July 15, 1941. H. L. IMELMANN 2,249,713

PHONOGRAPH NEEDLE

Filed Nov. 4, 1940

Fig. 1.

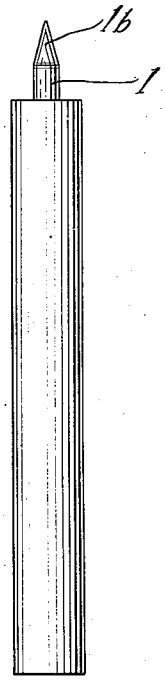
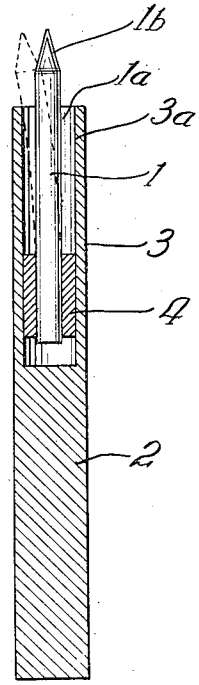



Fig. 2.



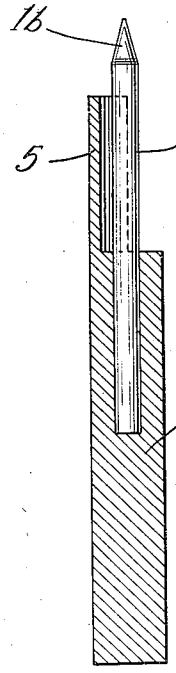




Fig. 3.

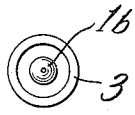



Fig. 4.

Inventor:
Henry Louis Imelmann
By: John Howard Smith Atty.

Patented July 15, 1941 2,249,713

# UNITED STATES PATENT OFFICE

2,249,713

## PHONOGRAPH NEEDLE

Henry Louis Imelmann, Chicago, Ill., assignor to Permo Products Corporation, Chicago, Ill., a corporation of Illinois

Application November 4, 1940, Serial No. 364,210

5 Claims. (Cl. 274—38)

My invention relates to phonograph needles, and pertains particularly to those needles which are constructed so as to cut out their responsiveness to high frequencies, record scratch or the like.

An important object of my invention is to provide means for protecting needles of the above character from bending and breakage generally caused by placing the pick-up head of the phonograph tone-arm against the record surface with too much force.

Other important objects and advantages of my invention will appear from the following description and accompanying drawing, in which:

Fig. 1 represents a side elevation of a needle embodying my invention;

Fig. 2 represents a longitudinal cross section of such a needle; and

Fig. 3 represents a top plan view thereof.

Fig. 4 represents a longitudinal cross section of a modified form of a needle embodying the invention.

After considerable experience in the manufacture of phonograph needles, and after extensive tests, I have found that the frequency range of a needle may be precisely controlled by carefully gauging both the diameter and the length thereof.

Tests have shown that by decreasing the diameter of the lower tip portion of a needle it does not respond tc that frequency range covered by the usual "scratch" of the record resulting from mere mechanical friction between the point of the needle and the walls and bottom of the record groove. The latter friction "scratch" is to be distinguished from desired tones resulting from the predetermined vibration of the needle point in the undulations of the record groove.

In thinning out the lower end of a needle it has been found that most of the necessary rigidity and strength is lost, with the result that when the pick-up head is accidentally dropped against the record, the strain placed upon the needle point and body is too great and it is bent beyond the fatgue point of the metal and thus rendered useless, since, under such circumstances the metal has been distorted to such a degree that it will not return to its original alignment.

The embodiment shown in the drawing comprises three principal sections; a needle or playing portion 1, having a point 1—*b*, a shank or holding portion 2, and a relatively rigid sheath or protective extension 3.

The needle 1 may be secured in the sheath 3 in any suitable manner, as, for instance, by a bushing element 4 which is swedged within the sheath.

It is contemplated that the distance between the adjacent surfaces 1*a* and 3*a* of the needle 1, and the protective extension 3, be great enough to permit free vibration of the needle portion during playing and less than or equal to the distance through which the needle body can be bent (see dotted lines of Fig. 2) without reaching its fatigue point, beyond which point it will not spring back to its original alignment. From the latter fact it will be seen that this space between the surfaces will be greater or smaller, depending upon the diameter and length of the needle body. As the needle diameter and length are decreased or increased the distance between the surfaces must be decreased or increased respectively.

It is also contemplated that the extension 3 may comprise a prong-like extension 5, as shown in Fig. 4, the extension 5 taking a position over the needle body to be abutted by the needle when the pick-up head is dropped on the record either accidentally or customarily as in some of the automatic record changing systems. In this construction the playing portion 1 is secured directly in the body of the holding portion 2.

In order that the relative sizes of the parts shown be understood by those skilled in the art, it may be mentioned that the diameter of the portion 2 of the embodiments shown here substantially represents the diameter of that portion of needles now generally used which is engaged in the pick-up head of a phonograph tone arm. From the foregoing it will be seen that a structure has been provided wherein the needle may be distorted only to a limited degree, the limit established being such that the needle cannot be bent beyond the fatigue point of the metal from which it is made. Under such circumstances when the needle body is bent the maximum amount established, it will always spring back to its original form.

It will be seen that I have provided a phonograph needle which, while having a reduced diameter, is protected against bending and is at all times retained in alignment within its range of fatigue through bending.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a phonograph stylus, a playing portion having a point at one end, a shank portion, said shank having a substantially concentric bore longitudinal of the shank thereof, said playing por-

tion extending substantially concentrically into said bore and being secured therein with its point protruding therebeyond in spaced relation to the inside wall of said shank at the lower end.

2. In a phonograph stylus, a playing portion having a point at one end, a shank portion, said shank having a substantially concentric bore longitudinal of the body thereof, said playing portion extending substantially concentrically into said bore along its principal axis and being secured therein with its point protruding therebeyond, said bore being of a greater diameter than that of the playing portion at its lower end.

3. In a phonograph stylus, a playing portion having a point, a holding portion for engagement with a phonograph reproducer, said playing portion having its end remote from the point and secured to said holding portion and in spaced relation with said playing portion, a protective element on said holding portion, said protective element having one end integral with said holding portion and extending adjacent to and spaced from the playing portion toward the point thereof.

4. In a phonograph stylus, a playing portion having a playing point, means at the end of said playing portion remote from its point for engagement with a phonograph reproducer, a relatively rigid protecting element on said stylus, said last named element having one end adjacent to and spaced from said playing portion, said space sufficiently large to permit normal vibration of the stylus without contacting said protecting element while playing and sufficiently small to prohibit the bending of the stylus beyond the elastic limit of the material from which it is made.

5. In a phonograph stylus, a playing portion having a playing point, one end of said stylus being adapted to engagement in a phonograph reproducer, a relatively rigid protecting element for said playing portion, said last named element having one part thereof adjacent to and in spaced relation with said playing portion in the region of said playing point, said space being sufficiently large to permit normal vibration of the stylus during playing and sufficiently small to prohibit the bending of the stylus beyond the elastic limit of the material from which it is made.

HENRY LOUIS IMELMANN.