March 28, 1950 G. M. MENCKE 2,501,872

PHONOGRAPH STYLUS

Filed Aug. 23, 1946

Fig. 1.

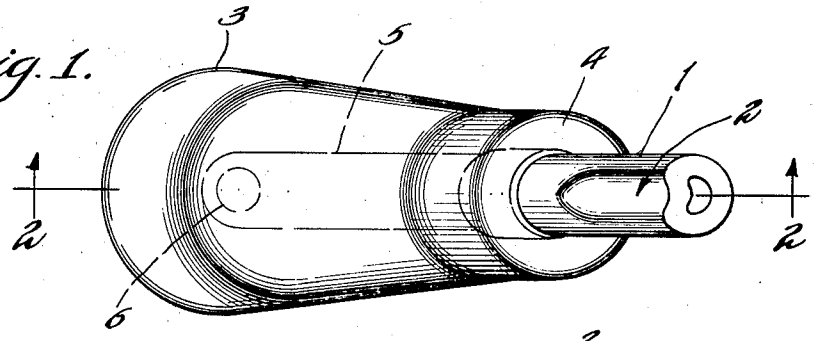


Fig. 2.

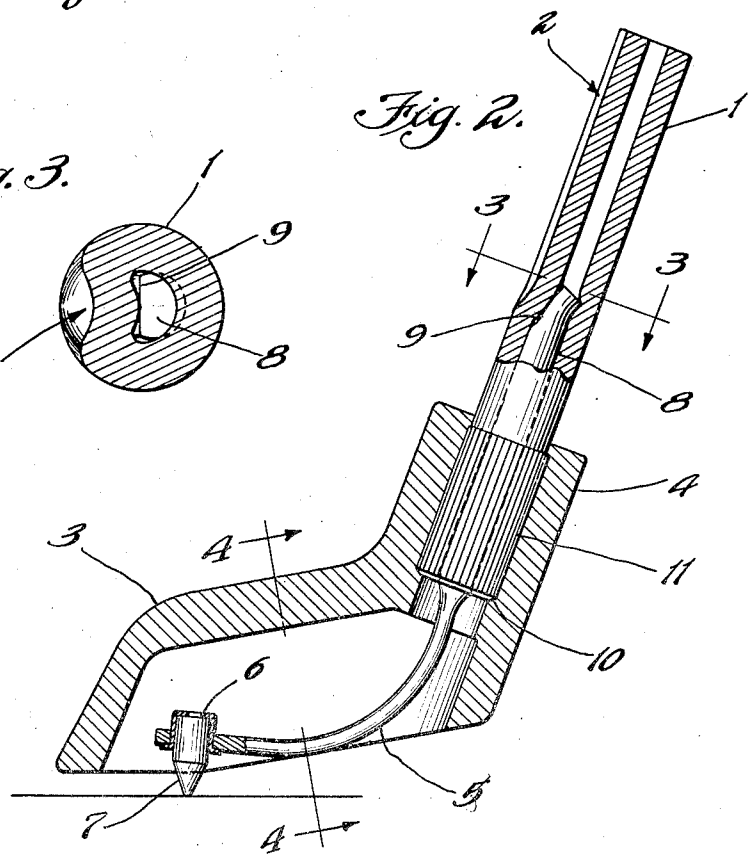
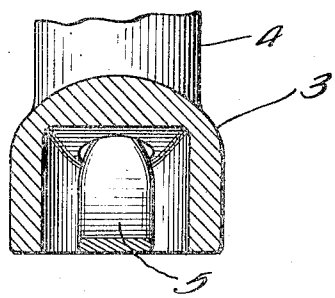


Fig. 3.

Fig. 4.



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PHONOGRAPH STYLUS

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3 Claims. (Cl. 274—38)

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This invention relates in general to phonograph styli and more particularly to a new reproducer needle.

Reproducing needles prior to this invention which incorporate a flexible playing portion are subject to permanent deformation resulting in improper operation unless handled with extreme care in a reproducer. The method of securing and mounting without excessive mass the playing tip in a flexible portion of a needle has also long been a problem. The novel guard and playing portion features to be hereinafter described are a solution to the above problems and constitute the principal objects of the invention.

A further object of the invention is the provision of a rigid shank and a flexible playing portion including means for securing a playing tip in the flexible portion.

A further object of the invention is the provision of a low mass guard secured to the rigid portion of the needle for protecting the flexible playing portion thereof.

These and other objects in one embodiment of the invention are described and shown in the following specification and drawing in which:

Fig. 1 is an enlarged plan view of the needle;

Fig. 2 is a cross sectional elevation of the needle taken generally through section line 2—2, Fig. 1;

Fig. 3 is a cross-sectional view of the needle shown in Fig. 1 taken through section line 3—3, Fig. 2;

Fig. 4 is a cross-sectional view of the needle shown in Fig. 1 taken through section line 4—4, Fig. 2.

