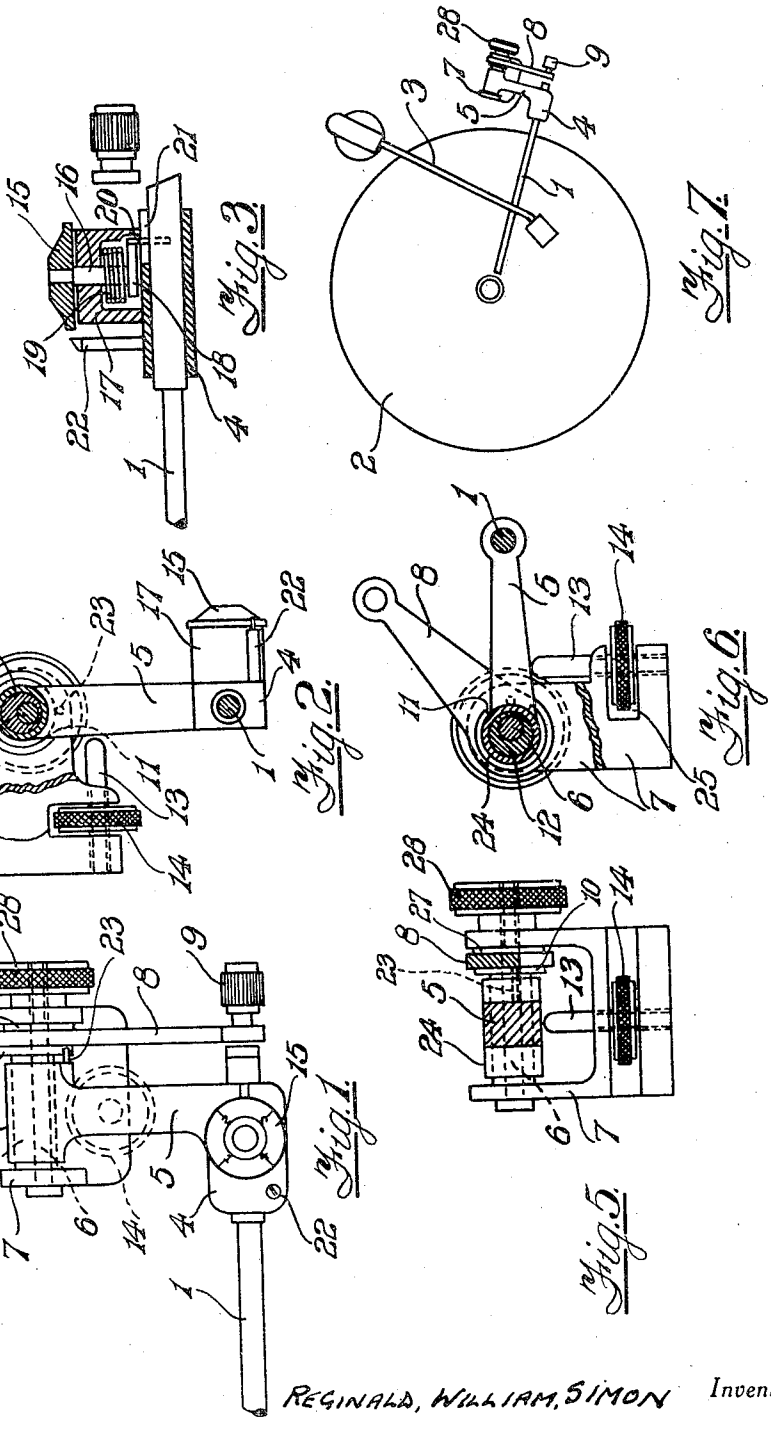
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TONE ARM CONTROL DEVICE

Filed June 4, 1947 2 Sheets-Sheet 1



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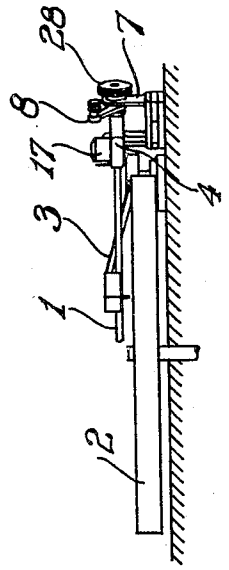


Fig. 8.

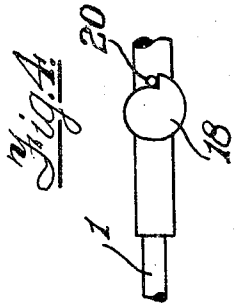


Fig. 4.

