April 3, 1956 L. J. ANDRES 2,740,296

PHONOGRAPH NEEDLE COMPARATOR

Filed Dec. 11, 1952

Fig. 1

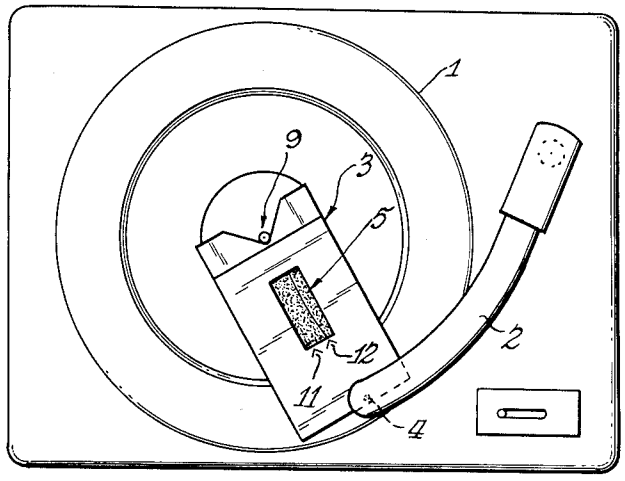


Fig. 3

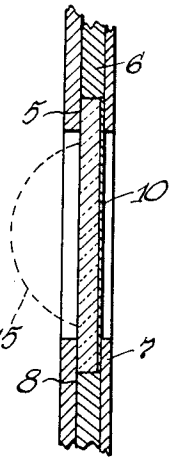
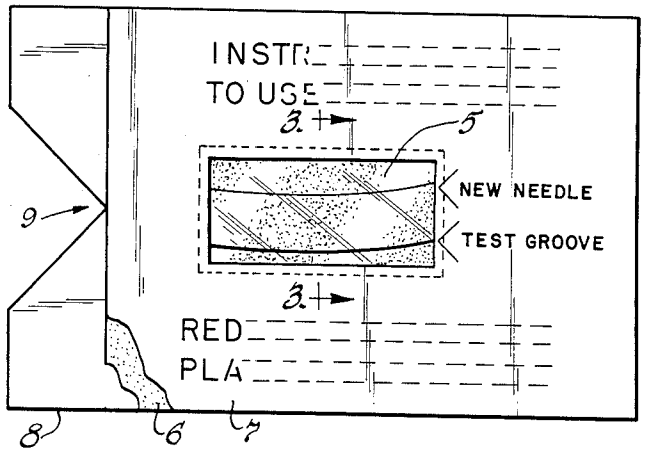


Fig. 2



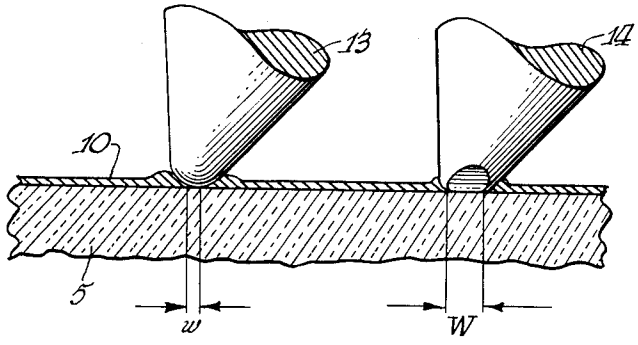


Fig. 4

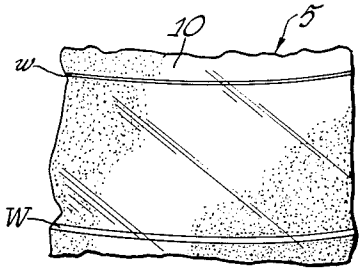


Fig. 5

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PHONOGRAPH NEEDLE COMPARATOR

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1 Claim. (Cl. 73—432)

This invention relates in general to phonographs and more particularly to a device for quickly testing the degree of wear on the playing tip of a phonograph needle without removal from the tone arm.

Previous to this invention the generally accepted method for testing a phonograph needle required first the removal of the needle from the transducer and then the visual examination of the playing point under a relatively powerful magnifier or microscope and comparing this point with an unworn needle or facsimile thereof. The removal of modern sub-miniature needles used in present day transducers is in itself difficult and the actual determination of wear by magnification requires the use of an expensive magnifier and is normally beyond the interpretive ability of the average layman.

The testing comparator and method hereinafter described provides a simple yet effective means for interpreting wear of the playing tip of the needle well within the ability of the average layman without the necessity of removing the needle from the transducer and constitutes the principal object of the invention.

A further object of the invention is the provision of a coated plate adapted to be placed on the stationary turntable of a phonograph for receiving a test embossment from the needle in the phonograph transducer for visual comparison with a standard embossment on the same plate.

