

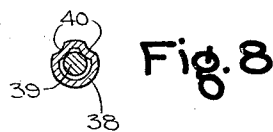
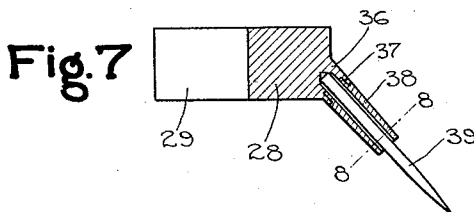
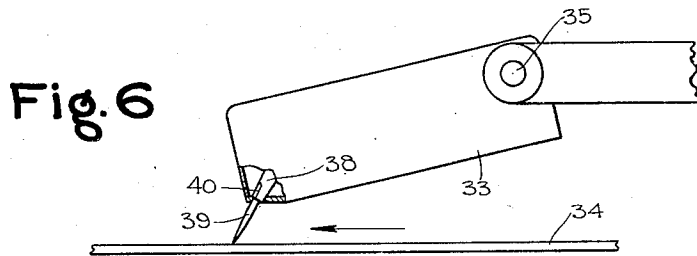
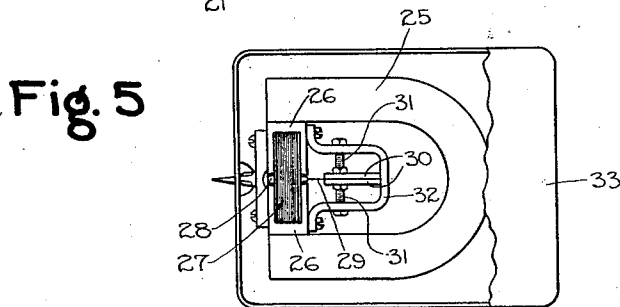
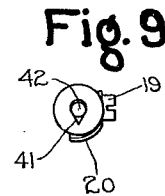
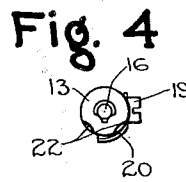
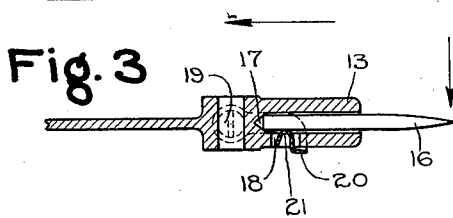
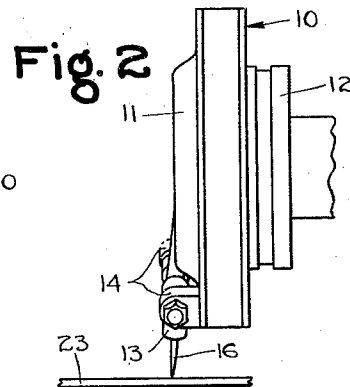
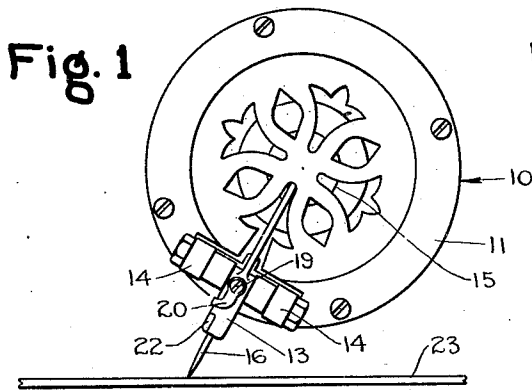
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F. L. CAPPS

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STYLUS HOLDER

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INVENTOR  
FRANK L. CAPPS

BY  
*John A. Hunschaw*  
ATTORNEY

## UNITED STATES PATENT OFFICE

FRANK L. CAPPS, OF MILFORD, CONNECTICUT, ASSIGNOR TO COLUMBIA PHONOGRAPH COMPANY, INC., OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF NEW YORK

## STYLUS HOLDER

Application filed May 10, 1928. Serial No. 276,584.

This invention relates to new and useful improvements in means for holding the stylus or needle usually employed in connection with the reproduction of sound from phonographic records.

An object of the invention is to reduce the weight of the stylus holder at its free or active end.

Another object is to provide means whereby the stylus is held in place without the use of the usual set-screw or other means commonly employed for that purpose.

A further object of the invention is to provide a stylus holder into which the stylus is simply pushed and remains unclamped.

