

No. 771,564.

PATENTED OCT. 4, 1904.

J. J. NEUMANN.
PHONOGRAPH REPRODUCER.

APPLICATION FILED APR. 22, 1904.

NO MODEL.

Fig. 1.

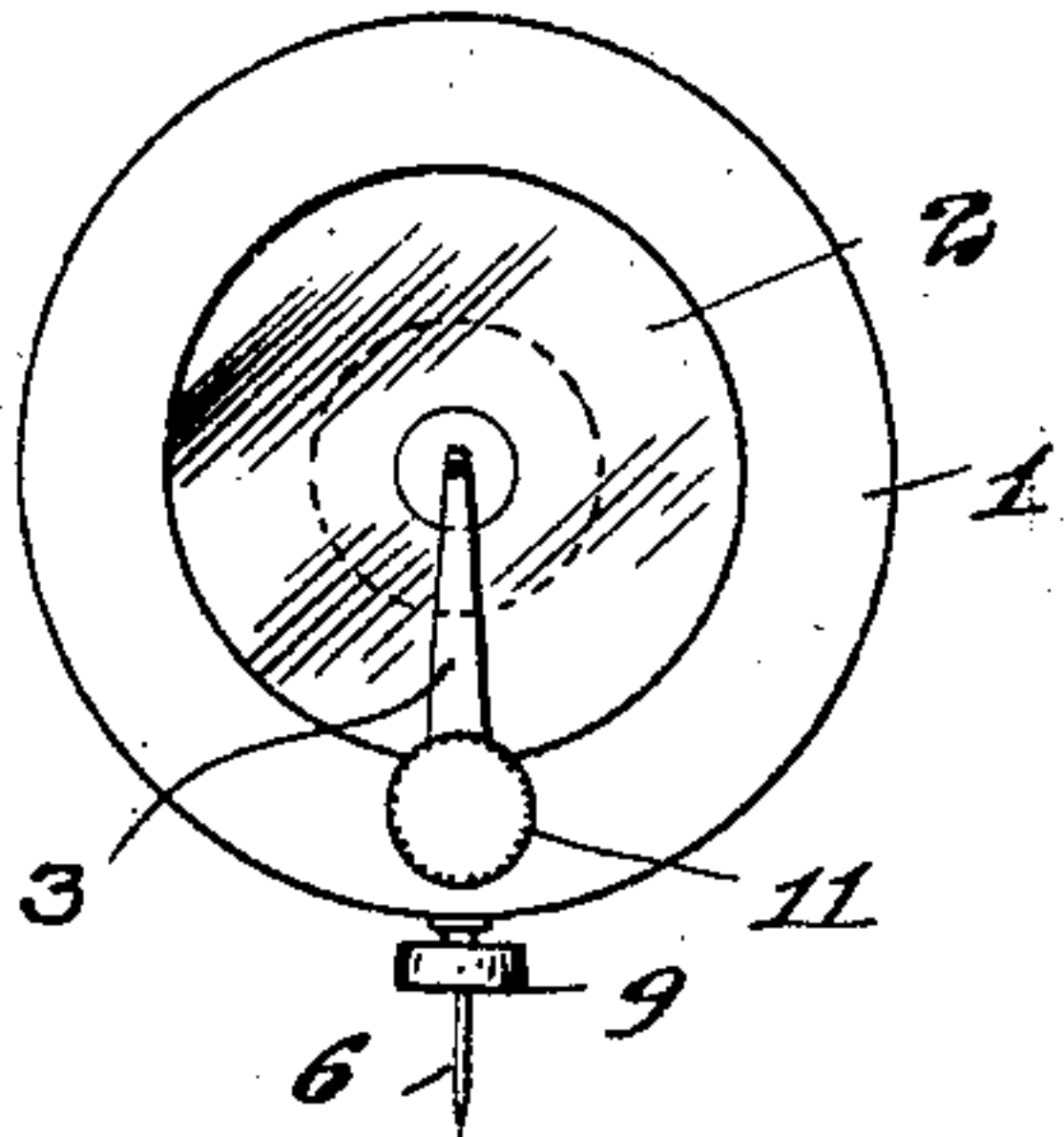


Fig. 2.

