Sept. 9, 1947. H. V. ALEXANDERSSON 2,426,978

RECORD CHANGER FOR PHONOGRAPHS

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FIG. 1.

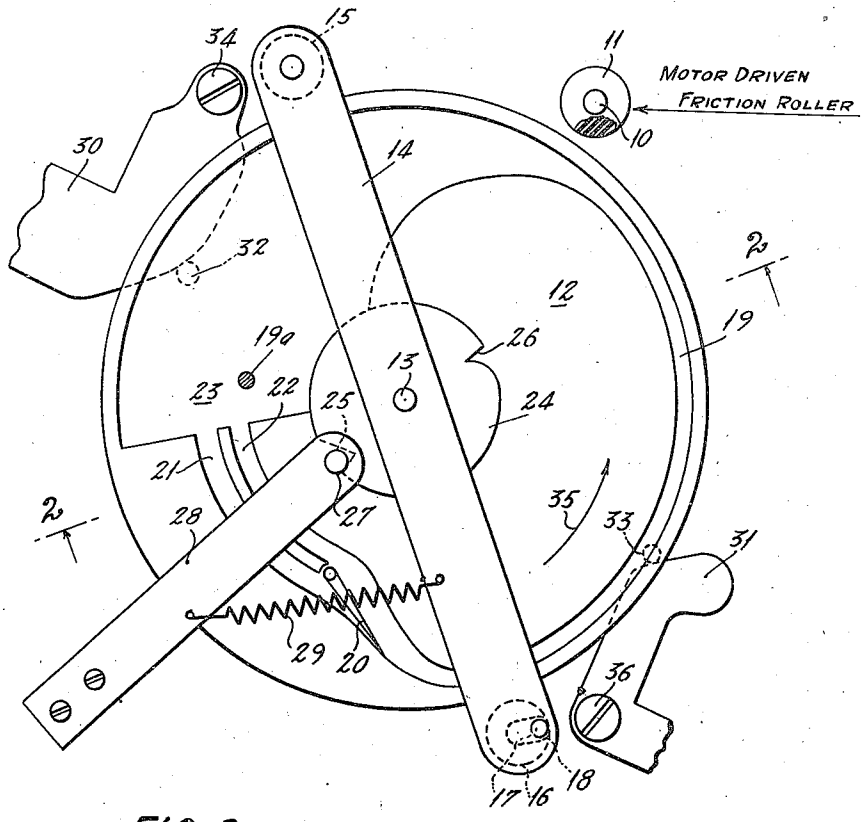
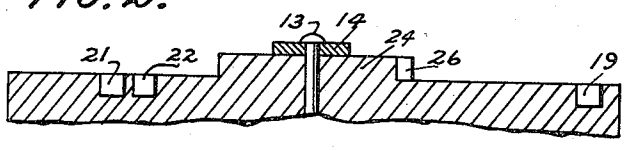


FIG. 2.



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RECORD CHANGER FOR PHONOGRAPHS

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My invention relates to record changers for phonographs.

Devices of this type commonly involve an actuating disc which is effective, usually by means of cam surfaces, to cause the sequential movements of the various members necessary in a record changing operation. This includes the lifting and outward pivoting of the pickup arm, the feeding of the next record onto the turntable, and the lowering of the pickup arm. These operations take place of course only during a record change and hence means must be provided for driving the cam disc only when a record change is desired, the disc remaining inactive during reproduction of the record. Inasmuch as it is highly desirable to drive the cam disc from the constantly running motor which drives the turntable, some type of releasable coupling is required between this motor and the disc.

In accordance with my invention there is provided a friction roller rotatably driven about a fixed axis by the turntable motor, and an actuating cam disc rotatably supported on a laterally shiftable axis so that the periphery of the disc may be brought into and out of frictional engagement with the roller. Due to the fact that the friction roller is mounted on a fixed axis, no complications are involved in the drive between the motor and this roller, as is the case when the axis of the roller is shifted in order to bring it into driving contact with the disc. Inasmuch as the cam disc cooperates only with cam follower means which are out of contact with the cam surface on the disc at the time the disc is shifted laterally, no difficulties are involved in such shifting.

Another advantage of the construction in accordance with the present invention resides in the fact that, once the cam disc has been moved out of engagement with the friction roller, continued rotation of the disc due to its inertia cannot possibly cause it to reengage the roller, which would result in repeating the record change before even the beginning of the reproduction of the new record, which possibility is present in the well-known record changing apparatus having a notch in the periphery of the cam disc in which the driving roller may freely rotate out of engagement with the disc, the driving connection being effected by imparting a slight rotation to the disc sufficient to bring the un-notched periphery thereof into contact with the friction roller.