An additional object is to provide a stylus holder wherein the stylus is held loosely but against falling out, the stylus holder being so constructed that when the reproducer or pickup, equipped with the invention, is lowered to place the stylus in engagement with the record, the weight of such reproducer or pickup cooperates with the structure of the stylus holder in such a manner that the stylus is rigidly held against movement relative to the holder.

Other and additional objects will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings, wherein for the purpose of illustration, practical embodiments of the invention are shown.

In the drawings:—

Fig. 1 is a face view of an acoustic reproducer or sound box including a stylus arm or bar having the invention incorporated therein;

Fig. 2 is an edge view of the same looking from the right in Fig. 1;

Fig. 3 is a sectional view of a portion of the stylus bar showing the location of the stylus therein, and the means for yieldingly preventing displacement of the stylus;

Fig. 4 is a view looking directly into the end of the stylus bar, a stylus being positioned therein;

Fig. 5 is a plan view of an electric pickup having the invention applied thereto, the top of the pickup casing being partly broken away;

Fig. 6 is a side elevational view showing the relationship of the pickup to a record in the playing position, a portion of the pickup being broken away;

Fig. 7 is a sectional view showing on an enlarged scale the armature and stylus holder carried thereby removed from the electric pickup;

Fig. 8 is a sectional view substantially on line 8—8 of Fig. 7; and

Fig. 9 is an end view of a stylus holder showing a different shape of stylus receiving opening which may be applied either to the acoustic reproducer or to the electric pickup.

Referring in detail to the drawings and particularly to Figs. 1 through 4 thereof, an acoustic reproducer of well-known make is shown at 10, the same including a front guard plate 11 and a connecting means 12 for securing the reproducer to a sound conveyor, as, for example, any or an ordinary tone arm. A stylus bar 13 is mounted in bearings 14 on the forward face of the sound box and has its upper end connected with the diaphragm 15 thereof.

The present invention is applied to the free end of the stylus bar 13 and in the instant case, the opening for receiving the stylus 16 is of such diameter that the stylus fits loosely therein. The inner end of this opening or pocket is cone-shaped, as indicated at 17 for centering the stylus.

One side of the free end portion of the stylus holder has an opening 18 therein leading into the stylus receiving pocket. Fastened to the stylus holder by means of a screw 19, is a light spring 20 having one end provided with a return bend as at 21, this end being disposed through the opening 18 and in contact with the stylus 16.

The only purpose of the spring 20 is to prevent the stylus from dropping out of the stylus holder during the raising or lowering of the reproducer in the course of the use of a phonograph having the invention applied thereto, this raising and lowering being incident to the changing of records and the like. Means are provided for securely holding the stylus against free movement during the playing of a record.

This last means comprises a pair of inwardly offset portions 22 formed at the forward portion of the stylus holder, whereby a crotch-like structure is provided between the inner walls of said offsets 22. Since the spring 20 bears against the inner end portion of the stylus, there is a tendency for the stylus to move into the crotch.

In operation, the sound box occupies substantially the position shown in Figs. 1 and 2 in which figures a record is indicated at 23. The pressure is against the stylus in the direction indicated by the arrow in Fig. 3. Since the record itself is moving in the direction of the arrow shown in Fig. 1, there is a constant pressure against the point of the needle urging the needle into the crotch-like portion between the off-sets 22 of the holder, and the action of the record materially augments the weight of the reproducer in accomplishing this purpose. From the foregoing, it will be seen that the stylus is securely held against free movement during the playing operation without the use of the usual clamp screw or other clamping means.

Not only is the changing of needle expedited by this structure, but what is more important, certain unnecessary weight or mass is removed from the active or free end portion of the stylus bar and the same is therefore much more able to respond immediately to the sinuosities of the record. This increases the ability of the reproducer to reproduce notes over a wider range of frequency.

The invention, as exemplified in Figs. 5 through 8 involves the same principles as in the examples shown in Figs. 1 through 4. However, there is some material difference since in the structures disclosed in these figures advantage is taken of certain characteristics of the electric pickup which are not to be found in the acoustic reproducer.

A pickup of usual construction is shown and includes a permanent magnet 25 between the free ends of which U-shaped pole pieces 26 are mounted, the same embracing a coil 27 surrounding an armature 28 (see Fig. 7). To the rear end of the armature, a reed or spring 29 is secured and this reed is received between clamping plates 30 adapted to be adjusted in the contact with the reed by means of bolts or screws 31 carried in the arms of a U-shaped bracket 32. This entire structure is mounted within a casing 33 shown in Fig. 6 in its active relation to a record 34, the pickup being pivotally mounted, as at 35.

