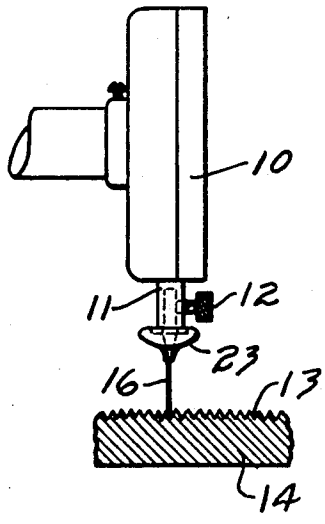
Dec. 13, 1938. S. F. NABERS 2,140,392

PHONOGRAPH NEEDLE

Filed March 21, 1938

Fig. 1



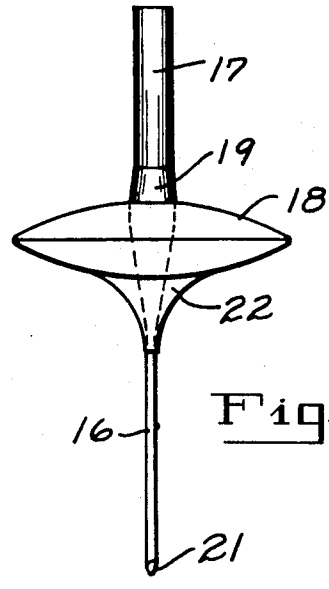


Fig. 2

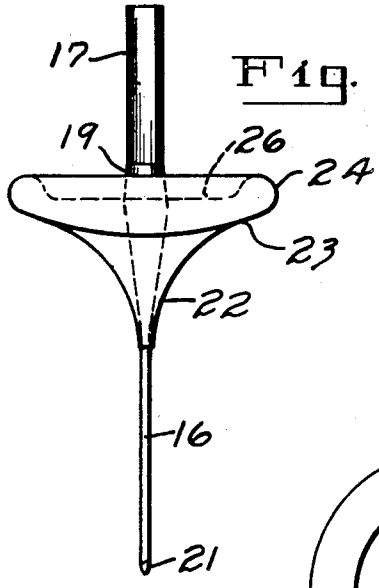


Fig. 4

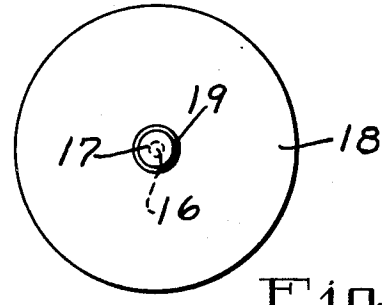


Fig. 3

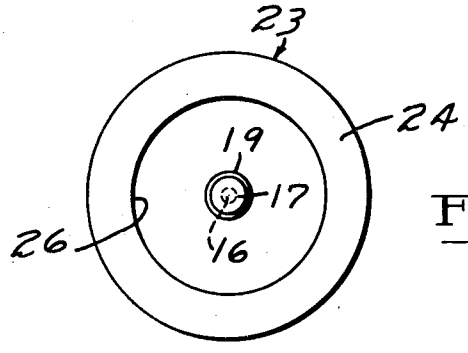


Fig. 5

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PHONOGRAPH NEEDLE

Samuel F. Nabers, Birmingham, Ala.

Application March 21, 1938, Serial No. 197,204

3 Claims. (Cl. 274—38)

This invention relates to phonograph needles employed with disc record having sinuous grooves, and has for its object the provision of a needle which shall effectively minimize, if not eliminate, the needle scratch or rasping noises due to friction between the needle and the grooves.

A further object of my invention is the provision of a phonograph needle which shall include an inertia member so proportional that vibrations within the musical range of wave lengths are freely transmitted by the needle, but which effectively damps out, or snubs, vibrations of shorter wave lengths within the range of scratch, or rasping noises.

A still further object of my invention is the provision of a phonograph needle which shall be effective to transmit sound vibrations within the musical and voice ranges without appreciable loss of volume, but which shall be effective to damp out sound vibrations within the range of scratch or rasping noises.

As is well known in the art to which my invention relates, one of the greatest objections to music reproduced by a phonograph is the fact that the scratching of the needle upon the record produces rasping, or scratching noises, which are superposed upon the musical notes and mar the rendition of the selection recorded. Efforts have been made to minimize the scratching noises, but so far as I am aware, a reduction in the scratching or rasping noises has been accompanied by such a reduction in volume that many of the musical or voice notes are so subdued as to be practically lost.