Referring to Figs. 1 and 2, a hollow shank member 1 has a groove 2 formed in its upper end thereof for locking engagement with a conventional set screw ordinarily used in the needle sockets of reproducers. A guard member or shoe 3 having a tubular upper end 4 and an open hollow base is integrally secured to the knurled end 11 of shank 1 providing a rigid bond between the shank 1 and the shoe 3, the lower end of the shank 1 bearing against a circular shoulder 10 in the shoe 3. The shoe is preferably made from light weight material such as molded plastic, light metals, and the like.

An insert 8 secured in the lower portion of the shank 1 as shown in Fig. 2 is provided with an arcuate flattened flexible playing portion 5 carrying a tip 7 near its end. The insert 8 has a flattened portion 9 at its upper end which end is deformed or bent as shown in Figs. 2 and 3 when the groove 2 is formed in the shank 1, thus

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securing the insert in a predetermined fixed position with respect to the shank 1.

A cylindrical cup-shaped holder 6 formed from sheet material having a flange around its lower edge is welded, soldered, or cemented in a hole near the end of the flattened playing portion 5 with the flange in close contact with the lower surface of the playing portion. The opening in the cup is constructed to accurately fit the cylindrical part of the tip 7 which may be secured therein through the use of solder, cement or welding, depending upon the type of tip material used. It is to be noted that this construction for securing the tip in the playing portion will prevent its loosening or disengaging as a result of shock transmitted thereto.

The shoe member 3 is provided with an open cavity in its base of sufficient size to permit normal predetermined movement of the playing portion 5 and its tip 7 in vertical and lateral directions independent of the movement of the shoe 3 and the shank 1.

In operation the tip 7 will normally project beyond the base of the shoe sufficiently far to properly engage the playing groove of a record and still vibrate laterally and vertically predetermined distances dependent upon the vertical and lateral compliance of the playing position independent of the shank 1 and the shoe 3 to provide desirable modifications in the reproduction produced by the needle as a whole.

When the playing tip is accidentally struck in directions generally lateral to the shank, the playing portion 5 will be sprung into contact with the inside wall of the shoe 3, shown in Fig. 4, which will arrest the flexure of the playing portion before it is moved beyond its elastic limit, thus preventing permanent deformation to the playing portion. Should the reproducer and the needle be dropped on a surface in a vertical direction, the contact of the tip with the surface will flex the playing portion 5 upwardly to a position where the lower surface of the shoe 3 strikes the surface, hence the playing portion is protected from deformation in a vertical direction. It is now apparent that the combination shank and guard provide a means whereby the sensitive predetermined flexure of the playing portion 5 will be maintained during the normal life of the tip.

Having described my invention, I claim:

1. A phonograph needle comprising a substantially rigid shank, the upper end of said shank adapted to be secured in a reproducer, a guard member rigidly secured to the lower por-

tion of said shank and extending at an angle to the principal axis of said shank, said member having an open cavity in its base and depending side walls, an insert member having its upper portion secured coaxially in the lower end of said shank and an offset end adapted for flexibility in a plurality of directions, a playing tip having a conical point secured at substantially right angles in proximity with the end of said offset end and said side walls of said guard member being located slightly above said tip, said free end positioned in said open cavity of said guard member in predetermined spaced relation with the said tip extending from said guard member for normally engaging the groove of a phonograph record whereby abnormal downward movement of said needle to a surface will flex said offset end sufficiently far to retract said tip into said cavity in said guard member and to permit the lower surface of said guard member to absorb the shock resulting from said abnormal downward movement.

2. A phonograph needle comprising a substantially rigid shank member, a guard means secured to one end of said member, said guard means having depending side walls, said guard means having an open cavity in the lower end thereof, a playing member having one end portion secured in the lower end of said shank member, the remaining portion of said member formed for predetermined flexibility and extending arcuately from the end of said shank member and including a playing tip having a conical point, the said side walls of said guard means

being located slightly above said playing tip, holding means for securing said tip at substantially right angles to and in proximity with the end of said remaining portion of said playing member, said remaining portion normally positioned in spaced relation to the inner surface of said cavity with the said conical point projection from said cavity for resilient engagement with the groove of a phonograph record.

3. In a phonograph needle having a substantially rigid shank and an offset flexible playing portion, a conical tip for engaging the groove of a phonograph record rigidly secured to the end of said playing portion, a shoe member having depending side walls, said shoe secured to said shank and laterally surrounding said offset playing portion in determined spaced relation, said shoe member having an opening in its base from which said conical tip normally projects for engagement with the groove of a phonograph record, the said side walls of said shoe member being located slightly above said conical tip.

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