

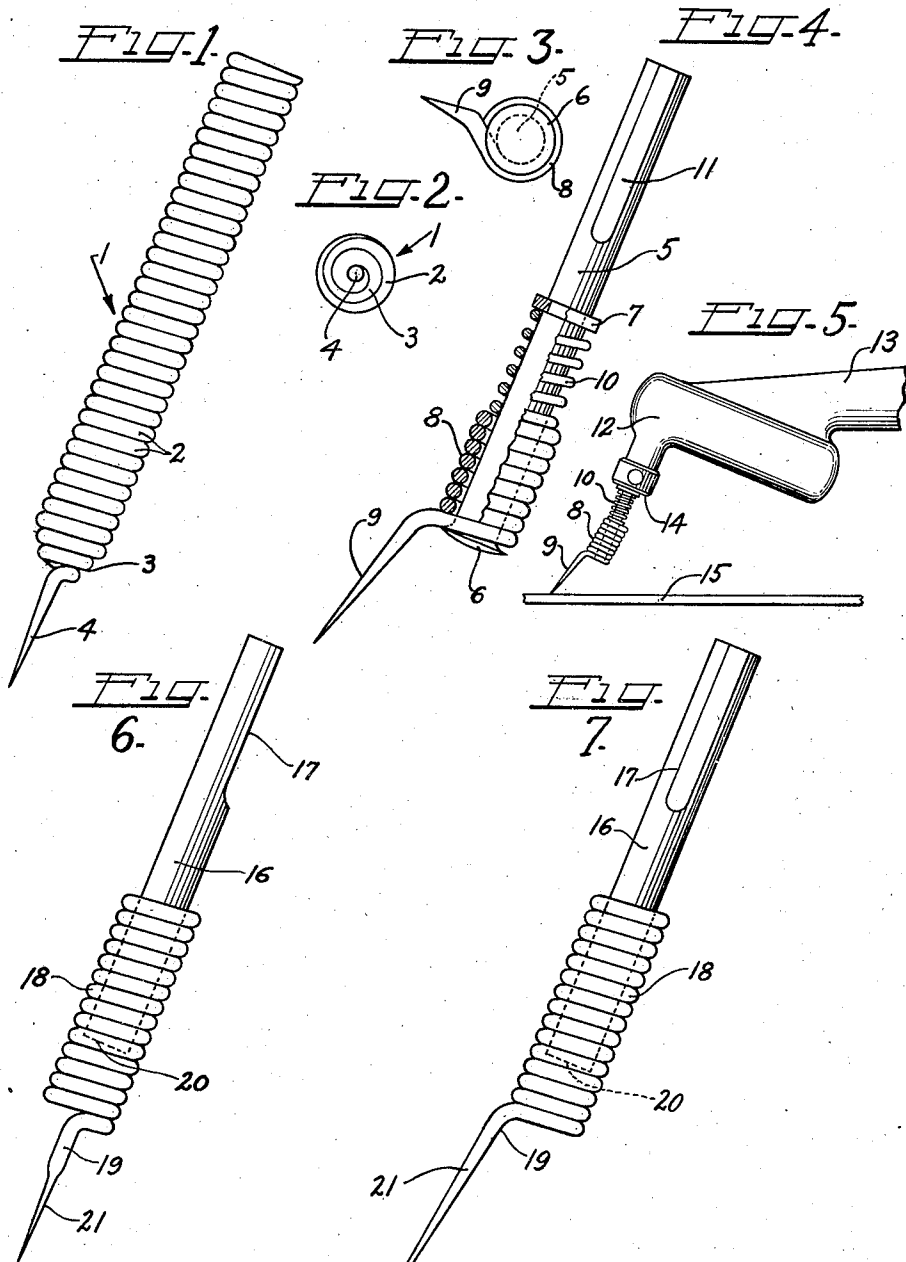
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STYLUS

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STYLUS

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This invention relates to improvements in a stylus or needle for association with sound reproduction equipment, such, for example, as the pick-up arm on a phonograph, although the invention may have other uses and purposes as will be apparent to one skilled in the art.

In sound reproduction from a grooved record, the conventional apparatus used embodies a tone or pick-up arm with a reproducer on the end of it carrying a needle which tracks the groove of the record. Many things interfere with accurate and faithful reproduction. Needles of the type heretofore known carry considerable vibrations to the reproducer and pick-up arm, thus interfering with fidelity of tone in the reproduction. Again, in most records there are defects, such as alignment of the groove toward the center of the record, warping or other unevenness of the record face, and the fact that the angle of contact between the needle point and the record groove changes as the needle approaches the center of the record in the case of a disk record, and other and various defects frequently occur. In such cases, there is both an upward pressure and a side pressure against the needle which causes considerable scratching and scraping and a consequent throw of the pick-up arm vertically and horizontally, all of which adds additional and undesirable noises to the reproduction of the recorded sound. Due to variations in the record groove, jouncing of the tone arm frequently occurs, and quite often the tone arm or reproducer is accidentally dropped a short distance so that the needle forcibly strikes the record and may permanently injure the record. In addition, with formerly known apparatus record wear mainly results from the scratching of the needle or stylus in the groove of the record, and obviously it is desirable to prolong the record life to as great as possible an extent.

