

E. S. OLIVER.
 ADAPTER STYLUS FOR PHONOGRAPHS.
 APPLICATION FILED MAR. 29, 1915.

1,169,861.

Patented Feb. 1, 1916.

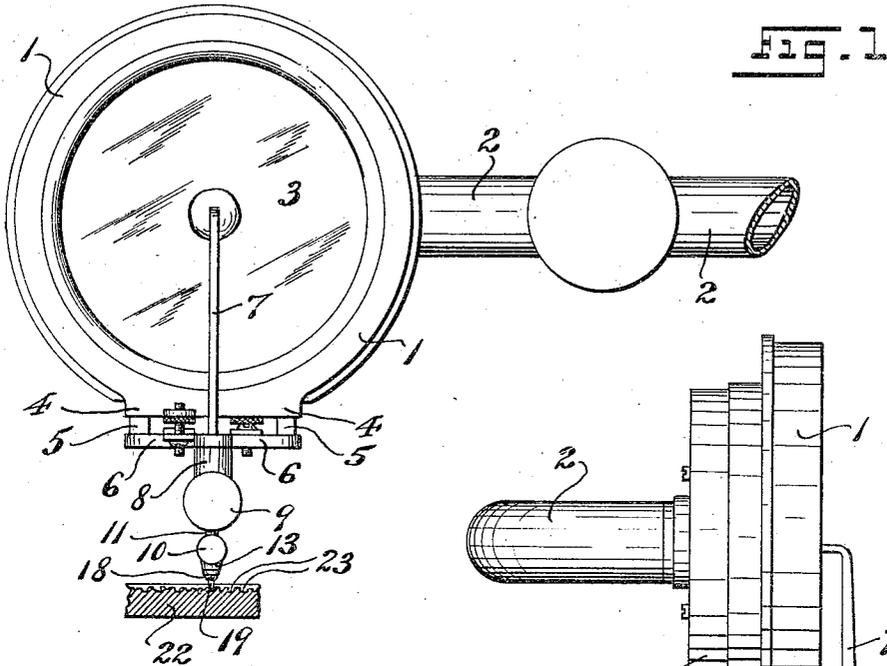


Fig. 1

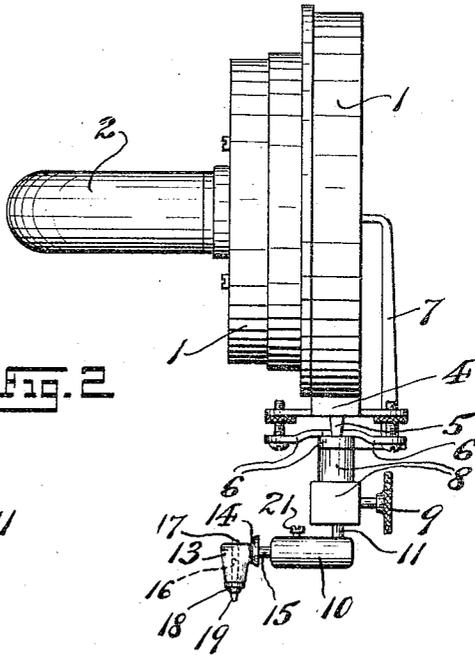


Fig. 2

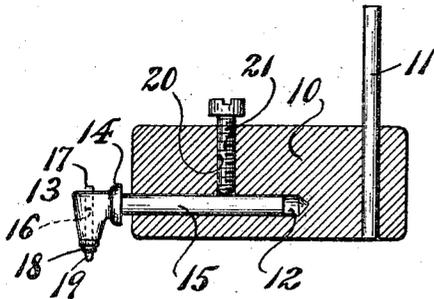


Fig. 3

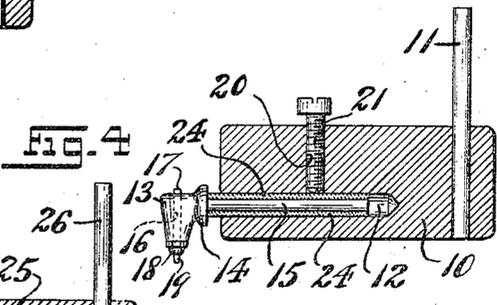


Fig. 4

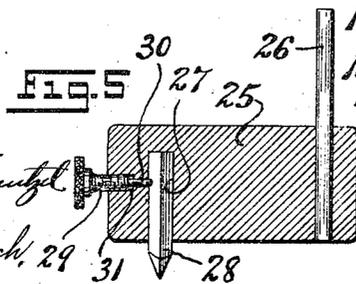


Fig. 5

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ADAPTER-STYLUS FOR PHONOGRAPHS.

1,169,861.

Specification of Letters Patent.