On the forward lower portion of the armature, is formed a projection 36 shaped to receive the reduced portion 37 of a tip or stylus holder 38. Attention is directed to the fact that the opening, for the stylus indicated at 39, extends throughout the entire length of the tip 38 and into the portion 36 of the armature 28.

The pickup occupies a different position relative to the record during the playing operation than that occupied by the reproducer and therefore its inwardly offset portions 40 corresponding to the portions 22 of the figures previously described, appear at the top. A record 34 moves in the direction indicated by the arrow in Fig. 6 and accordingly pressure is applied to the stylus in a direction to constantly urge it into the restricted space between the inwardly offset portions 40. This action of the record augments a similar action applied due to the weight of the pickup resting on the needle during playing.

No physical means are shown for holding the needle in place. Experiment has shown that there is sufficient magnetism owing to the presence of the magnet 25 to prevent the stylus 39 from sliding out of the holder when the pickup is being raised or lowered. Also experiment has shown that the use of a tip 38 formed of brass or other non-magnetizable material is better for the present purpose than a tip of magnetizable material as, for example, steel. It seems that due to certain conditions, a tip of magnetizable material will, when of sufficient mass or when having other characteristics, serve to neutralize the action of the magnet and the stylus will slip from the holder.

However, when the tip is formed of brass, it is but necessary to insert the stylus a short distance into the tip, when the stylus will be affected by the magnet and be drawn into the tip. In Fig. 7, the stylus is shown with its inner end disposed within the projecting portion 36 of the armature, this being a matter of convenience owing to the length of the stylus. As a matter of fact, upon the insertion of the stylus a short distance into the tip, the stylus is influenced by the magnet and fairly leaps into the position shown in Fig. 7. The inwardly offset portions 22 and 40 extend back only a short distance from the free end of the stylus holder, this distance being indicated in Figs. 1 and 6.

In Fig. 9 there is shown a slightly different shape of opening 41 in the forward end of stylus bar or tip, as the case may be, this opening being somewhat pear-shaped, and the weight of the reproducer or pickup cooperates with the pressure exerted by the movement of the record to force the stylus 42 into the small portion of said opening 41.

Since the invention is equally applicable to an acoustic reproducer or an electric pickup, it is to be understood that where either of these words are used in the following claims, the intention is that the word shall cover both structures, except where the remainder of the claim prohibits such an understanding. Further, it is to be understood that while the drawings and description illustrate and describe specific embodiments of the invention,

this description and disclosure is for the purpose of illustration only, and changes may be made without departing from the spirit or scope of the invention, provided such changes fall within the scope of the appended claims to which reference should be had for a definition of the limitations of the invention.

What is claimed is:—

1. In combination, a movable armature, and a hollow tip carried by said armature and movable therewith and adapted to receive a stylus, said tip being of non-magnetizable material.

2. In an electric pickup, a permanent magnet, an armature disposed between the end portions of said magnet, said armature having a hollow projection, an open ended tip secured to said projection and communicating with the hollow thereof, said tip adapted to receive a stylus, and said tip being of non-magnetizable material whereby the stylus will be drawn through it due to the presence of a permanent magnet.

3. A device as in claim 2 characterized in that the tip is provided with independent means for retaining the stylus against movement relative to the tip.

4. A device, as in claim 2, characterized in that the tip is shaped to provide a restricted portion into which the stylus is forced upon the stylus being brought into engagement with a phonograph record.

5. In an electric pickup, a magnet, an armature disposed between the end portions of said magnet, a tip secured to said armature, said tip adapted to receive a stylus, and said tip being of non-magnetizable material whereby the stylus will be drawn into the same, due to the presence of the magnet.

6. In a means for taking sound from a phonograph record, a movable magnetic part, a hollow tip of non-magnetizable material secured to said part and movable therewith, and said tip adapted to receive a stylus and have the stylus drawn through it by the magnetizable part.

7. In an electric pick-up, a magnet, an armature extending between the end portions of said magnet, a tip secured to said armature and adapted to receive a stylus, said tip being of non-magnetizable material whereby the stylus will be drawn into the same due to the presence of the magnet, said tip having inwardly off-set portions forming a crotch adjacent the end of the tip, and said tip so disposed that a stylus in the tip will be moved into said crotch on the stylus being brought into engagement with a phonograph record.

Signed at New York, in the county of New York, and State of New York, this 7th day of May, A. D. 1928.

FRANK L. CAPPS.