July 14, 1953 W. MILLER ET AL 2,645,498

PICKUP ARM HAVING A ROTATABLE CARTRIDGE WITH TWO NEEDLES

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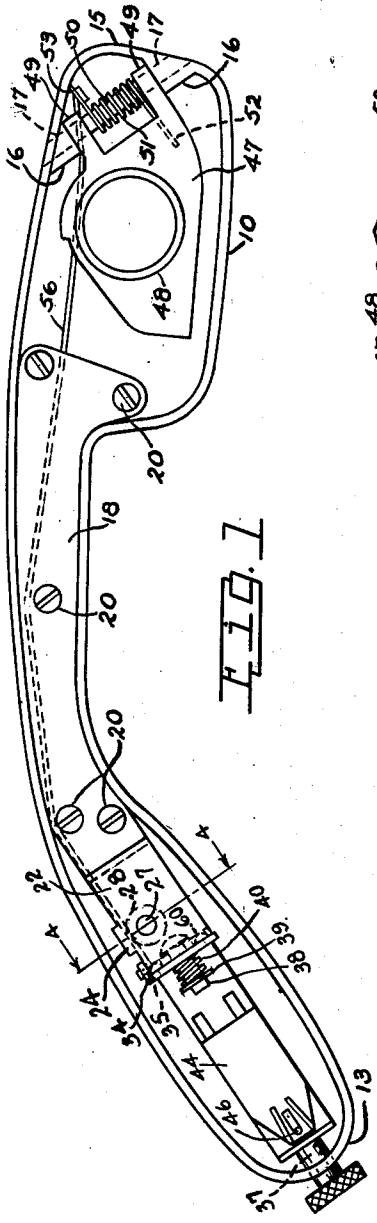


FIG. 1

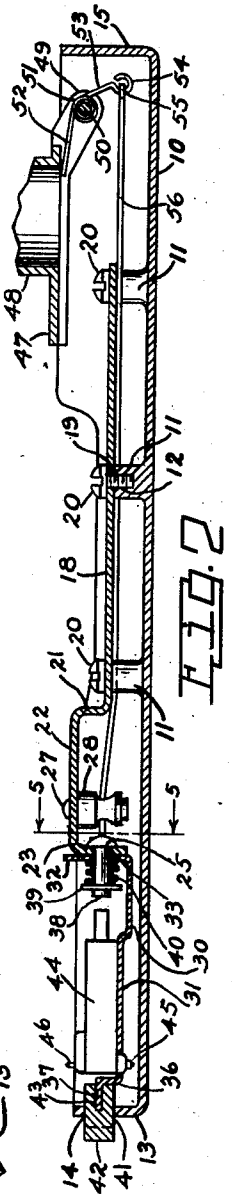


FIG. 2

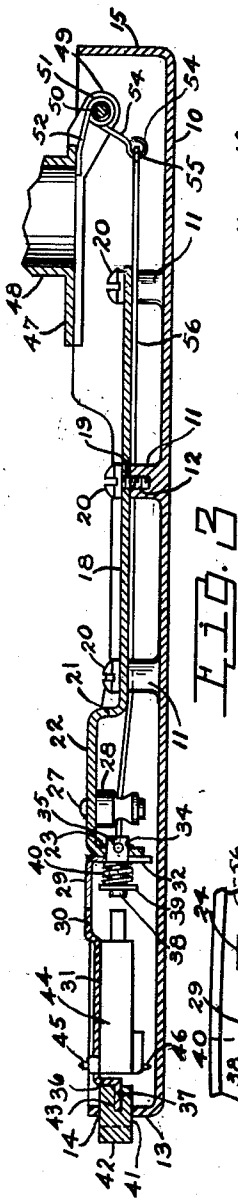


FIG. 3

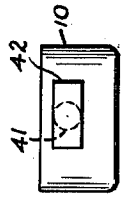


FIG. 8

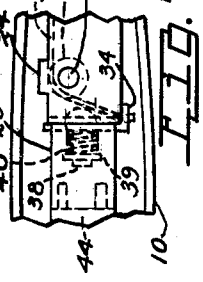


FIG. 7

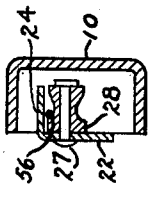


FIG. 4

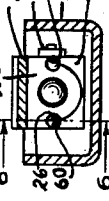


FIG. 5

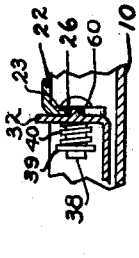


FIG. 6

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PICKUP ARM HAVING A ROTATABLE CARTRIDGE WITH TWO NEEDLES

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5 Claims. (Cl. 274—23)

1

The present invention relates to pick-up units in tone arms for use in playing records and particularly to a unit or cartridge having two needles, one for playing standard records and one for playing fine grooved records, the cartridge being adapted for rotation.

