details of form, combination and arrangement, all of which will be fully set forth in the description of the accompanying drawings, in which:

35 Figure 1 is a plan view of a record and tone arm illustrating one embodiment of my invention.

Fig. 2 is a side elevation of the same.

The practice heretofore with disk records of both the hill and dale and lateral cut type has been to pivotally mount the tone arm so that its free end may travel through the arc of a circle in traversing the face of the record from a point near the center of the record to the circumference of the record. During this travel of the tone arm the recording or reproducing mechanism comprising the sound box, the stylus, and the pivotally mounted stylus carrying member do not change their relation to the tone arm, and hence do not travel in a strictly radial direction, but change their positions angularly or axially relative to the record and the line of travel of the spiral record groove relative to the stylus, to the same extent that the arc of travel of the stylus diverges

from a true radial line across the face of the record from its center outwardly.

My improvements are applicable to both the hill and dale and lateral cut types of record, and to both the mechanism employed to cut the records and to the mechanism employed to reproduce vibrations from the records.

I have discovered that the essential feature in truthfully engraving sound vibrations upon the record and in reproducing them therefrom is to support and retain the axis upon which the stylus lever vibrates or rotates at right angles to a radial line across the record disk, or in other words in a plane parallel to that portion of the spiral record groove being traversed by the stylus. As heretofore practised this axis of rotation of the stylus lever has been permitted to diverge to a considerable extent in one direction or the other so as to occupy different positions of angularity as the stylus progressed from the center toward the periphery of the record, resulting in the point of the stylus vibrating diagonally across the spiral groove instead of transversely across the spiral groove. Such diagonal vibration of the stylus point tends to produce or reproduce imperfectly the original sounds, and also to cause the stylus to climb one wall of the groove.

The accompanying drawings illustrate the preferred embodiment of my invention. As illustrated A represents the record disk which rotates upon the center 2. The dotted line *s s* indicates approximately the radial path or line traversed by the point of the stylus. B represents the major tone arm section, which rotates or swings relative to the stationary bell or megaphone section E upon a stationary center or vertical axis 3. A minor tone arm section C is pivotally connected upon a movable or floating center or axis 4 to the major tone arm section. A sound box D is pivotally connected to the free end of the minor tone arm section C upon a horizontal axis 5 at right angles to the axis 4. The sound box carries a stylus lever 6 pivoted thereto upon an axis 7 which occupies an inclined position in a vertical plane at right angles to the radial line *s s*. The axis 7 is also at right angles to the axis 5 on which the sound box is mounted upon the section C. A stylus 8 is carried by the lever 6. The sound box can be adjusted about its axis 5 to operative or idle position.

Attached to the section C is a lug 9 which is pivotally connected to one end of a link 10, which link is in turn pivotally connected at its opposite end to a post or stationary center 11 so that as the tone arm section B travels across the face of the record, the link 10 causes the section C to move on its axis 4 with reference to section B to counteract or compensate for the tendency of the section B to shift the axis 7 into a plane diagonal to the line *s s*. The effect of the link 10 and consequent movement of the section C upon its axis 4 is to cause the stylus point to travel along a substantially radial line from the margin of the record inwardly, and at all points on the record to be in a position to vibrate transversely to that portion of the spiral groove with which it is in contact. I am thus enabled to record or reproduce vibrations at all parts of the record under like and correct conditions, and to produce and work from a superior type of record. With the hill and dale type of record also superior and more uniform results are obtainable by retaining the stylus axis uniformly in one position of angularity with reference to the groove being cut or traversed by the stylus.

The apparatus herein illustrated and described is capable of considerable modification without departing from the principle of my invention.

Having described my invention, what I claim is:

35 1. In a sound recording and reproducing machine having a horizontally disposed disk record, a tone arm rotatably movable upon a fixed substantially vertical axis, a sound box

having a stylus to engage the record and pivotally connected to the free end of said tone arm upon a substantially vertical axis, and a link member substantially parallel to said tone arm pivotally connected near the fixed end of the tone arm upon a fixed axis and pivotally connected at its opposite end to said sound box, to cause the sound box to move pivotally relative to the tone arm in proportion to the movement of the tone arm upon its fixed axis.

2. In a sound recording and reproducing machine having a rotarily mounted disk record, a major tone arm rotatably movable upon a fixed axis transverse to the face of said disk, a minor tone arm rotatably mounted upon the free end of said major tone arm upon an axis substantially at right angles to the face of the record, a sound box having a stylus to engage the record rotatably mounted upon said minor tone arm upon an axis parallel to the face of the record, and a link member substantially parallel to said major tone arm and pivotally mounted near the fixed end of the major tone arm upon a fixed axis and at its opposite end pivotally connected to said minor tone arm, to cause said sound box to move relative to said major tone arm in proportion to the movement of said major tone arm upon its fixed axis.

In testimony whereof I have affixed my signature in the presence of two witnesses.

ALFRED J. SWING.

Witnesses:

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