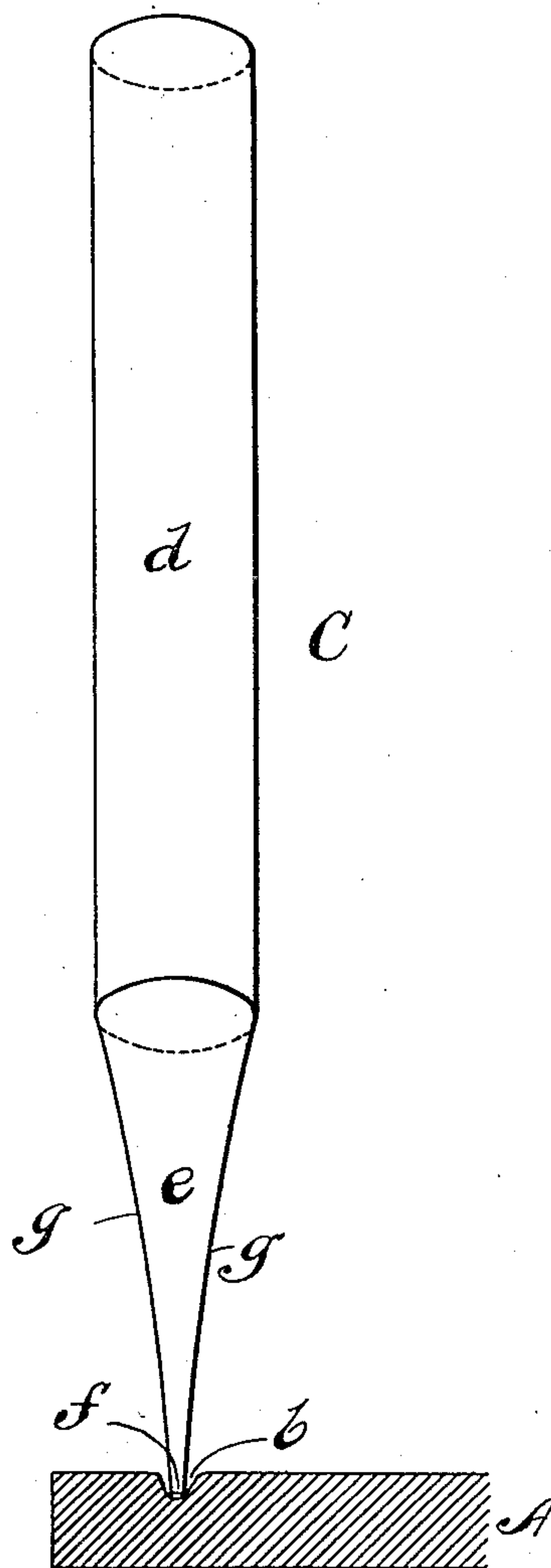


J. E. & W. B. SULLIVAN.
TALKING MACHINE NEEDLE.
APPLICATION FILED SEPT. 11, 1907.

918,389.

Patented Apr. 13, 1909.



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Witnesses

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UNITED STATES PATENT OFFICE.

JOHN E. SULLIVAN, OF READING, AND WILLIAM B. SULLIVAN, OF PHILADELPHIA,
PENNSYLVANIA.

TALKING-MACHINE NEEDLE.

No. 918,389.

Specification of Letters Patent.

Patented April 13, 1909.

Application filed September 11, 1907. Serial No. 392,269.

To all whom it may concern:

Be it known that we, JOHN E. SULLIVAN and WILLIAM B. SULLIVAN, both citizens of the United States, and residents, respectively, of the city of Reading, in the county of Berks, and the city and county of Philadelphia, both in the State of Pennsylvania, have invented certain new and useful Improvements in Talking-Machine Needles, of which the following is a specification.

Our invention relates generally to phonographs or talking machines, and more particularly to an improved form of stylus or needle for engaging the wave-line groove of the record; the main object being to insure a uniformly accurate reproduction of the sounds by which said record was originally produced, while at the same time preventing deterioration of the record by the action of the needle upon the finely lined groove thereof, such as ordinarily rapidly occurs.

The invention is fully described in connection with the accompanying drawing and the novel features are specifically pointed out in the claim.

The drawing is a fragmentary cross-sectional view of a talking machine record showing the groove thereof greatly enlarged and with my improved stylus or needle engaged therein, the latter being correspondingly enlarged.

Owing to the extreme nicety with which the delicately defined groove of the record must be followed by the needle of the reproducing mechanism in order that the finest recorded vibrations may be accurately reproduced, great difficulty has been heretofore experienced. This is due to the minute but practically serious wear of the needle and groove which results from their frictional contact throughout the long and devious course of the record-groove, and to the modification of the original sounds which ordinarily result from a scratchy action of the needle in following the sinuous path to which it is confined.

The object of our invention is to eliminate these defects, and this object we have found to be practically attained by forming the needle as indicated in magnified dimensions in the drawing.

A indicates a record disk, having a spiral groove *b* as usual, corresponding in its sinuosities with the vibrations imparted to the recording diaphragm by the recorded sounds;

and C indicates our improved needle with its point engaged in said groove; a showing of these parts only of a sound recording and reproducing machine being required to illustrate our invention, and such parts being enlarged, as previously stated, so as to make clear the distinguishing features of form and proportions.

To enable the invention to be utilized with ease and certainty, as applicable to the well-known records indicated, the construction of our improved needle C will be specifically described by indicating exact measurements as actually employed by us in practically attaining the desired results. The material preferably employed is high grade steel wire of sixty-five one-thousandths (.065) of an inch in diameter; and the full length of the needle being twenty-one thirty-seconds of an inch, the round body portion *d* thereof is made fourteen thirty-seconds of an inch, and the tapered end portion or tip *e* seven thirty-seconds of an inch in length. The point *f* of the tip *e*, which is made slightly blunt as indicated, has a diameter of two one-thousandths (.002) of an inch, and the incline *g* of the tapered tip, instead of being straight, is inwardly curved or "concaved" longitudinally as shown, to a radius of about three inches, so that the diameter at the blunted point is very gradually increased at first and thereafter more rapidly as it extends into the round body *d*. The improved effect of this novel shape of record-needle tip is very marked, both in the securing of more accurate reproductions of the exact original sounds free from the unpleasing tones commonly introduced in the reproduction; and in the avoidance of wearing action upon the record whereby its usefulness is ordinarily soon destroyed or impaired. The point *f* so rests in the bottom of the groove *b* as to greatly reduce friction and "scratch" while at the same time accurately following the delicate deflections of the groove; and the relative diameters and lengths of the so-called "concaved" tip and round body, as indicated by the dimensions of our actual construction stated above, give sufficient rigidity to the needle to prevent alteration of the tones because of undue yielding in the needle structure. Notwithstanding the hardness of the needle material there has been heretofore not only the objectionable "scratch" referred to, but such wear of the

sharp needle point during its contact with the very lengthy groove of many records, as to frequently cause quite imperfect reproduction of the latter portion; which effect is
5 avoided in my improved needle by the fact that the point *f* is not only slightly blunted originally but that it is so slightly changed in diameter by wear, owing to the "concaved" conical form of the tip, as to have
10 no appreciable effect upon the proper reproduction of the whole record.

What we claim is:—

The talking machine needle described comprising a body and a concavely tapered point.

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In testimony whereof, we affix our signatures, in the presence of two witnesses.

JOHN E. SULLIVAN.

WILLIAM B. SULLIVAN.

Witnesses:

D. M. STEWART,

W. G. STEWART.