With the foregoing in mind, it is an important object of the instant invention to provide a stylus for use in sound reproduction from records, which stylus results in greatly improved fidelity in reproduction.

Another object of the invention is the provision of stylus which considerably reduces so-called record noises in sound reproduction.

It is also an object of this invention to provide a record stylus so constructed as to absorb a portion of the vibration resulting from needle contact with the record, and transmit to the reproducer a softened vibration which results in a clear and even reproduction.

Also a feature of this invention is the provision

of a record stylus which considerably reduces record wear and tends to very materially prolong the life of a record.

Still another feature of the invention resides in the provision of a record stylus so constructed as to absorb to a very considerably extent the shocks occurring from the needle riding the record groove and keep these shocks away from the reproducer, thus decreasing extraneous noises and improving the fidelity of reproduction.

It is also an object of this invention to provide a record stylus so constructed as to prevent jouncing or excess vibration of the reproducer and pick-up arm, and to merge one vibration into another in a sinuous manner with the elimination of any sudden jolts or jars or changes from one vibration to another of a different character, thus materially enhancing the smoothness of reproduction.

Still another object of the invention is the provision of a record stylus so arranged as to provide an equalized pressure to all vibrations resulting from contact of the needle point with the record, so that the needle faithfully follows all vibrations of the record groove, and a truer and higher quality reproduction results.

A further object of the invention is the provision of a record stylus so constructed as to be highly shock-absorbing, so that injury to a record does not result from an accidental dropping of the tone arm or reproducer a short distance in a manner such that the point of the needle backed by the weight of the reproducer or tone arm strikes the record.

While some of the more salient features, characteristics and advantages of the instant invention have been above pointed out, others will become apparent from the following disclosure, taken in conjunction with the accompanying drawing, in which:

Figure 1 is an enlarged side elevational view of a stylus or needle embodying principles of this invention;

Figure 2 is a bottom plan view of the stylus in Figure 1;

Figure 3 is a bottom plan view of a stylus of somewhat different construction, also embodying principles of the instant invention;

Figure 4 is a part sectional, part side elevational view of the stylus shown in Figure 3;

Figure 5 is a fragmentary elevational view showing the stylus of Figures 3 and 4 mounted in operative position in a reproducer;

Figure 6 is a front elevational view of a stylus embodying a still different construction and in-

corporating principles of the instant invention; and

Figure 7 is a side elevational view of the stylus of Figure 6, taken at a 90° angle to the showing in Figure 6.

As shown on the drawing:

In that illustrated embodiment of the instant invention seen in Figures 1 and 2, there is shown a stylus generally indicated by numeral 1 which is preferably made from a single piece of material, such as a high quality steel, alloy, or other metal. The piece of material is wound in the form of a helical spring as indicated at 2, and near the lower end thereof the convolutions of the spring are gradually narrowed so that a taper 3 results leading into a sharply defined elongated point 4, the tip of which rides the groove of the record.

It will be noted from this construction that defects in the surface or groove of the record as well as excess vibrations resulting from the stylus tracking the groove will be absorbed by the flexible resilient body of the stylus and the major portion of such shocks and vibrations will not be transmitted to the reproducer. Further, it will be especially noted that vibrations resulting from the tracking of the needle will be merged one into the other in a sinuous manner so that there will be no abrupt jerk from the vibration of one type to that of another type, and the reproduction will consequently be much smoother. In addition, it will be seen that the reproducer and tone arm will ride much more evenly even though the needle follows every deviation in the side walls of the record groove, by virtue of the shock-absorbing powers of the needle. Further, by virtue of these same shock-absorbing powers the pressure of the needle upon the record is equalized and kept nearer to a constant value regardless of the deviations in the record groove because the reproducer and tone arm are held to a smooth movement and their weight is not transmitted directly to the record surface through a stiff rigid connection. The coils of the helical spring 2 nearest the point 4 are not in direct contact with each other but are spaced apart sufficiently to better absorb vibrations and permit the point to move relatively to the remainder of the spring 2. Sudden dropping of the tone arm or reproducer head will not result in a permanent injury to the record, if that drop is of reasonable distance, because the sudden shock of the point of the needle striking the record will be absorbed by the body of the needle to a considerable extent. Likewise, record wear is reduced to a minimum because the needle is permitted to move by virtue of its own resiliency both vertically and horizontally in keeping with the record track and relatively to the reproducer and tone arm so that the full weight of the tone arm and reproducer head is not transmitted directly at every angle to the face of the record.

