Nov. 21, 1950 F. MASSA 2,531,067

PHONOGRAPH NEEDLE

Filed April 17, 1946

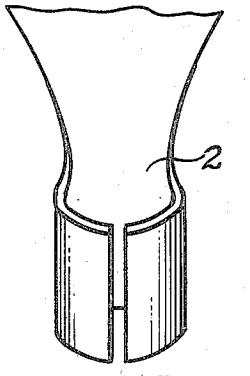


FIG. 2

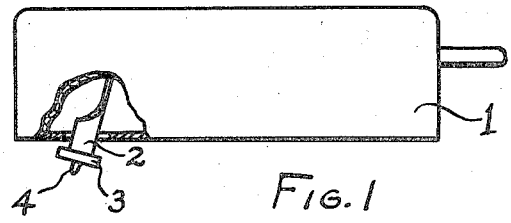


FIG. 1

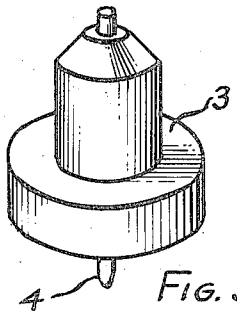


FIG. 3

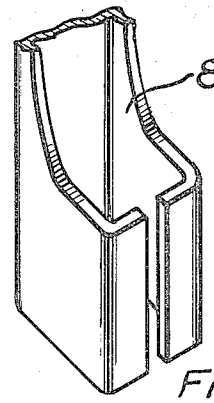


FIG. 6

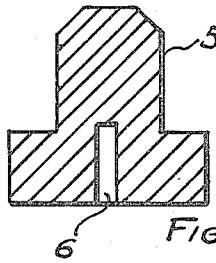


FIG. 4

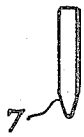


FIG. 5

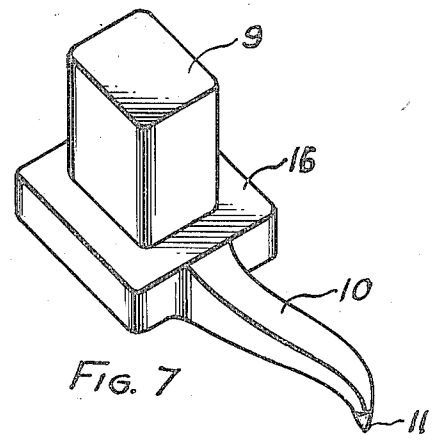


FIG. 7

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PHONOGRAPH NEEDLE

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3 Claims. (Cl. 274—38)

1

My invention is concerned with phonograph needles and, more particularly, with phonograph needles of the interchangeable type. In the present types of phonograph pickups, there are two general methods whereby needles are attached to the vibrating mechanism. In one class of equipment, the needle is mounted inside a chuck and a set screw is used to hold the needle rigidly in place. In the other class, which is generally the high-fidelity type, the needle tips are directly attached either by soldering or by some other means to the vibrating system of the pickup. In this latter case the mass of the needle tip assembly is kept at an absolute minimum, thereby permitting improved high-frequency performance for the pickup and also resulting in minimum record wear. In the better types of pickups which employ a light-weight, long-playing needle tip which is permanently assembled as an integral part of the vibrating system, it is very difficult to replace a worn needle by the ordinary user. This means that the phonograph user is forced to a relatively high expense to have his worn pickup needle tip replaced by a service man having the proper specialized tools.

The major purpose of this invention is to provide a light-weight needle tip assembly that may be easily replaced by any unskilled person. My invention provides a simple spring chuck as a part of the pickup assembly into which is inserted a tiny jewel-like needle tip which is imbedded in an accurate light-weight sleeve. Before such an arrangement can operate satisfactorily, several necessary requirements had to be worked out as will become apparent in the specifications which follow.

An object of my invention is to provide an improved light-weight needle tip assembly which may be easily installed in a phonograph pickup without the use of set screws.

Another object of my invention is to produce an economical arrangement for a long-playing needle tip which can be manufactured at low cost.

Still another object of my invention is to provide a spring-type chuck as the needle holder in the construction of a pickup so that my new improved needle tip assembly may be inserted by a simple push fit.

Another object of my invention is to produce an interchangeable type of needle tip in which the axis of the needle cannot rotate within the spring chuck into which it is mounted.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself however, both as to its organization and method of operation as well as advantages thereof will best be understood from the following description of several embodiments thereof when read in connection with the accompanying drawings in which—

2

Fig. 1 is a partially cut-away view of a phonograph pickup incorporating my new invention.

Fig. 2 is an enlarged view of the spring chuck arrangement indicated in Fig. 1.

Fig. 3 is an enlarged view of one type of my improved needle assembly which is shown inserted in position in Fig. 1.

Fig. 4 is a cross-sectional view of another type of sleeve construction which I may employ as part of the needle assembly.

Fig. 5 is a view of a needle tip which when assembled to the sleeve of Fig. 4 will complete the needle element.

Fig. 6 is a modified type of spring chuck shown in Fig. 2 in which a rectangular opening has been substituted for a circular opening.

