

Sept. 7, 1943.

F. L. CAPPS

2,328,889

SOUND REPRODUCING STYLUS

Filed June 18, 1942

Fig. 1.

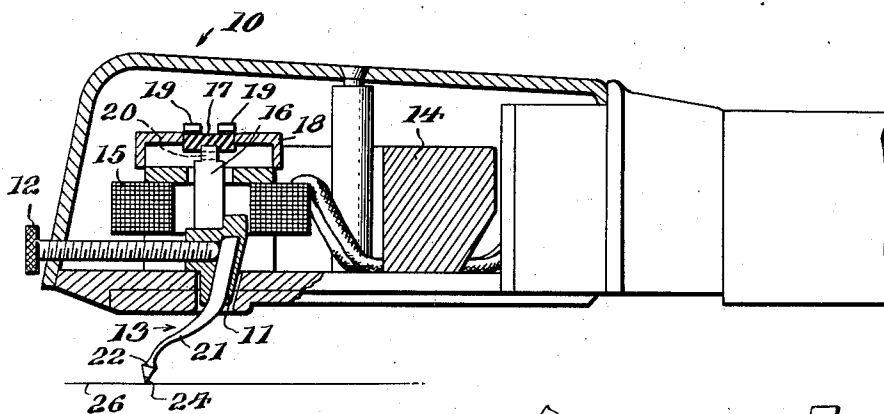


Fig. 4.

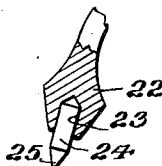


Fig. 2.

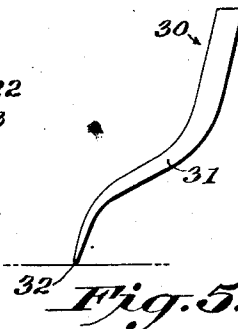
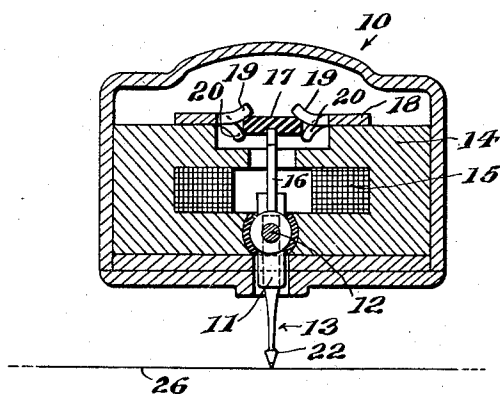
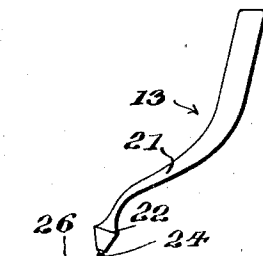


Fig. 3.



Inventor
FRANK L. CAPPS

By *John H. Haurahan*
Attorney

UNITED STATES PATENT OFFICE

2,328,889

SOUND REPRODUCING STYLUS

Frank L. Capps, New York, N. Y.

Application June 18, 1942, Serial No. 447,511

5 Claims. (Cl. 274—38)

This invention relates to new and useful improvements in sound reproducing apparatus and has particular relation to an improved sound reproducing stylus such as is used for the reproducing of sound from phonograph records and the like.

The invention includes in combination with a sound record and a reproducing device a stylus the point of which enters substantially vertically into a sound groove of such record when the stylus is carried by the reproducing device and the latter is disposed over the record.

The stylus of the invention is an improvement in the stylus of my Patent 2,276,562, issued March 17, 1942.

The objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein satisfactory embodiments of the invention are shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawing:

Fig. 1 is a longitudinal sectional view through a pick-up and showing my improved stylus clamped therein and in playing association with a sound record;

Fig. 2 is a transverse sectional view through the pick-up and showing the relation of the stylus thereto and to a record being played;

Fig. 3 is an enlarged side elevational view of the stylus alone;

Fig. 4 is a further enlarged detail sectional view through the head on the reduced end portion of the stylus and showing the mounting of a permanent point therein; and

Fig. 5 is a view similar to Fig. 3 but showing a modification.

As disclosed in my patent above identified a stylus having an end portion reduced along the lines of a logarithmic curve gives a reproduction of smooth and agreeable quality and is particularly fitted for quality reproduction of sound from a phonograph record with a minimum of surface noise.

Referring in detail to the accompanying drawing a pick-up generally designated 10 is shown for the purpose of illustrating one manner of clamping the present stylus and presenting it to a sound record. The pick-up shown is merely for the purpose of showing one way of holding the present stylus in relation to a record and it

is to be understood that the present stylus may be used with any type or kind of pick-up or equivalent device but that when in use the relation of the stylus to the record is preferably that shown.

As illustrated the pick-up 10 includes a stylus holder 11 into which a screw 12 is clamping my improved stylus generally designated 13. Holder 11 is associated with the usual permanent magnet 14 and coil 15 and has attached thereto a fin or reed 16 the upper end portion of which is embedded in a block or cushion 17 of rubber. The control or dampener device 17 is mounted as by the finger-like portions of a cap or securing device 18 which has upper fingers 19 and lower fingers 20 lanced and pressed therefrom to secure or mount the rubber 17.