Records as produced to-day have a standard groove that requires a needle having an .003'' radius and an operating R. P. M. of 78, and a fine groove that requires a needle having an .001'' radius and having an operating R. P. M. of 33⅓.

The approximate needle pressure required on a standard record using an .003'' needle varies between 20 to 28 grams. The needle pressure required on a fine groove record using an .001'' needle requires about a 6 gram pressure.

It is an object of the present invention to provide a cartridge for tone arms having two sets of pick-ups or needles.

Another object of the present invention is the provision of a tone-arm having a cartridge with two pick-ups adapted for rotation in the tone-arm.

A still further object of the present invention is the provision in a tone arm for pivotally mounting a cartridge.

A still further object of the present invention is the provision of means on a cartridge for rotatively moving the cartridge.

A still further object of the present invention is the provision of means in the tone arm for regulating needle pressure.

A still further object of the present invention is the provision of means for holding a cartridge in place in either playing position.

A still further object of the present invention is the provision of means pivotally mounted and carrying resilient pressure means.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts as will be hereinafter more specifically described, claimed and illustrated in the accompanying drawing; in which:

Figure 1 is a bottom plan view of a tone arm and illustrating the cartridge and associated mechanism mounted therein.

Figure 2 is a longitudinal sectional view of Figure 1 showing the internal arrangement of parts, and the position of the tensioning spring for one of the needles in playing position.

Figure 3 is a view similar to Figure 2 and illustrating the position of the tensioning spring for the other of said needles in playing position, a portion of the cartridge supporting bracket being shown in full lines.

2

Figure 4 is a transverse sectional view taken on line 4—4 of Figure 1.

Figure 5 is a transverse sectional view taken on line 5—5 of Figure 2 and illustrating the holding or locking means for the cartridge.

Figure 6 is a vertical sectional view taken on line 6—6 of Figure 5.

Figure 7 is a fragmentary top plan view showing a portion of the cartridge and tensioning spring in a different position than that shown in Figure 1.

Figure 8 is an end elevational view of the tone arm illustrating the means for rotating the cartridge.

Referring to the drawing in detail wherein similar reference characters designate corresponding parts throughout the several views, the numeral 10 represents a tone arm housing having a plurality of lugs 11 that are integrally formed therewith, and each lug is provided with an internally threaded bore 12, the end 13 of the tone arm housing having an aperture 14, the end 15 of the tone arm having integrally formed bearings or sockets 16 having a bore 17.

Superposed upon the lugs 11 is a stiffener plate 18 having a plurality of apertures 19 that are in alignment with the bores 12. The plate 18 is securely held on the studs by screws 20, the portion 21 of the plate being bent at right angles providing a raised portion 22, the raised portion having a depending end portion 23, the bottom portion of which is semi-circular, and a depending side portions 24 that serves as a retaining and guide means. The depending portion 23 is provided with a central aperture 25 and two smaller openings 26 for a purpose to be later described. Mounted to the raised portion 22 by a pin 27 is a roller 28 that is adapted for rotative movement.

Mounted between the depending end portion 23 and the end 13 of the tone arm housing 10 is a plate 29 that is deformed, providing a portion 30 and an offset portion 31, one end 32 of the plate being bent at right angles to the portion 30 and provided with an aperture 33, detents or semi-circular raised elements 60, and a right angularly formed ear 34 having an aperture 35. The offset portion 31 is provided with a portion 36 that is bent at right angles thereto, and a portion 37 of reduced width that is bent at right angles to the portion 36. The plate 29 is supported at one end by a rivet 38 that engages the aperture 33 and the aperture 35, the rivet being

provided with a washer 39. Interposed between the inner face of the portion 32 and the washer 39 is a spring 40 that encompasses the rivet and assists in holding the portion 32 in locking engagement to the depending portion 23. The opposite end of plate 29 is supported by the shank 41 of a handle or knob 42, the shank having a groove 43 that is engaged by the portion 37.

Fixedly secured to the plate 29 by any suitable means is a pick-up cartridge 44 having a needle 45 of an .003" radius, and a needle 46 of an .001" radius. In the opposite end of the tone arm is a suspension plate 47 having a tubular portion 48 and a pair of arms 49 each having a bore. The element 47 is held in the tone arm housing by a pin 50. Interposed between the arms 49 and encompassing the pin 50 is a tortion spring 51, one end or leg 52 of the spring impinging the bottom face of the suspension plate 47, the opposite end 53 of the spring being provided with a loop 54. One end of cable 56 is connected to the loop 54, the cable extending to the flange 34 and having its end connected in aperture 35, the cable being trained around the roller 28 and held in engagement by the depending portion 24.