Fig. 7 is a view of another type of needle tip assembly which is designed to fit into the type of chuck shown in Fig. 6 so that no rotation of the axis of the needle is possible.

Referring more particularly to Fig. 1, the character 1 represents a phonograph pickup cartridge which includes vibratile means (not shown) for converting mechanical motion to electrical energy. On the free end of the vibratile system is attached a spring chuck 2 into which is inserted a sleeve 3 which carries the needle tip 4. An enlarged view of the spring chuck 2 is shown in Fig. 2 and an enlarged view of the sleeve 3 and needle 4 is shown in Fig. 3. In the design of the pickup, the spring chuck 2 is allowed to project a small distance below the surface of the pickup housing so that the sleeve 3 may be easily inserted by simply pushing it into the cylindrical opening of the chuck 2. During the development of this simplified system of needle assembly, I found that two essential requirements had to be met before the performance was satisfactory. In the first place, the sleeve 3 had to be made light, and in the second place, the force applied by the jaws of the spring chuck 2 against the sides of the sleeve 3 had to be sufficiently high so that there would be no tendency for the needle assembly to rattle within the chuck during the playing of phonograph records. Specifically, I found that if the clamping force of the spring was made greater than four ounces, very satisfactory performance was achieved when playing practically all types of phonograph records. In order to

achieve the desirable objective of very light weight for the needle tip assembly, I found it very advantageous to use a molded plastic collar for part 3. The sleeve 3 was actually molded using the needle 4 as an insert. A suitable type of plastic for the sleeve is Polystyrene which has one of the lowest specific gravities as well as a very high internal stiffness. Polystyrene sleeves molded around permanent types of needle tips gave excellent performance in the several samples that I built incorporating my new invention. Although a plastic sleeve gives excellent results, it is possible to deviate somewhat in the design of the sleeve and to employ one of the lighter metals such as beryllium, magnesium, or aluminum. I shall refer to these light-weight metals as the magnesium or aluminum type.

Fig. 4 shows the cross-section of a metallic sleeve 5 of the magnesium or aluminum type into which a hole 6 is drilled, as shown. The needle tip 7 which is shown in Fig. 5 is then forced into the hole 6 of the sleeve 5 resulting in a needle tip assembly similar to the previously described assembly of Fig. 3. The metallic assembly, however, will weigh somewhat more than the plastic assembly which will result in a sacrifice in the performance.

Fig. 6 shows a modification of the opening of the spring chuck. The portion 8 of the chuck of Fig. 6 has a rectangular opening, as shown, to replace the cylindrical opening shown in the chuck of Fig. 2. The purpose of the construction of the spring chuck of Fig. 6 is to receive a needle assembly 9, as shown in Fig. 7, and to prevent its rotation inside the chuck. The needle tip assembly of Fig. 7 includes an offset portion 10 which carries the needle tip 11, as shown. A flange portion 16 near the base of the shank 9 will serve as a stop against the edge of the spring chuck when the needle assembly is inserted into the chuck. The enlarged diameter of the sleeve 3 in Fig. 3 also serves as a stop when it is inserted into the chuck of Fig. 2. It will be noted that the length of the shank 9 is substantially less than the distance from the center line of the shank to the needle tip.

Although I have chosen only a few specific embodiments to illustrate my invention, it will be obvious to those skilled in the art that numerous deviations may be made in the specific details for executing the desired functions and I, therefore, desire that my invention shall not be limited except insofar as is made necessary by the prior art and by the spirit of the appended claims.

I claim:

1. As an article of manufacture, a phonograph needle including a shank adapted to be engaged by the chuck of a phonograph pickup, an offset portion on the shank and a separately formed needle tip secured to the end of the offset portion, the shank having an enlarged shoulder formed at the juncture of the offset portion and the shank to serve as a stop when the shank is inserted into the chuck, the shank also having a flat portion to prevent rotation thereof in the chuck, and the length of the shank being less than the distance from the center line of the shank to the needle tip.

2. As an article of manufacture, a phonograph needle including a plastic shank adapted to be engaged by the chuck of a phonograph pickup, an offset portion formed integrally with the shank and a separately formed needle tip secured to the end of the offset portion, the shank having an enlarged shoulder formed at the juncture of the offset portion and the shank to serve as a stop when the shank is inserted into the chuck, the shank also having a flat portion to prevent rotation thereof in the chuck.

3. A phonograph needle according to claim 2 wherein the plastic is polystyrene.

FRANK MASSA.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
D. 139,584	Jensen	Nov. 28, 1944
1,270,526	Keen et al.	June 25, 1918
1,397,835	Elmer	Nov. 22, 1921
1,768,704	McCarter	July 1, 1930
2,227,574	Creager	Jan. 7, 1941
2,261,616	Dally	Nov. 4, 1941
2,363,497	Begun	Nov. 28, 1944
2,399,035	Imelmann	Apr. 23, 1946
2,418,212	Williamson	Apr. 1, 1947
2,473,374	Hutter	June 14, 1949
2,476,414	Hutter	July 19, 1949

FOREIGN PATENTS

Number	Country	Date
393,571	Great Britain	Sept. 5, 1931
372,428	Great Britain	May 12, 1932