Patented Feb. 1, 1916.

Application filed March 29, 1915. Serial No. 17,600.

To all whom it may concern:

Be it known that I, ELLIS S. OLIVER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Adapter-Styli for Phonographs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters or reference marked thereon, which form a part of this specification.

The present invention relates, generally, to improvements in phonograph apparatus; and the invention has reference more particularly to an adapter stylus which will operate to transmit the vertical vibrations produced by the vertical indentations of a sound-record disk to produce the horizontal vibrations of a diaphragm of a reproducing sound-box set in a vertical plane.

It is well known in the art that there are two types of sound-record impression for phonograph disks, viz., the "hill and dale" impressions which consist of a series of vertical indentations or impressions formed in the face of the disk, which, when traveling against a sound-box stylus or needle, produce vibrations of the stylus in a vertical plane, or in a plane parallel to the vertical axis of the stylus or needle; and the horizontal or lateral impressions which consists of a series of lateral or horizontal indentations or impressions formed in the face of the disk, which, when traveling against a sound-box stylus or needle, produce lateral vibrations of the stylus or needle. Usually in a phonograph instrument arranged to play the former type of sound-record disk, the sound-box is positioned so that the diaphragm thereof lies in a horizontal plane and substantially parallel to the disk surface, and the vertical vibrations imparted to the stylus are transmitted directly to the diaphragm; and in a phonograph instrument arranged to play the latter type of a sound-record disk, the sound-box is positioned so that the diaphragm thereof lies in a vertical plane and substantially at right angles to the disk surface, and the horizontal vibrations imparted to the stylus are transmitted indirectly through a pivoted vibrator-arm, to which the stylus is secured, to

the diaphragm. Consequently the sound-box positioned and equipped for playing said latter type of sound-record disk cannot play or respond to the sound-record impressions of the former type of sound-record disk, since the vertical vibrations caused by such sound-record impressions cannot be transmitted through the ordinary stylus or needle and the pivoted vibrator-arm.

It is the principal object of my present invention, therefore, to provide an interchangeable or detachable adapter stylus adapted to be connected with the ordinary needle-socket of the vibrator-arm of a vertical sound-box, in place of the usual type of needle adapted to play horizontal sound-record impressions, so that, without other change, the vertical vibrations recorded by the vertical or "hill and dale" sound-record impressions may be transmitted through such adapter stylus to the pivoted vibrator arm and vertical diaphragm of the vertical sound-box, so that the latter is adapted to reproduce the sounds recorded upon such type of sound-record disk.

Other objects of the present invention, not at this time more particularly enumerated, will be clearly understood from the following detailed description of the present invention.

With the various objects of the present invention in view, the same consists, primarily, in the novel and simple construction of a detachable or interchangeable adapter stylus for phonograph sound-boxes, hereinafter set forth; and, the invention consists, furthermore, in the several novel arrangements and combinations of the various parts thereof, as well as in the details of the construction thereof, all of which will be more fully described in the following specification, and then finally embodied in the claims which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a face view of a vertical sound-box, the vibrator-arm of which is equipped with the novel construction of adapter stylus made according to and embodying the principles of the present invention, in this view the said adapter stylus being shown in contact with the vertical sound-record impressions of a "hill and dale" sound-record disk, the latter being shown in section. Fig. 2 is an edge side view of said vertical sound-

box so equipped. Fig. 3 is a longitudinal vertical section of an adapter stylus made according to and embodying the principles of the present invention, the same being drawn on an enlarged scale. Fig. 4 is a longitudinal section of a modified construction of said novel adapter stylus. Fig. 5 is a similar view of another modified construction of said novel adapter stylus.

Similar characters of reference are employed in all of the hereinabove described views to indicate corresponding parts.

Referring now to the said drawings, the reference character 1 indicates a sound-box for playing sound-record disks, said sound-box being so connected with the tone-arm 2 of a phonograph apparatus as to be positioned vertically to dispose the diaphragm 3 thereof in a vertical plane at right angles to the horizontal plane of the sound-record disk adapted to be revolved beneath said sound-box. Connected with the lower side 4 of said sound-box are the fulcrum-projections or points 5 upon which is fulcrumed the pivot-frame 6 of an upwardly extending vibrator-arm 7, the upper end of which is connected with the diaphragm 3 in the usual manner. Connected with and extending downwardly from said pivot-frame 6 is the needle or stylus socket 8, which receives and securely connects in operative relation to said vibrator-arm a needle or stylus adapted to contact operatively with the sound-record impressions of a sound-record disk. Said needle or stylus socket 8 is provided with the usual set-screw or lock-screw 9 for securing the needle or stylus in the socket 8.