The scratch or rasping noises are produced by the friction of the needle passing along the groove, and the vibrations thereby produced are of a wave length shorter than those of the highest musical notes. It will at once become apparent, therefore, that mechanism which will respond to vibrations of an amplitude within the range of musical notes, but which will not respond to vibrations within the higher ranges, will not produce the scratch noises. I have discovered that this result may be accomplished by the provision of an inertia member or weight on the needle intermediate its ends, the weight being of sufficient inertia to resist the transmission of vibrations within the range of scratch noises. By properly proportioning the weight, the musical notes are transmitted without diminution in volume, so that a faithful reproduction may be had without a sacrifice of volume and without the imposition of disagreeable short wave vibrations.

Devices embodying features of my invention are illustrated in the accompanying drawing forming a part of this application, in which

Fig. 1 is a view in elevation showing a conventional reproducer assembly having one of my improved needles mounted therein;

Fig. 2 is a view in elevation of a needle drawn to enlarged scale;

Fig. 3 is a plan view of Fig. 2;

Fig. 4 is an elevational view of a modified form of my invention; and

Fig. 5 is a plan view of Fig. 4.

Referring to the drawing, there is shown a reproducer assembly 10 including a chuck 11 with a set screw 12 therein for holding a needle, the needle being adapted to coact with the sinuous groove 13 of a record 14.

My improved needle comprises a body 16, a shank 17 and an inertia weight 18. I have found it highly important that the needle be firmly held in the chuck 11, and have accordingly provided a conical enlargement 19 on the shank thereof to fit snugly within the mouth of the chuck 11, with the set screw 12, provides a firm anchorage for the needle, and prevents relative vibration between the needle and the chuck.

The body 16 of the needle is preferably made of spring wire, such as of steel, phosphor bronze, or other tempered metal, and is preferably slightly resilient. For best results, it may be of from 18 to 20 gauge material and be provided with a point 21 of iridium, or similar hard, wear resisting material, which is rounded off in the conventional manner, as shown. The mass of the inertia member 18 must be sufficient to resist effectively the transmission of the high frequency scratch noises, but permit freely to pass the notes of the musical scale. I have found that if too heavy a weight be employed, the higher musical notes are absorbed or greatly subdued, and if too light a weight is employed, some of the scratch noises will be transmitted. I have found that a weight of from two to four grams gives the best results.

A conical reinforcement 22 is preferably provided on the resilient body 16 near its juncture with the inertia member 18. Otherwise I have found that the volume of musical notes is greatly reduced. The provision of this reinforcement increases the volume of the musical notes without introduction of scratch noises.

Instead of forming the inertia member as shown in Figs. 2 and 3, I may form it as shown in Figs. 4 and 5, in which the inertia member 23 has the greater portion of the mass of the weight composed of a ring 24 surrounding the shank 17 and forming an annular trough 26 around the

shank, the trough being of sufficient diameter preferably that the chuck 11 may fit down into it. This provides a snug fit between the needle and the chuck and obviates any relative vibration between the two which might produce distracting noises. Further, the greater portion of the mass of the inertia member being remote from the axis of the needle makes it more effective in absorbing the scratch noises.

From the foregoing it will be apparent that I have devised an improved phonograph needle which is effective to absorb or snub out high frequency vibrations causing scratch noises, but which permits the free transmission of notes within the musical scale.

While I have shown my invention in but two forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications, without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. A needle for sound reproducing apparatus comprising a resilient body of spring metal having a point on one end thereof, a chuck engaging shank on the other end, an integral inertia member joined between the shank and the body remote from the point and comprising a weight sufficient to damp or snub scratch noises but effective to transmit musical vibrations, and a reinforcing means joining the resilient body to the weight.

2. A needle for sound reproducing apparatus having a chuck with a set screw therein for mounting the needle, comprising a resilient body of spring metal having a point on one end of relatively harder material, a shank on the other end having a conical enlargement for snug engagement with the chuck, and a weight of from two to four grams on the shank adjacent the chuck and remote from the point.

3. A needle for sound reproducing apparatus having a chuck with a set screw therein for mounting the needle, comprising a resilient body of spring metal having a point on one end of relatively harder material, a shank on the other end having a conical enlargement for snug engagement with the chuck, a weight of from two to four grams on the shank adjacent the chuck and remote from the point, and a conical reinforcement for the resilient body at its point of engagement with the weight.

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