The stylus 13 comprises an elongated metal body one end portion of which is reduced along the lines of a logarithmic curve preferably an exponential type of logarithmic curve as at 21. At its smaller end this reduced portion is provided with an enlargement of head 22 having a socket 23 opening through its free end and in which is partly received a permanent point 24. Point 24 is a sapphire although it will be understood that other types of permanent points may be used. Attention is directed to the fact that point 24 has a radius 25 at its free end.

In its reduced portion 21 stylus 13 is bent twice, first to provide a laterally extending portion and then again to dispose its free end portion substantially parallel with but in off-set relation to the shank portion of the stylus. Thus the reduced portion of the stylus is substantially in the form of an ogee curve when the stylus is viewed in side elevation. With this construction when the stylus is held in a pick-up (or other reproducing apparatus for presenting a stylus to a record) the point of the stylus is so disposed as to enter vertically or substantially vertically into the sound groove of the record as suggested by the relation of the stylus 13 to the record surface indicated by the line 26 in the drawing.

Thus the carefully formed radius on the end of the stylus and forming the extreme point of the latter is correctly presented to the record and enters straight or substantially straight into the groove thereof. The stylus of the invention is not so constructed that the stylus point is presented to a record at a rather small acute angle. In the latter instance the stylus enters the record groove at an angle and partly on its side and does not correctly present its radiused point to the sound groove.

In the drawing it will be noted that the center line of the permanent point 24 is substantially parallel with the upper shank portion of the stylus. Therefore the construction disclosed provides for the use of a stylus having a relatively long reduced shank portion 21 without any increase in the total or overall length of the stylus.

In the modification of Fig. 5 the stylus generally designated 30 is provided with a portion 31 reduced toward its free end along the lines of a logarithmic curve and preferably along the lines of an exponential type of logarithmic curve. This gradual reduction in styli 13 and 30 is as set forth in my patent above identified. The free end portion of stylus 30 is provided with a radiused point 32 for entering a sound groove.

Stylus 30 is for use in the manner indicated in connection with stylus 13 and differs therefrom essentially only in that the stylus 30 is not provided with a head and a permanent point. Both styli have bodies of metal and they may be of the desired metal and may be hardened if so desired. It is noted that in each instance the reduction in diameter of the end portions of the styli take place gradually along the lines of an exponential type of logarithmic curve and not along straight lines such as would impart to the reduced portions of the styli the characteristics of a truss.

With the described construction the styli of the invention are especially adapted to properly transmit the vibrations imparted to their ends by sound records and the like. Where the styli of the invention are hardened, the hardening treatment may be given after bending of the styli. Further while the bends in the two styli illustrated are rounded or on radii it will be understood that they may be sharp if such is desired.

Having thus set forth the nature of my invention, what I claim is:

1. In a sound reproducing stylus, an elongated shank having an end portion reduced substantially along the lines of an exponential type logarithmic curve toward its free end, a rounded point at the free end of said portion, and said shank bent twice in said reduced portion whereby it includes in said reduced portion a laterally extending portion disposing the free end portion of the shank substantially parallel with but in laterally off-set relation to the remainder of the shank.

2. In a sound reproducing stylus, a permanently unitary element comprising an elongated metal body including a downwardly extending end portion comprising a shank shaped to enter

and be secured in the conventional round socket of a stylus holder, said body curved forwardly from the inner end of said shank to provide a forwardly off-set portion and then again curved to provide a downwardly extending lower end portion whereby to have the actual ends of said body facing in substantially opposite directions with a downwardly and forwardly curved off-set portion between such end portions, and said body at least in its off-set portion reduced in cross sectional area along the lines of an exponential type of logarithmic curve as it approaches said lower end portion.

3. A sound reproducing stylus comprising an integral body having an upper end portion comprising a shank shaped to be received and secured in the conventional round socket of a stylus holder and an end portion provided with a point permanently rigid therewith and shaped to enter a sound record groove, said end portions having their actual outer ends facing substantially in opposite directions, a downwardly and forwardly curving intermediate portion between and connecting the upper and lower end portions of said body, and said intermediate portion of diminishing cross sectional area toward the said lower end portion.

4. In a sound reproducing stylus, an elongated metal body bent twice in unequally spaced portions intermediate its ends whereby it includes a relatively long upper end shank cross-sectionally shaped to be received and secured in the conventional round socket of a stylus holder, a relatively long forwardly off-set intermediate portion and a relatively short depending lower end portion, a short depending point permanently rigid with the free end of said depending lower end portion and shaped to be received in a sound record groove, and said intermediate portion as it approaches said depending end portion gradually reduced in cross-sectional area.

5. In a sound reproducing stylus, a permanently unitary element comprising an elongated metal body having an upper end shank shaped to enter and be secured in the conventional round socket of a stylus holder, said body extending forwardly from the lower end of said shank portion, said forwardly extending portion of said body at least in its portion toward its forwardmost end gradually reduced in cross-sectional area, and a point shaped to enter a sound record groove and permanently rigid with the forwardly extending portion of said body and depending substantially vertically therefrom adjacent the forwardmost end thereof.

FRANK L. CAPPS.