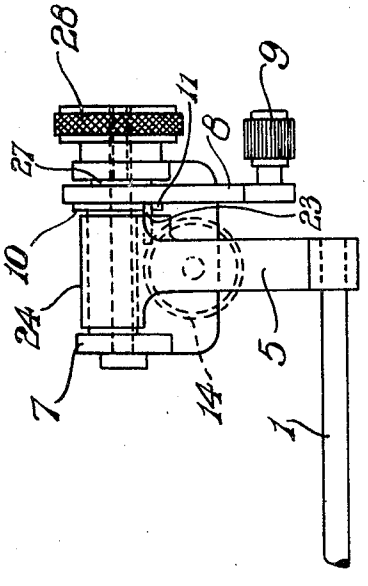


Fig. 9.

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TONE ARM CONTROL DEVICE

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In Great Britain January 17, 1946

4 Claims. (Cl. 274—1)

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This invention relates to gramophone pick-up devices and has for its object to provide an improved construction or arrangement designed to facilitate the accurate placing of a needle in the required position on a record and to prevent damage to a record and a needle by the too rapid lowering of the pick-up arm into operative position.

According to the invention a device for controlling the position of a gramophone pick-up arm comprises an arm or plate situated below the pick-up arm between the pick-up pedestal and the needle the said arm or plate being movable vertically about a horizontal spindle whereby the pick-up arm may rest upon it while being lowered into operative position and the arm or plate thereafter moved lower and off contact with the pick-up arm until at the conclusion of a period of operation, the said arm or plate is lifted to lift the pick-up arm and needle from the record.

According to the preferred form of the invention a device for controlling the position of a gramophone pick-up arm comprises a horizontal element carried by a pivoted component movable about a horizontal spindle, the said horizontal element constituting a support for the pick-up arm while the needle is being positioned relatively to a record and a hand operated eccentric device adapted to be operated thereafter to enable said element to be given a slight lowering movement to bring the needle into engagement with the record.

Reference will now be made to the accompanying drawings which show a construction according to the invention and in which—

Fig. 1 is a plan of the device,

Fig. 2 is an end elevation,

Fig. 3 is a sectional elevation of the axial adjusting means,

Fig. 4 is a fragmentary plan showing the cam used in the device shown in Fig. 3,

Fig. 5 is a sectional elevation of the device,

Fig. 6 is a cross sectional elevation,

Fig. 7 is a plan view showing the application of the invention to a gramophone pick-up arm,

Fig. 8 is an elevation of Figure 7, and

Fig. 9 is a plan view similar to Fig. 1 showing an alternative form of the invention.

In the construction illustrated a movable rod 1 is arranged, when operative, to extend in a radial direction across and above a record 2 as shown in Figs. 7 and 8. The rod 1 acts as a support for the pick-up arm 3 which is free to move radially whilst resting upon the rod 1. The rod 1 is carried in a sleeve or socket 4 mounted at the

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outer end of an arm 5 movable around a horizontal spindle 6 whose ends are carried in a supporting framework 7 which constitutes a fixed support for all the component parts of the invention.

Mounted co-axially with the arm 5 is an operating lever 8 provided with a handle 9, this lever being formed integral with a disc 10 having a peripheral arcuate recess 11 in which engages a pin 23 projecting laterally from the arm 5.

The lever 8 is mounted upon an eccentric sheave 12 disposed within a sleeve 24 formed integral with the arm 5. Adjacent the end 26 of the lever 8 which surrounds the spindle 6 is a disc or washer 27 which acts as a clutch member and is caused to bind more or less on the part 26 by operating a knurled disc 28 which is screw-threaded on the spindle 6, the purpose of this arrangement being to brake the lever 8 according to the type and weight of the pick-up arm to which the invention is applied.

The lowermost position of the arm 5 and sleeve 4 is determined by an adjustable stop device consisting of a screw-threaded stem 13 whose upper end is arranged to bear upon the the lower edge of the arm 5 and which is rotatably mounted in the supporting framework 7. A milled edged wheel 14 surrounds and engages the stem 13, part of this wheel projecting through a slot 25 in the framework 7 to facilitate manual adjustment. This adjustment is effected according to the thickness of each record but once effected does not need to be varied so long as records of a uniform type continue to be played.

In the operation of the devices above described, the arm 5 and rod 1 are lowered about the spindle 6, the rod occupying a position substantially as shown in Fig. 7 and the pick-up arm 3 is caused to rest upon the rod whose position is such that the needle is held slightly above the surface of the record. The fine adjustment necessary to bring the needle into operative position is then effected by lowering the operating handle 8—9 which, owing to the pin 23 and recess 11, can move through an arc independently of the arm 5. This arcuate movement imparts rotational movement to the eccentric sheave 12 whose movement shifts the centre about which the arm 5 pivots. During this movement the under edge of the arm 5 slides on the stop pin 13 and being a tapered arm its outer end is thereby slightly lowered taking with it the rod 1 which is moved gently from beneath the pick-up arm 3 to allow the needle to come gradually into operative engagement with the record.