In the operation of the device the cartridge 44 carrying needles 45 and 46 being pivotally mounted may be rotated 180° by the knob 42 to select the desired needle to play a record. As shown in Figures 1 and 2 the needle 46 having an .001" radius is in position to play a fine groove record. The cable 56 that is guided around the roller 28 has the proper amount of pressure of 6 grams, the pressure being supplied by the tortion spring 51 through the arm 53 that is connected to the cable 56. In the position shown in Figures 1 and 2, the cartridge is held in playing position by the studs 60 that are in locking engagement with the apertures or openings 26 (as shown in Figures 5 and 6) in the depending element 23, the depending end 32 of plate 29 being assisted in locked engagement with the depending portion 23 by spring 40.

If it is desired to place needle 45 having an .003" radius in position to play a standard groove record the knob 42 is turned 180° clockwise at which point the studs 60 enter the openings 26. As shown in Figure 3 the needle 45 is in playing position, the cable during movement of the knob 42 and plate 29 is pulled forward by movement of plate 29 and flange 34 as shown by dotted lines in Figure 7, the arm 54 of the spring assuming the position as shown in Figure 3, the proper gram pressure between 20 and 28 through the floating element 47 to which end 52 of the spring is in engagement.

Obvious modifications in the form and arrangement of parts as illustrated may be made without departing from the spirit and scope of this invention, as defined in the appended claims.

What is claimed is:

1. In a sound reproducer an elongated pick-up arm mounted adjacent one end to move about a horizontal axis under the influence of gravity, restraining means mounted to move about the horizontal axis for yieldingly restraining the movement of said arm under the influence of gravity, diametrically opposed record engaging needles mounted in said arm remote from the supported end thereof for movement about an axis which intersects the horizontal axis into and out of record engaging position, and flexible means connected to the needles and to the restraining means for altering the effort of the restraining means on the arm as the needles are moved into and out of record engaging position.

2. In a sound reproducer an elongated pick-up arm mounted adjacent one end to move about a horizontal axis under the influence of gravity, restraining means mounted to move about the horizontal axis for yieldingly restraining the movement of said arm under the influence of gravity, a needle cartridge mounted in said arm remote from the horizontal axis for rotation about an axis which intersects and lies perpendicular to the horizontal axis, diametrically opposed needles carried by said cartridge and lying perpendicular to the perpendicular axis, and flexible means connected to the cartridge adjacent one side thereof and to the restraining means for altering the restraining effort of the restraining means on the pick-up arm as the cartridge is rotated about the perpendicular axis relative to the pick-up arm.

3. In a sound reproducer an elongated pick-up arm mounted adjacent one end to move about a horizontal axis under the influence of gravity, restraining means mounted to move about the horizontal axis for yieldingly restraining the movement of said arm under the influence of gravity, a needle cartridge mounted in said arm remote from the horizontal axis for rotation about an axis which intersects and lies perpendicular to the horizontal axis, diametrically opposed needles carried by said cartridge and lying perpendicular to the perpendicular axis, a guide roller carried by the pick-up arm adjacent the cartridge for rotation about an axis which lies to one side of and perpendicular to the perpendicular axis and a cable connected to the cartridge adjacent one side thereof and to the restraining means and contacting the periphery of the guide roller for altering the restraining effort of the restraining means on the pick-up arm as the cartridge is rotated about the perpendicular axis.

4. In a sound reproducer a suspension plate, a pick-up arm mounted on the suspension plate to move about a horizontal axis under the influence of gravity, a tortion spring encircling the horizontal axis, an arm carried by the tortion spring and engaging the suspension plate to arrest rotation of said spring about the horizontal axis, a restraining arm carried by the tortion spring for yieldingly restraining the movement of the pick-up arm under the influence of gravity, a needle cartridge mounted on the pick-up arm remote from the suspension plate for rotation about and longitudinal movement along an axis which lies perpendicular to the horizontal axis, record engaging needles carried by and projecting outwardly from opposite sides of the needle cartridge, detents carried by the needle cartridge on opposite sides of the perpendicular axis and cooperating with the pick-up arm in holding one or the other needle in record engaging position, a guide roller carried by the pick-up arm to one side of the perpendicular axis and adjacent the needle cartridge, and a flexible member connected to the restraining arm and to the needle cartridge on one side of the perpendicular axis for altering the effort of the restraining arm on the pick-up arm as the needle cartridge is rotated about the perpendicular axis and a needle is moved into record engaging position.

5. The structure defined in claim 3 in which a shank is carried by the needle cartridge and projects longitudinally from the pick-up arm, and a knob is carried by the shank remote from

the pick-up arm for rotating the shank and the needle cartridge about the perpendicular axis.

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