When reproducing from a sound-record disk in which the sound-record impressions are of the horizontal or lateral form, a straight vertically extending needle or stylus is secured in the socket 8, the same being in vertical alinement with the fulcrum-projections or points 5, so that the lateral or horizontal vibrations imparted to the needle or stylus point cause a rocking of the pivot-frame 6 which transmits similar horizontal or lateral vibrations to the vibrator-arm 7 which in turn vibrates the diaphragm 3 to reproduce the recorded sounds from the sound-record impressions.

It will be apparent that, with the type of sound-box, constructed as above described, equipped with a straight needle or stylus as above mentioned, a sound-record formed with vertical or "hill and dale" sound-record impressions could not be played or its sound-record reproduced; since such vertical or "hill and dale" sound-record impressions would cause a vertical vibration of the needle or stylus point, that is a vibration parallel to the axis of the needle or stylus and in line with the fulcrum-projections or points 5. Consequently no rocking or oscillation of the vibrator-arm 7 would result,

but merely a vertical rise and fall of the entire sound-box bodily, with no vibratory effect upon the diaphragm 3. It is therefore necessary to provide an adapter stylus, which can be used in place of the ordinary straight needle or stylus so that through such means the vertical or "hill and dale" sound record impressions may be utilized to vibrate the diaphragm 3. My present invention provides such an adapter stylus which is of novel and simple construction, and which may be interchangeably used in place of said straight needle or stylus in connection with the socket 8 of the vibrator arm 7 of the same type of sound-box.

My novel adapter stylus comprises a horizontally extending main-body 10, of any desirable cross-sectional shape. Connected rigidly with and extending upwardly from one end of said main-body 10, and at right angles to the axis thereof, is a butt-piece or shank 11 of a proper diameter to be received or inserted in the socket 8 of the vibrator-arm 7, by which means the adapter stylus is operatively secured to the vibrator-arm 7 in substantially the same manner as an ordinary straight needle or stylus. Formed in the outer or free end of said main-body 10 is a longitudinally extending tubular opening 12.

The reference character 13 indicates a stylus-head, the same having a shoulder 14 at one end from which extends a horizontal shank-piece 15. Said stylus-head 13 is provided with a vertically extending opening or socket 16 extending therethrough. Into this opening is inserted the upwardly extending tail-piece 17 of a stylus-point setting 18, which extends and is positioned in a plane below the under side of said main-body 10. The stylus-point 19 is fixed in said setting 18, and may be made of any suitable material, preferably of diamond or emerald stone. The said shank-piece 15 is slidably received in said tubular opening 12, so that the said stylus-point and its supporting parts may be moved inward or outward to adjust the same toward and away from the main-body 10, so that the leverage provided through the same and the said main-body may be decreased or increased at will, or in other words adjustable for purposes presently to be more fully disclosed. Said main-body 10 is provided with a vertical internally screw-threaded opening 20 in which is arranged the threaded shank of a set or lock screw 21, which is adapted to be brought into binding relation to said shank-piece 15 to securely hold the same, and the stylus parts connected therewith, in any desired adjusted position in which the same has been arranged.

The operation of my novel adapted stylus is as follows:—The butt-piece is inserted in the socket 8 of the vibrator-arm 7 and

locked rigidly thereto by means of the set-screw or lock screw 9. When thus secured the main-body 10 extends horizontally beneath said sound-box and at right angles to the fulcrum-projections or points 5 thereof. As thus positioned the stylus-point 19 carried at the free end of said main-body 10 is off-set or positioned to one side of the pivot or fulcrum axis of the vibrator-arm 7. Now when a sound-record disk 22 provided with vertical or "hill and dale" sound-record impressions 23 is revolved beneath said stylus-point 19 and in contact therewith, a vertical vibration or oscillation of said stylus-point 19 is produced, which effects a vertical vibration or oscillation of the outer end of said main-body 10, but since the stylus-point 19 is off-set from the fulcrum-projections or points 5 of the sound-box this vertical vibration or oscillation when transmitted through said off-set horizontal main-body is translated into a horizontal vibration or oscillation of the socket 8, pivot-frame 6 and vibrator-arm 7, so that the upper end of the latter is vibrated horizontally to produce the proper vibratory effect of the diaphragm 3 of the sound-box. In simple terms instead of the vibration of the said vibrator-arm 7 being effected by a simple lever oscillation, it is effected, as a result of the off-set construction of the adapter stylus, by a bell-crank lever oscillation.