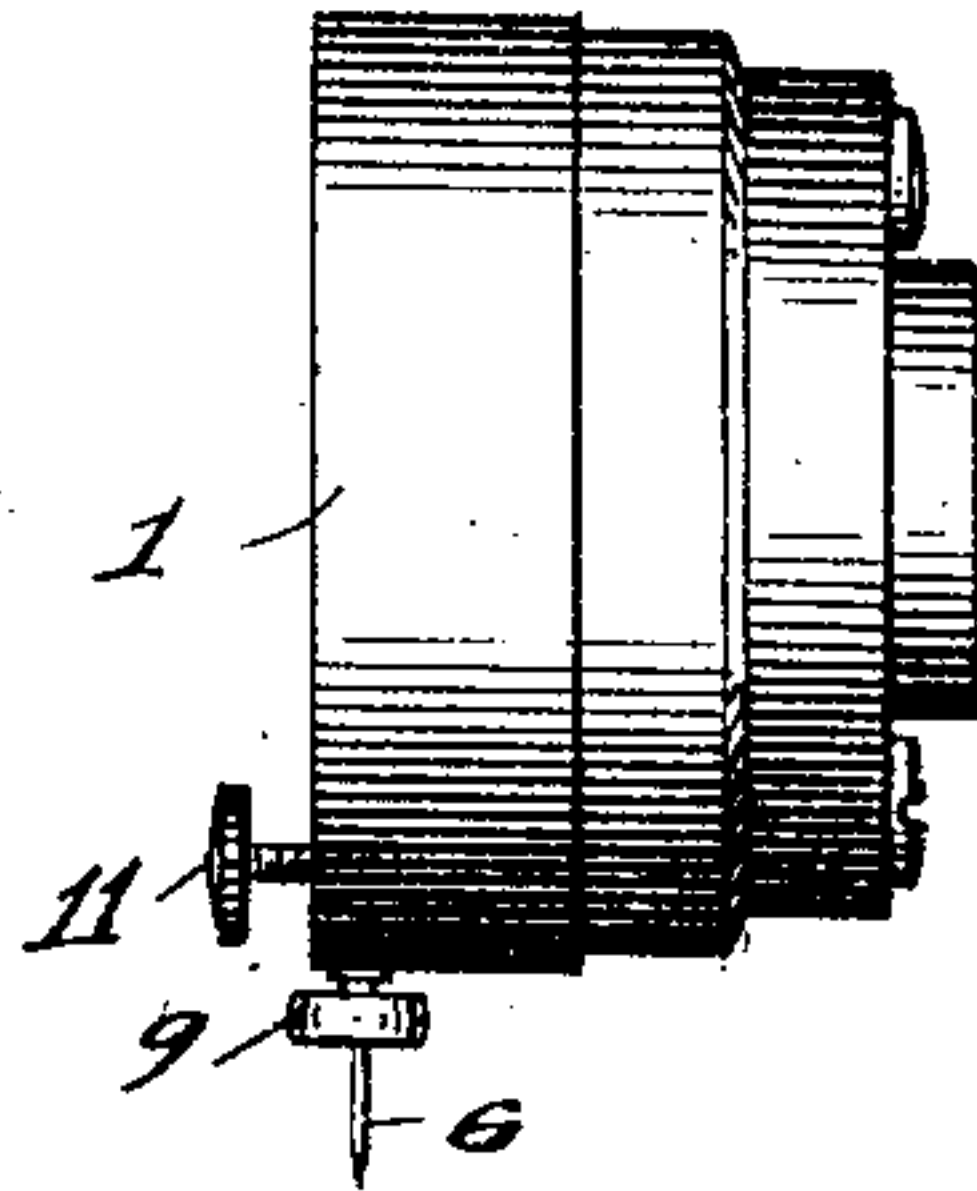
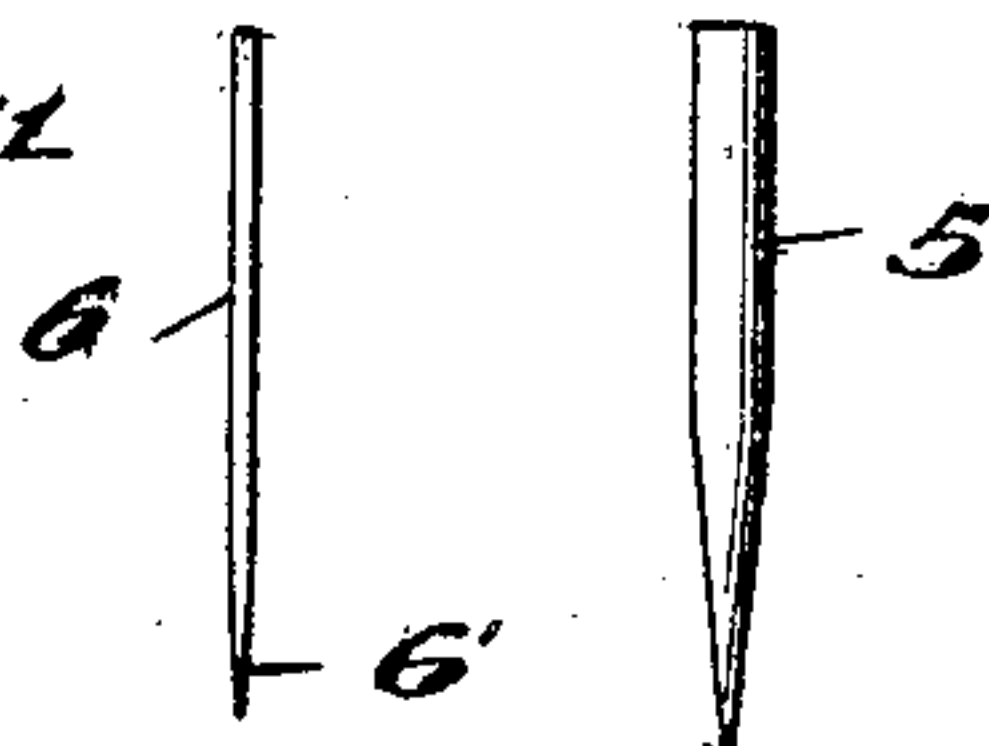