Of course, during reproduction from a grooved record most of the wear will occur on the record because of its softer substance in comparison with the reproducing stylus. However, some wear is bound to occur to the stylus itself. With the structure shown in Figures 1 and 2, and likewise with the structure shown in all of the other figures of the drawing, a stylus made in accordance with the instant invention will wear more evenly so that a uniform point or tracking end will be retained on the stylus for a considerable

length of time, and consequently the life and usefulness of the stylus is greatly prolonged.

In Figures 3, 4 and 5 I have illustrated a stylus of somewhat different construction, but still providing all of the advantages of that shown in Figures 1 and 2.

In this instance, the stylus is made up of a number of initially separate pieces. The structure includes a solid shank 5 which is headed by swaging or an equivalent process at its lower end as indicated at 6. Spaced upwardly from the head 6 a fixed collar 7 is secured to the shank. Prior to the application of the collar 7 a resilient stylus point is dropped over the shank to rest against the head 6. This point construction embodies a helically wound spring-like body 8 which terminates in a projecting point 9 for contact with the record. The body portion 8 is freely floating around the shank 5 and may rotate relatively to the shank. A coil spring 10 is preferably mounted around the shank between the helical body 8 of the stylus point and the collar 7 to urge the stylus point downwardly at all times against the head 6. In order to facilitate the secure mounting of the stylus in a reproducer head, the shank 5 is provided with a flat spot 11 in its upper portion for engagement by the set screw in a reproducer head so that the entire stylus will be held in the correct angular position and will remain in that position relatively to the record.

In Figure 5 I have illustrated the stylus construction of Figures 3 and 4 mounted in operative position in the reproducer head 12 carried on a tone or pick-up arm 13, the stylus being held by the customary hand operable set screw 14 in the reproducer head. The stylus is shown tracking upon a record diagrammatically illustrated at 15.

The stylus seen in Figures 3, 4 and 5, as stated above, provides all of the advantages obtained from the previously described stylus seen in Figures 1 and 2. In addition, the point construction of this stylus may rotate or swing relatively to its shank 5 and thus lateral vibrations may be taken up by the stylus itself without any but a negligible throw or swing of the reproducer head and pick-up arms, so that the ultimate reproduction is smooth, even, and of great fidelity.

It should be noted that the position of the stylus seen in Figure 5 is the preferable position also for the other illustrated embodiments of styli.

In Figures 6 and 7 I have illustrated still another form of construction for my novel stylus. In this instance, the stylus includes a shank 16 having the customary flat spot 17 adjacent the upper end thereof for engagement by the set screw in the reproducer head. The point construction embodies a helical wound spring body portion 18 which terminates in a sharp projection 19 for tracking in the record groove. The spring wound body 18 is tightly affixed to the shank 16, but it will be especially noted that the shank terminates as indicated at 20 well above the lower end of the coiled body portion 18 so that below the end of the shank the coils are slightly spaced apart and the needle functions in substantially the same manner as above described in connection with the showings in Figures 1 and 2.

In Figures 6 and 7 I have also illustrated a construction for the point of the needle which construction may, if so desired, be used as well and in an obvious manner on the needle con-

struction shown in Figures 1 to 5 inclusive. This point construction embodies a flattening of the point as indicated at 21 so that the working end of the needle is broader in one direction than the other. As the result of this construction, the needle may wear after continued usage, but in wearing the needle will develop a contact end that is somewhat akin to a short knife edge, rather than a round blunt nose. Accordingly, even though considerably worn, the needle will track properly in a record groove and not tend to ride high on the side walls of the groove in such a position that it will not be able to follow the deeper deviations of the record groove. There will, therefore, be less wear of the side walls of the record groove, and the life of the needle is considerably prolonged.

From the foregoing, it is apparent that I have provided a long lived reproducing stylus which is simple in construction, highly economical, and which greatly improves the fidelity of reproduction, as well as conserving the life of the record.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles

of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. A stylus for reproducing recordings from a grooved record, a stiff shank for connection to a reproducer, a helically wound body fixed to said shank, and a pointed element extending from said body to track in a record groove, said body being resilient and extending beyond the outer end of said shank, the portion of said body beyond the shank being movable relatively to the portion on the shank and the shank.

2. A stylus for reproducing recordings from a grooved record, including a rigid shank member for connection to a reproducer, an elongated body member helically wound around said shank member concentric with the axis thereof, said wound body member projecting freely beyond the end of said shank member, and an integral end of said body member extending therefrom and sharpened to track in a record groove.

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