Sept. 9, 1924. 1,508,163

W. E. CLIFTON

NEEDLE FOR TALKING MACHINES AND LIKE APPARATUS

Filed Jan. 3, 1923

Fig. 1.

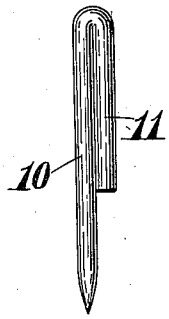


Fig. 2.

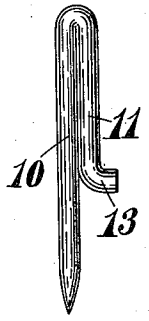


Fig. 3.

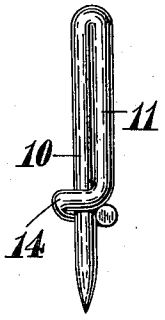


Fig. 4.

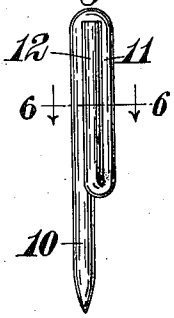


Fig. 5.

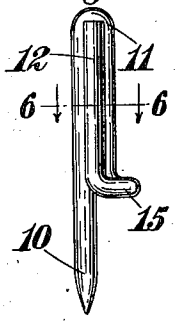


Fig. 6.

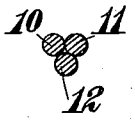


Fig. 7.

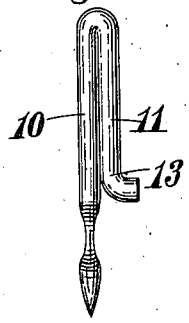
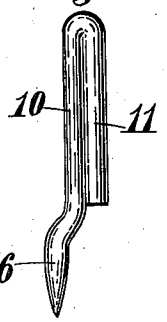


Fig. 8.



Fig. 9.



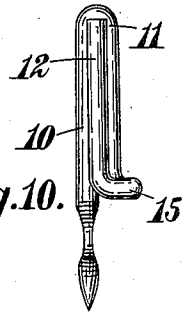
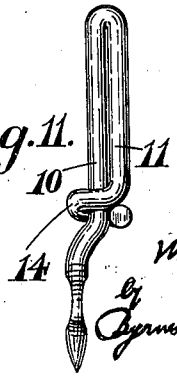


Fig. 10.

Fig. 11.



INVENTOR:
William C. Clifton,
By Lyons, Stubbs & Parmelee,
his attys.

Patented Sept. 9, 1924. 1,508,163

UNITED STATES PATENT OFFICE.

WILLIAM ERNEST CLIFTON, OF NOTTINGHAM, ENGLAND, ASSIGNOR TO CLIFTOPHONE LIMITED, OF LONDON, ENGLAND, A BRITISH LIMITED LIABILITY COMPANY.

NEEDLE FOR TALKING MACHINES AND LIKE APPARATUS.

Application filed January 3, 1923. Serial No. 610,425.

To all whom it may concern:

Be it known that I, WILLIAM ERNEST CLIFTON, a subject of the King of England, residing at Nottingham, England, have invented certain new and useful Improvements in Needles for Talking Machines and like Apparatus, of which the following is a specification.

This invention consists in improvements in or relating to needles for talking-machines and like apparatus, and has for its object the improvement of the tone produced by the needle, the lessening of surface noise, and the cheapening of the cost of production. A further object is to provide a needle, by the use of which wearing of the record-surface will be reduced.

According to the present invention a gramophone or like needle is formed from a length of wire doubled back on itself one or more times with a pointed end extending clear of and beyond the extremity of the doubled back portion.

The invention also includes a gramophone-needle whereof that end which is to be retained in a needle-socket is formed with a looped portion, the construction and purpose of which will be more fully described hereinafter.

The invention will be more clearly understood from the following description given by way of example with the aid of the accompanying drawings, in which—

Figures 1, 2, 3, 4, 5, 7, 9, 10 and 11 show respectively different forms in which the needle may be manufactured, all drawn to an enlarged scale;

Figure 6 is a section on the line 6—6 either of Figure 4 or Figure 5; and

Figure 8 is a side view of the pointed end of the needle shown in Figure 7.

Like reference numerals indicate like parts throughout the several figures of the drawings.

Thus, in the form shown respectively in Figures 1, 2, 3 and 7, a needle may be formed from a length of thin brass, mild steel or wire doubled back on itself once with the two limbs 10 and 11 thus provided lying close to one another. If the doubled-back portion of such a needle be inserted in the usual needle-socket in, or in connection with, the stylus-bar the end of the retaining-screw will engage the two limbs so as to grip them firmly and will tend to open them or will actually open them apart, thus increasing the security, the area of contact, and rigidity with which the needle is held in the socket.