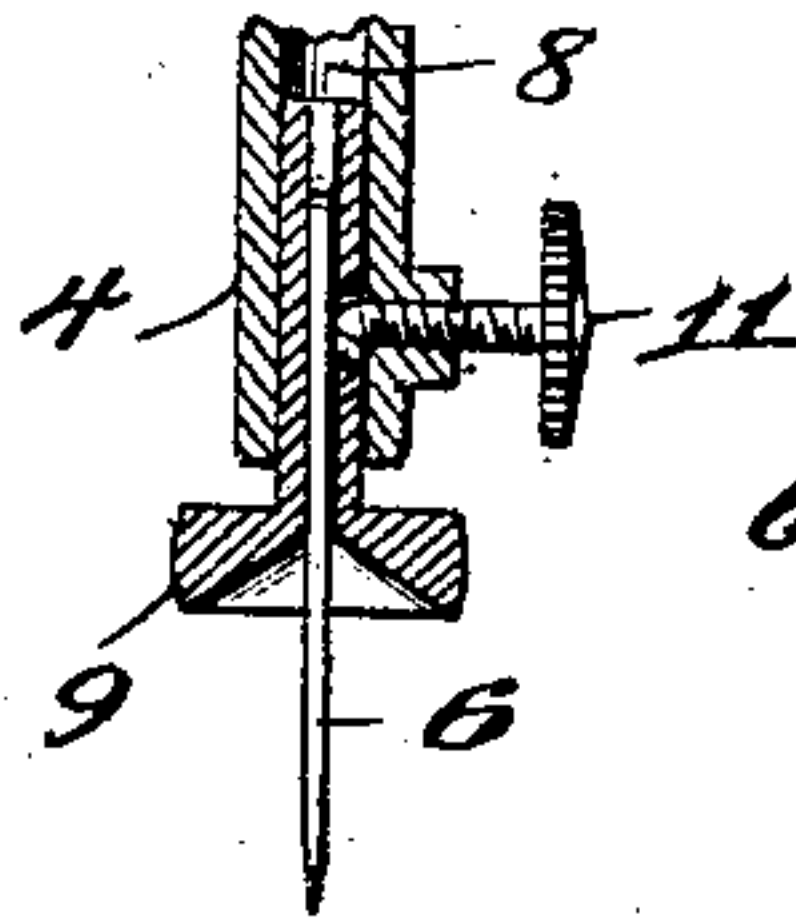
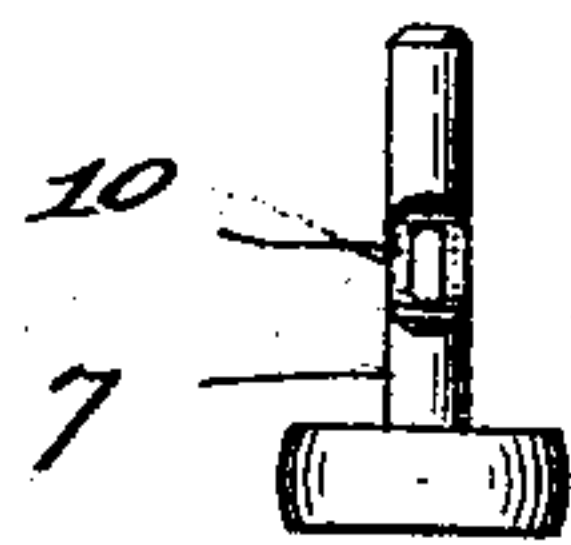