When the period of operation has been completed, upward movement applied to the handle arm 8—9 will lift the rod 1 sufficiently to engage beneath the pick-up arm to lift it and remove the needle from engagement with the record. Further movement applied to the handle arm 8—9 will cause the pin 23 to engage one end of the recess 11 and lift the arm 5 and rod 1 to an upper and completely inoperative position.

To enable fine mechanical control of the lateral movement of the pick-up arm to be effected and to facilitate the positioning of the needle relative to the desired position of the sound track of the record an additional device may be included in the structure. This device includes a rotatable nut or knob 15 mounted on a pin 16 carried in a cylindrical extension 17 of the sleeve 4. Within the extension 17, the pin 16 carries a cam 18 and is rotatable in one direction to an extent determined by a spring 19 which returns the knob 15 subsequently to a zero position. The cam 18 bears against a stud 20 projecting upwards from the rod 1 through a slot 21 in the sleeve 4 and as the cam is rotated it bears against the stud 20 and causes axial movement of the rod 1. The knob 15 is provided with graduations which in cooperation with a fixed pointer 22 enable the desired degree of adjustment of the rod 1 to be effected. The shape of the cam is shown in Figure 4 and when zeroised by the action of the spring 19. The rod 1 is left in the adjusted position until depression of the handle 9 brings it into contact with the end of rod 1 projecting beyond the sleeve 4 and pushes the rod back to its initial position. To facilitate this operation the end of the rod 1 is chamfered. With this arrangement it is possible to return to pre-selected position and for the needle to be lowered into the required groove of the sound track for the replaying of a given passage or part of a record. To facilitate these operations the rod 1 may be graduated.

The means above described for axial adjustment of the rod 1 do not constitute an essential feature of the invention and in Figure 1 a device is shown similar in all respects to that shown in Figs. 1–6 but without the axial adjustment device.

Where even greater accuracy in location of the groove in a record is required than is provided by the devices above described, a clamp may be fitted to the turntable spigot having a pin thereon rotating on its own axis and which is arranged to engage the rod 1 when this rod is free of the pick-up arm. When the pick-up arm is lifted free of the record, the pin is simultaneously dissengaged and thus provides an indication of where disengagement was made and also provides a more accurate means of location for use in replacing the pick-up arm and needle in operative position.

I claim:

1. In a device for controlling the lowering movement of a phonograph tone arm into playing position and having the ability substantially to lower the tone arm needle for playing and thereafter permit the needle to be gradually moved into actual playing relationship with a record on the phonograph turntable, a frame structure, a horizontal spindle on said frame structure, an arm rotatably mounted at one end upon said spindle, an elongated rod member on the other end of said arm, said rod being adapted to extend substantially radially above the phonograph turntable in position to intersect the tone arm, when in its playing position, at a point intermediate its needle end and its pivotal axis, relatively coarse adjustment means engageable with said arm and adjustable to vary the angular position of the arm with respect to said horizontal spindle and hence the proximity of said rod to the phonograph turntable, and an eccentric means operatively associated with said arm and adapted to effect a precision lowering movement of said arm to remove the said rod gently from beneath the tone arm and thereby allow the needle to enter gradually into playing contact with the record, said eccentric means comprising an operating lever, an eccentric sleeve on said spindle, said arm being mounted upon said eccentric sleeve, and an operative connection between the sleeve and the said operating lever adapted in one direction of movement of the lever to impart movement to the said sleeve to shift the center of said spindle to an extent and in such manner as gradually lowers the rod on said arm from beneath the tone arm to allow the needle to engage a record.

2. The invention as defined in claim 1, said rod being mounted for axial reciprocation upon said arm, adjustment means operatively associated with said rod to move the rod axially in one direction, said adjustment means comprising a cam, mounting means rotatably supporting said cam adjacent said rod, a projection on said rod adapted for engagement with said cam to impart axial movement to said rod when the cam is adjusted in one direction of rotation, and resilient means incorporated in said mounting means adapted to restore said cam to a zero position.

3. The invention as defined in claim 1, said arm having a tapered surface and said relatively coarse adjustment means comprising a vertical adjustable spindle positioned to engage said tapered surface, said surface tapering off from the pivoted end of the arm to the end thereof on which the said rod is carried.

4. In a device as claimed in claim 1, a pin and slot connection between said eccentric means and said arm adapted in one direction of movement of said eccentric means to effect said gradual rod lowering movement and in the opposite direction of movement to raise the said rod into position to lift the tone arm needle from the record.

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