Consequently, with the construction in accordance with the present invention, the inertia of the cam disc and parts moved thereby may be

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disregarded and hence the disc may be rotated more rapidly to thus effect a quicker record change. Moreover, it is possible to provide mechanism for interrupting the record change cycle, so as to provide a pause between records, which will operate with certainty, as there is no possibility of continued rotation of the disc due to inertia causing it to reengage the friction roller and complete the cycle when an interruption is desired.

Further objects and advantages of my invention will be apparent from the following description considered in connection with the accompanying drawing, of which:

Fig. 1 is a top view of a device embodying my invention; and

Fig. 2 is a cross-sectional view taken on the line 2—2 of Fig. 1.

Referring to the drawing, reference character 11 designates a rubber roller which is mounted on the shaft 10 of the turntable, driven by the phonograph motor, which shaft rotates about a fixed axis. This roller cooperates with the cam disc 12, which is, however, in the position shown in the drawing out of contact with the rubber roller. The cam disc is turnable about a shaft 13, supported by a bar 14, which is in turn rotatable on a stud 15, which is fixed to the chassis plate of the device. On the other side of the cam disc 12 the bar 14 is carried by a similar stud 16 having a lower portion 17 of reduced diameter. The portion 17 moves in a slot 18 in the chassis plate, so that the bar 14 and hence also the cam disc 12 may be swung clockwise or counter-clockwise a small angle about the stud 15. This angle is so dimensioned that the disc 12 is in good contact with the friction roller 11 in one of its end positions but fully out of contact with the friction roller 11 in its other position.

The cam disc 12 is provided with grooves, which cause the above mentioned functions in connection with the changing of records. One such groove 19 is shown in the drawing. The groove 19, by means of a switch lever 20, may be caused to communicate with one of the grooves 21 and 22, which open in an enlarged part 23. This groove construction is intended for the swing out and swing in of the pick-up arm during the course of record changing. Dependent upon the size of the record just changed, a pin 19a carried by the pick up arm and cooperating with the groove 19, is led into either the groove part 21 or the groove part 22. During the reproduction the cam disc 12 is stationary and the pin

19a moves radially in the enlarged part 23 as the pick up arm is swung inwardly.

However, the cam disc 12 is provided with a second cam part 24, elevated above the level of the disc, which cam part preferably is circular with the exception of two diametrically opposite saw-tooth shaped recesses 25 and 26. These recesses co-operate with a pin 27, extending from an arm 28, which is rigidly connected to the chassis. A spring 29 is connected between arm 28 and bar 14, so that the bar is forced in clockwise direction about the stud 15. Consequently, the spring 29 attempts to move the cam disc 12 out of contact with its driving roller 11.

The arrangements for starting the cam disc may be of different kinds. In the construction shown in the drawing means are provided for giving the cam disc an impulse for turning it in the direction of the arrow 35.

Further it is assumed that the arrangement is of such a kind that it has its normal position of rest during the playing off, but that it may also get a diametrically opposite intermittent position of rest during the record changing, and that the time during which the arrangement has the last mentioned intermittent position of rest may be prolongated at will, that is, there may be introduced a controllable pause during the record changing. Also the arrangement will stop in the intermittent position of rest after the last record of a stack has been reproduced. In this intermediate position the pick-up arm is swung to its outermost position.

For starting the cam disc from its normal position of rest which it occupies during reproduction, a lever 30 is arranged, a second lever 31 being arranged for the starting of the cam disc after it has occupied its intermittent position of rest. The lever 30 co-operates with a pin 32, and the lever 31 co-operates with a pin 33, these two pins being arranged on the cam disc.

The arrangement functions in the following way: It is assumed that a record has been fully reproduced and that a record changing operation should be started. By means which form no part of the present invention the lever 30 is given a turning movement in counter-clockwise direction about the stud 34, the lever thereby engaging the pin 32, so that the cam disc 12 is turned a small angle in the direction of the arrow 35. Due to the co-operation between the pin 27 and the recess 25, however, the bar 14 and the cam disc 12 will simultaneously be swung about the stud 15, so that the periphery of the cam disc 12 comes into contact with the friction roller 11. This contact is thereafter maintained during a half revolution due to the pin 27 contacting the circular periphery of the cam surface 24. It is assumed that during said half revolution of the cam disc the pick-up arm is elevated from the record just reproduced and swung out to a position radially beyond the turntable. It is immaterial to the present invention whether the next record to be played is deposited on the turntable during this first half revolution, or during the second half revolution to be presently described. After the said functions have been fulfilled, however, the recess 26 will co-operate with the pin 27. The recess 26 approaches the pin 27 with its radial edge, so that the cam disc 12 and the bar 14 will be thrown back into their positions shown in the drawing, as the pin 27 will prevent the arrangement from further movement by co-operation with the recess 26, in which the pin contacts the inclined edge. In this way an especially exact indexing of the angular position of the cam disc 12 is obtained, and also the disc is rapidly moved away from the friction roller 11.