The invention may therefore be considered as including a needle whereof that end which is to be retained in the needle-socket is formed with a "looped" portion (i. e. a portion formed by doubling back the material of the needle as described herein or, it may be, by slitting or even forming an eye in that end portion) to be engaged by the retaining-screw so that the loop will be thereby opened or wedged apart to engage with the inner wall of the needle-socket along two or more lines of contact. Alternatively the "looped" portion of the needle could be so formed as naturally to tend to open by its own resilience so that it will be compressed when it is inserted in the needle-socket and will thereby engage the latter as before along two or more lines of contact without having to be opened by means of the retaining-screw.

The following description of other constructions of needle according to the invention shows specifically how a needle can be formed to afford more than two lines of contact with the needle-socket. By what may be termed "a multiple-line contact" between the needle and its socket a more satisfactory retention of the needle within the socket is obtained with improved results.

If desired, instead of bending the wire back once only, it may be returned in a further bend 12, as shown in Figures 4, 5 and 10, with the third limb 12 thus provided lying in the groove formed by the other two limbs which lie close together. The shank of such a needle would then have in cross section a virtually triangular form, as shown in Figure 6.

According to another feature of the invention, the non-pointed end 11 of the double-back portion is bent outwardly as at 13, Figures 2 and 7, or is wrapped round the adjacent limb as at 14 in Figures 3 and 11. In Figures 5 and 10 the looped portion connecting limbs 11 and 13 is bent outwardly at 15 in a manner similar to the offset 13 in Figures 2 and 7. The purpose of these constructions is to afford a more ready grip for the fingers in inserting or removing the needle from the socket and, moreover, the outwardly-bent portion or the part

that is bent round the adjacent shank, may serve as a stop to limit the amount by which the needle-shank is inserted in the socket.

Another feature of the invention consists in flattening the pointed end of the wire as shown in Figures 7, 8, 10 and 11 so that the flattened portion lies in a plane transverse to a plane containing two adjacent limbs of the wire which are doubled back one over the other. Thus, if the needle is constituted by a length of wire doubled back once over itself, the flattening of the needle just short of the pointed end in a plane transverse to that containing the two limbs will tend to increase the flexibility of the pointed end in the direction of needle-drag over a record but will increase its rigidity in a direction transverse thereto, that is to say in the direction of vibration with records most commonly employed.

A still further feature of the invention consists in bending the limb 10 away from the doubled shank portion, as shown at 16 in Figures 9 and 11, with the extremity bent back again so as to extend approximately in the original direction of the limb so that the point rests on the record at the required angle. This affords additional flexibility in the direction of needle-drag and is found, in some cases, to be of advantage.

By the present invention a wire of soft metal, for example mild steel or brass, may be employed. It is found that, in contrast with the hardened steel needles in general use, a needle according to the present invention is capable of yielding more readily in the direction of needle-drag to give to unevennesses in the record-grooves. It is found in consequence that such a needle will run more smoothly over the record with less jarring or chattering and with less scratching than is the case with hardened needles. A further advantage is that the needle is reversible (i. e. can be turned about the axis of its shank, for example between its use with any pair of records one after the other) and by doubling the wire back on itself there is no difficulty in ascertaining that the needle has been properly and completely reversed as the grip of the retaining-screw on the relatively broad surface afforded by the two limbs of the doubled-back portion automatically grips the needle correctly in its reversed position.

It will be understood that many modifications in details of construction may be made without departing from the spirit of the invention. For example, in place of the double or treble shank formation described, the wire may be bent back, if it is sufficiently small in diameter, and the needle-socket is sufficiently large, four or more times; but in practice it will rarely be found that a needle formed from a wire of suitable diameter can be doubled back more than three times. This latter form, however, is particularly suitable for use with the comparatively large needle-sockets formed for the reception of the known wood or fibre needles.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A needle for gramophone and like sound reproducing machines formed from a single length of wire doubled on itself to provide two adjacent prongs whereof one is longer than the other and is pointed at the end.

2. A needle for gramophone and like sound reproducing machines whereof that end which is to be retained in a needle-socket is formed with a "looped" portion which will engage with the inner wall of the socket along two or more lines of contact.

3. A needle for gramophone and like sound reproducing machines whereof that end which is to be retained in the needle-socket is formed with a resilient looped portion providing substantially parallel prongs which lie substantially in contact throughout their length.

4. A needle for gramophone and like sound reproducing machines whereof that end which is to be retained in the needle-socket is formed with a "looped" portion adapted to be engaged by a retaining screw whereby it will be opened out and engaged with the inner wall of the socket along two or more lines of contact, substantially as described.

5. A needle for gramophone and like sound reproducing machines formed from a length of wire doubled back on itself for the purpose described, with a pointed end extending clear of and beyond the extremity of the doubled portion and with the non-pointed end of the doubled portion bent outwardly to form a stop, substantially as described.

6. A needle for gramophone and like sound reproducing machines formed from a length of wire doubled back on itself for the purpose described, with a pointed end extending clear of and beyond the extremity of the doubled portion and the non-pointed end of the doubled portion bent outwardly and wrapped round the adjacent limb to afford a stop, substantially as described.

In testimony whereof I have signed my name to this specification.

WILLIAM ERNEST CLIFTON.