These and other objects and advantages in one embodiment of the invention are described and shown in the following specification and drawing.

Fig. 1 is a plan view of a phonograph with a needle comparator in testing position on the turntable.

Fig. 2 is a full size plan view of the comparator.

Fig. 3 is a fragmentary enlarged cross sectional view of the comparator shown Fig. 2 taken through section line 3—3.

Fig. 4 is an enlarged diagrammatic view illustrating the method of making embossments with a new and a worn needle.

Fig. 5 is an enlarged fragmentary plan view showing the comparative embossments made by a new and worn needle.

Fig. 1 illustrates a conventional phonograph having a turntable 1 and a tone arm 2 and the needle comparator 3 placed on the turntable ready to receive an embossment from the needle 4 in the tone arm 2.

Figs. 2 and 3 illustrate one embodiment of the comparator in which a platen or transparent glass plate 5 having ordinary polished surfaces is held in a paper board holder 6 sandwiched between upper and lower paper board members 7 and 8 respectively. A notch 9 in one end of member 8 is used to register the comparator against the spindle of the turntable as shown in Fig. 1.

A thin coating of opaque wax 10 is applied in intimate contact to one outer surface of the glass plate 5 before assembly in the paper board holder assembly 6, 7 and 8.

A preferred wax is a mixture of paraffin, carnauba and carbon black and may be applied to the plate 5 by

masking one outer surface and dipping the plate in the melted wax and permitting the plate to drain leaving a layer on one side approximately .005 inch in thickness. Many varieties of well known waxes and lacquers are suitable for this purpose as long as they remain reasonably soft and free from embrittlement and are substantially opaque.

Referring to Fig. 1, a test embossment is made by placing the comparator 3 on the turntable as shown and manually positioning the tone arm with the needle point on the coated surface of the glass near the arrow 11 and then moving the arm about its vertical pivot across the plate, embossing a single groove in the wax coating. Previously or later, a standard groove 12 is embossed with a new unworn needle on the same plate for comparative purposes.

Referring to Fig. 4 needle point 13 represents a new needle with its radiused point resting on the glass plate 5 and needle point 14 represents a needle the same as 13 except having normal wear on its point from playing engagement with the record grooves. When each of the needle tips thus illustrated are moved across the plate under normal needle pressure, they will emboss grooves in the coating 10 and expose a width of clear glass proportionate to the wear on the needle tips. As illustrated, a new needle will expose clear glass of a width w whereas a worn needle will expose clear glass having a width W. Thus by holding the plate before good illumination a sharp distinction between the width of the grooves is readily noted by the unaided eye. This comparison without magnification is sufficient to decide by predetermined standards, embossed on the plate or printed on the holder, whether or not a needle requires replacement.

Although a variety of materials may be used for plate 5, glass was selected because of its low cost availability and it is apparent that the surface of the glass plate 5 will not be embossed or otherwise affected by the needle tips because of its natural high finish and hardness.

Although the embossed lines lend themselves to good resolution with the unaided eye, it is also possible to use the same comparator construction to permit the needle point to impress the coating without scribing and thus provide a transparent dot for comparative observation rather than using the groove method previously described. It is also apparent that the comparator may be positioned adjacent to the turntable for scribing with the tone arm instead of on the turntable.

In the event a more accurate determination of small degrees of needle wear is required, then the lower side of glass plate 5 may be shaped in the form of a cylindrical lens 15 (shown as dotted line Fig. 3) with its radius of curvature and the image distance made equal. This alternate construction will magnify the embossments to the advantage of the observer.

A contributing reason for the high resolving power of the above described comparator resides in the fact that spherical tipped needles wear flat on their lowest extremity due to contact with the bottom of the record groove and since the plate 5 is positioned substantially in the working position of the record, the lateral embossment on the surface of the plate is a true representation of the above mentioned "flat."

Having thus described my invention, I claim:

A comparator for indicating the wear on the point of the needle in a tone arm of a phonograph having a turntable comprising a flat platen means a portion of which is made of transparent glass and having a smooth planar upper surface, said upper surface coated with a thin layer of an opaque wax-like compound, there being a standard linear groove engraved through said layer by the spherical point of an unworn needle providing a transparent line at the bottom of said groove of prede-

termined width, means for registering said platen on said turntable when the latter is stationary so that said layer underlies the lateral movement of said needle in said tone-arm and said groove lies in the same direction but spaced from the actual path of said needle in lateral movement, whereby said tone arm needle may be tested by manually drawing said needle across the wax-like layer of said platen to produce a test groove, whereby the bottom width of said test groove when visually compared through said transparent glass with the bottom width of said standard groove will indicate the degree of wear of said tone arm needle.

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