Fig. 4. Fig. 3. Fig. 5. Fig. 6.



Witnesses,
J. J. Mann,
A. N. Graves.

Inventor,
Julius J. Neumann,
By *Offield Towler* *Lithicum*
Aug 3

UNITED STATES PATENT OFFICE.

JULIUS J. NEUMANN, OF CHICAGO, ILLINOIS.

PHONOGRAPH-REPRODUCER.

SPECIFICATION forming part of Letters Patent No. 771,564, dated October 4, 1904.

Application filed April 22, 1904. Serial No. 204,383. (No model.)

To all whom it may concern:

Be it known that I, JULIUS J. NEUMANN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Phonograph-Reproducers, of which the following is a specification.

This invention relates to improvements in phonograph-reproducers, and refers more specifically to an improved reproducing-needle and mechanism for operatively connecting the same with the vibratory arm.

The salient object of the invention is to provide a needle which is resilient to a substantial degree and to such degree as to yield in itself when in operation, thereby producing a radically different tone when used in connection with records of the usual character.

A further and subordinate object is to provide a needle of the character above referred to which is more durable, follows the record with greater fidelity, and by reason of the peculiar manner in which it engages the record produces less wear upon the latter.

To the above ends the invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims.

The invention will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a face view of a reproducer-head equipped with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is an axial sectional view of the socket portion of the needle-arm and reproducing-needle seated therein. Fig. 4 is a side elevation of the filler-sleeve removed from the needle-arm socket. Fig. 5 is an elevation of my improved needle, shown on a magnified scale. Fig. 6 is a similar view of the needle heretofore in common use, likewise shown on a magnified scale, but magnified in the same proportion as is the needle shown in Fig. 5.

Referring to the drawings, 1 designates as a whole a reproducer-head of a usual construction, in so far as its general features are concerned, and provided with the usual reproducing-diaphragm 2 and vibratory arm 3,

mounted on the rim portion of the shell of the reproducer and operatively connected with the central portion of the diaphragm, as usual.

4 designates the socket-end portion of the arm 3, which in the present embodiment of my invention is shown as constructed to receive a reproducing-needle 5 of relatively large diameter. The needle of my present invention is comparatively slender or of small diameter, as indicated at 6, Figs. 3 and 5, and in order that a needle of this character may be fitted to the sockets of reproducers now in common use I provide a filler-sleeve designated as a whole 7. Said sleeve is of such exterior diameter as to fit snugly in the socket of the reproducer-arm and is axially bored to receive the much smaller needle 6 of my invention, as shown clearly in Fig. 3. For convenience of manipulation the protruding end of the sleeve 7 is provided with an enlarged head 9, and in order that both the filler-sleeve and the needle may be held in position in the socket 8 by means of a single set-screw the sleeve is cut through at one side, as indicated at 10, to expose the side of the needle, and a set-screw 11 is threaded through the side of the socket portion 4 of the needle-arm and arranged to impinge at its inner end against the needle 6.