By moving or adjusting the stylus-point 19 and its supporting parts outwardly relative to said main-body 10, by sliding outward said shank-piece 15, the leverage of said off-set portion or main-body is increased relatively to the leverage of the vibrator-arm 7, and since the sound-record impressions 23 always oscillate the stylus-point vertically the same distance in all positions thereof, it follows that by increasing the leverage of said off-set portion or main-body, the oscillations or vibrations of the vibrator-arm 7 and the diaphragm 3 of the sound-box are reduced in scope, that is the arc of movement is shortened, and consequently the tones produced by the diaphragm 3 of the sound-box are reduced in volume or softened. Conversely if the stylus-point 19 and its supporting parts are moved or adjusted inwardly relative to said main-body 10, by sliding inward said shank-piece 15, the leverage of said off-set portion or main-body is decreased relatively to the leverage of said vibrator-arm 7, and consequently the oscillation or vibration of the vibrator-arm 7 and the diaphragm 3 of the sound-box are increased in scope, that is their arc of movement is lengthened, and consequently the tones produced by the diaphragm 3 of the sound-box are increased in volume or loudened. It will therefore be apparent that by such a simple means my

adapter stylus may be delicately adjusted to produce various degrees of tone volume and audible strength, quickly, easily, and efficaciously.

Referring now to Fig. 4 of the drawings, I have illustrated a slight modification of the construction of my novel adapted stylus. In this construction the various essential features are the same as already above described and are indicated by the same reference letters. In addition to said features is provided a resilient coating or sleeve 24 surrounding and fixed upon said shank-piece 15. This sleeve may be made of hardened shellac, collodion, asphaltum, rubber, or any other substance which provides the qualities I seek, namely, a certain limited degree of resiliency, or shock-absorbing effect, which will not, however, impair the proper transmission therethrough, of the vibrations or oscillations imparted to the stylus-point by the sound-record impressions 23. The use of such a resilient body as the sleeve 24, interposed between the stylus-point supporting parts and said main-body 10, tends to soften or sweeten the tones produced by the sound-box diaphragm when vibrated by such novel adapter stylus, and tends to eliminate the harshness, clang, and metallic sounds usually incident, more or less, to phonographic sound reproduction.

Referring now to Fig. 5 of the drawings, I have illustrated therein another modified construction of my novel adapter stylus. This construction comprises a main-body 25, provided at one end with the upwardly extending, rigidly secured butt-piece 26. Located adjacent to the outer end of said main-body 25, and extending upwardly therein from its bottom side, is a vertical receiving socket 27, in which may be inserted the butt end of the well-known reed stylus 28. A set-screw 29, having at its inner end a reduced binding-point 30 is arranged in an internally screw-threaded opening 31, so that the same may be brought into holding or binding engagement with said reed stylus 28 to rigidly secure the same to the main-body 25 in proper downwardly projected relation to the outer end thereof.

I am aware that some changes may be made in the various arrangements and combinations of the various devices and parts, as well as in the details of the construction thereof, without departing from the scope of my present invention. Hence, I do not limit my present invention to the exact arrangements and combinations of the said parts as described in the foregoing specification, nor do I confine myself to the exact details of the construction of said parts as shown in the accompanying drawings.

I claim:—

1. An adapter stylus for a phonograph sound-box having its diaphragm in a plane

substantially perpendicular to the sound-record disk to be reproduced comprising a horizontal body, a vertical butt-piece extending upwardly from one end of said body, said body having a receiving-opening extending longitudinally into the same from its outer end, a stylus-point, means for supporting said stylus-point having a shank-piece slidably entering said receiving-opening, and means connected with said body and adapted to engage said shank-piece to secure said stylus-point supporting means in desired longitudinally adjusted position relatively to said body.

2. An adapted stylus for a phonograph sound-box having its diaphragm in a plane substantially perpendicular to the sound-record disk to be reproduced comprising a horizontal body, a vertical butt-piece extending upwardly from one end of said body, said body having a receiving-opening extending longitudinally into the same from its outer end, a stylus-head having a laterally extending shank-piece slidably entering said receiving opening, a downwardly projected stylus-point carried by said stylus-head, and means connected with said body and adapted to engage said shank-piece to

secure said stylus-head in desired longitudinally adjusted position relatively to said body.

3. An adapter stylus for a phonograph sound-box having its diaphragm in a plane substantially perpendicular to the sound-record disk to be reproduced comprising a horizontal body, a vertical butt-piece extending upwardly from one end of said body, said body having a receiving-opening extending longitudinally into the same from its outer end, a stylus-head having a laterally extending shank-piece slidably entering said receiving opening, a downwardly projected stylus-point carried by said stylus-head, and means connected with said body and adapted to engage said shank-piece to secure said stylus-head in desired longitudinally adjusted position relatively to said body, comprising a lock-screw associated with said body.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 26th day of March, 1915.

ELLIS S. OLIVER.

Witnesses:

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FRED'K H. W. FRAENTZEL.