By means which form no part of the present invention, after a suitable pause, the cam disc is caused to leave its intermittent position of rest, in which the recess 26 cooperates with the pin 27. This is accomplished by the lever 31 turning in a counter-clockwise direction about the stud 36 so as to strike the pin 32 and thus turn the cam disc sufficiently to move the pin 27 out of the groove 26, so that the latter rides on the circular part of the cam 24 during the next half revolution. In the same manner as just described the periphery of the cam disc 12 will then co-operate with the friction roller 11, so that the cam disc is turned the remaining half revolution.

Over the above mentioned advantages of less consumption of power for the driving motor and greater security against unintentional continuation of the rotation of the cam disc past one of the positions of rest there is gained by the invention, that the rubber covering of the friction roller 11 is better protected. In the earlier arrangement with recesses in the periphery of the cam disc these recesses were limited by sharp edges, and when the cam disc was given an impulse for movement, so that the friction roller was caused to ride up on the periphery of the cam disc, the friction roller first contacted such sharp edge, whereby the rubber covering of the friction roller was usually damaged. It has proved that after a short time the rubber surface was made rough, whereby the rubber was gradually torn to pieces. In the present construction, however, the friction roller 11 contacts only an even surface.

Of course, the invention is not limited to the form of execution shown in the drawing and described in detail in the specification, but modifications of the invention may be made without deviating from the frame of the invention. For instance instead of the starting arrangement 30—32 or 31—33 shown in the drawing for giving the impulse necessary for starting the disc 12 the free end of the bar 14 may be moved counter-clockwise, whereby the first impulse of movement of the disc will be directly obtained from the friction roller 11.

What is claimed:

1. In an automatic record changer, a cam disc for moving the pick-up arm, a movably mounted member, means for rotatably mounting said disc on said member, a friction roller normally spaced a short distance from the periphery of said disc, and means for moving said disc and said member to bring the disc into and out of frictional engagement with said roller.

2. In an automatic record changer, a cam disc for moving the pick-up arm, a movably mounted member, means for rotatably mounting said disc on said member, a friction roller normally spaced a short distance from the periphery of said disc, a fixed element, and a cam fixed with respect to said disc and having an eccentric portion cooperating with said element during rotation of the disc and cam to move said disc and said member to bring the disc into and out of frictional engagement with said roller.

3. In an automatic record changer a cam disc for moving the pick-up arm, a movably mounted member, means for rotatably mounting said disc on said member, a friction roller normally spaced a short distance from the periphery of said disc, a

cam surface on said disc, and a fixed element cooperating with said cam surface, the contour of said cam surface comprising a concentric portion and recessed portion whereby said element moves said disc and said member to bring the disc into frictional engagement with said roller when the cam surface is turned so that said element cooperates with said concentric portion.

4. In an automatic record changer, a cam disc for moving the pick-up arm, a bar extending across said disc, means for pivotally mounting said bar radially beyond said disc, means for rotatably mounting said disc on said bar, a friction roller normally spaced a short distance from the periphery of said disc, and means for moving said disc and said bar to bring the disc into and out of frictional engagement with said roller.

5. In an automatic record changer, a cam disc for moving the pick-up arm, a bar extending across said disc, means for pivotally mounting one end of said bar radially beyond said disc, pin-and-slot means at the other end of said bar for limiting pivotal movement of the bar, means for rotatably mounting said disc on said bar, a friction roller normally spaced on short distance from the periphery of said disc, and means for moving said disc and bar to bring the disc into and out of frictional engagement with said roller.

6. In an automatic record changer, a cam disc for moving the pick-up arm, a bar extending across said disc, means for pivotally mounting said bar radially beyond said disc, means for rotatably mounting said disc on said bar, a friction roller normally spaced a short distance from the periphery of said disc, a fixed element, a cam fixed with respect to said disc and having an eccentric portion cooperating with said element during rotation of the disc and cam to move said disc and said bar to bring the disc into frictional engagement with said roller, and resilient means acting on said bar for moving said cam disc out of engagement with said roller.

7. In an automatic record changer, a cam disc for moving the pick-up arm, a movably mounted member, means for rotatably mounting said disc on said member, a friction roller normally spaced a short distance from the periphery of said disc, a cam surface on said disc, a fixed element cooperating with said cam surface, the contour of said cam surface comprising a concentric portion and a recessed portion, whereby said element moves said disc and said member to bring the disc into frictional engagement with said roller when the cam surface is turned so that said element cooperates with said concentric portion, and means other than said roller for imparting a turning impulse to said cam disc to turn said cam surface sufficiently to bring said element out of said recessed portion and into cooperation with said concentric portion.

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