Describing more specifically the characteristics of the needle 6, I make the same of relatively slender construction or small diameter throughout and of a highly-resilient and moderately-hard metal. In practice I have found the steel commonly known as "piano wire" to be well suited for this purpose and secure the most satisfactory results by using wire of about 11 gage. The needle is formed with a relatively fine or long tapered point 6', much resembling the point of an ordinary sewing-needle. The construction and arrangement of the parts by means of which the needle is united to the arm should be such as to insure a rigid connection—i. e., a connection free from vibration in the joints, such a connection being secured in the construction shown.

The character of the tone produced by a needle of my invention when used in conjunction with the ordinary commercial hard

records now in common use is much softer than the tones produced by the needles heretofore in use, and at the same time the reproduction is characterized by much greater fidelity and by a marked absence of harsh or scratching notes. In other words, while the tones of an instrument equipped with my needle are not so loud they are more exact reproductions of the original sounds, the harmonics being especially improved and brought out more distinctly.

The resilience of the needle is found to increase its longevity, the wearing away or blunting of the point being much less rapid and less perceptible than in the case of a rigid or substantially non-resilient needle, even though the latter be of the hardest practicable temper. Moreover, I have found in practice that when my improved needle is used in connection with a gramophone-record—*i. e.*, a record in which the undulations or deviations are formed laterally with reference to the face of the record—the wear of the point of the needle upon the record is much less than is the case with a needle of blunter and more rigid construction.

It is to be noted that although the needle is sufficiently long, slender, and resilient to yield in itself to the irregularities of the record, and thus largely dampen the harsher noise, the same is sufficiently rigid to support the reproducer from its clamped end and to transmit to the reproducer-arm the fundamental tones and overtones produced by the lateral sinuosities of the record.

It will be obvious that a needle embodying my invention may be fitted directly in a suitably-formed reproducer-arm socket without the interposition of the filler-sleeve or its equivalent.

Accordingly I do not limit myself to the exact details of the invention shown herein, except to the extent that such details are made the subject of specific claims.

I claim as my invention—

1. In combination with a gramophone reproducer-head and the diaphragm thereof, of a vibratory arm formed of rigid material having a high sound-conducting coefficient supported upon the frame of the head and connected to the diaphragm, a socket carried by said arm and a needle formed of highly-resilient hard metal, the body portion whereof is of substantially cylindric form, approxi-

mately 11-gage diameter, terminates at one end in a fine point and at its opposite end is adapted to said socket, whereby the needle is supported to extend freely from the socket and is free to flex by reason of its resiliency throughout its projecting length.

2. A gramophone-needle of wire having one end adapted to be clamped in an ordinary gramophone reproducer-arm its other end sharpened and free to move laterally when the needle is so clamped and a record is being reproduced, said needle being sufficiently long slender and resilient to yield in itself to the irregularities of the record and thus largely dampen the harsher noise but sufficiently rigid to support the reproducer from its clamped end and to transmit to the reproducer-arm the fundamental tones and overtones produced by the lateral sinuosities of the record.

3. In a device of the character described, a needle-support provided with a socket, a removable sleeve open at one side, and a clamping means, whereby the diameter of the socket may be varied to receive needles of different sizes, said sleeve and needle being secured by the same clamping means.

4. A gramophone-needle of wire substantially straight throughout and having one end adapted to be clamped in an ordinary gramophone reproducer-arm its other end sharpened and free to move laterally when the needle is so clamped and a record is being reproduced, said needle being sufficiently long slender and resilient to yield in itself to the irregularities of the record and thus largely dampen the harsher noise but sufficiently rigid to support the reproducer from its clamped end and to transmit to the reproducer-arm the fundamental tones and overtones produced by the lateral sinuosities of the record.

5. In a reproducer-head of the character described, the combination of a vibratory arm provided with a socket, a sleeve fitting said socket and provided with a longitudinal bore and also with a lateral recess, a highly-resilient slender reproducer-needle fitting the bore of said sleeve, and a set-screw threaded through the side of the arm-socket, entering the recess of the sleeve and engaging said needle.

JULIUS J. NEUMANN.

Witnesses:

FREDERICK C. GOODWIN,
ALBERT H. GRAVES.