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INTERMISSION DEVICE FOR AUTOMATIC PHONOGRAPHS

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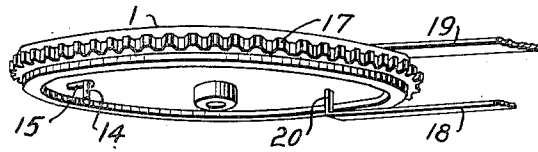


Fig. 3.

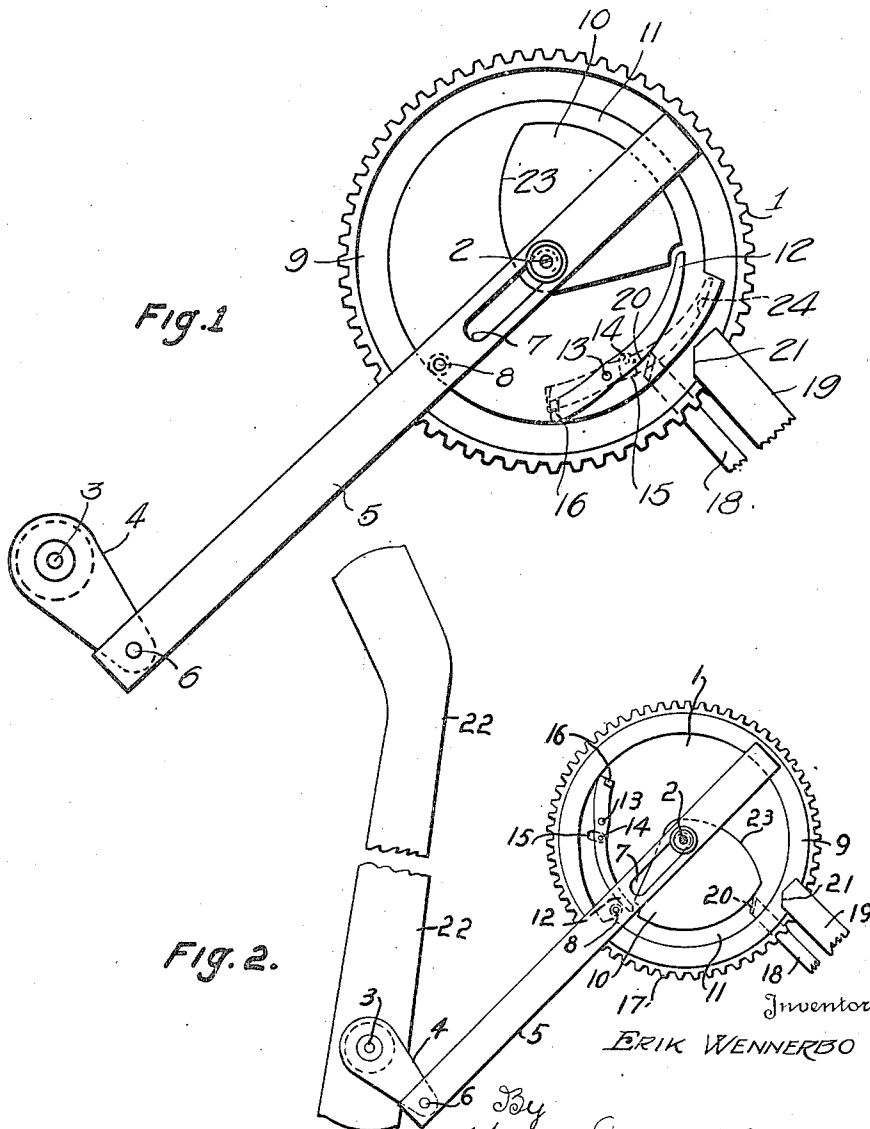


Fig. 1

Fig. 2.

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INTERMISSION DEVICE FOR AUTOMATIC
PHONOGRAPHSErik Wennerbo, Motala, Sweden, assignor to In-
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3 Claims. (Cl. 274-10)

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The present invention relates to phonographs which are adapted for automatic change of records.

Phonographs of this kind are provided with a tone arm mechanism which, when a record has been played, raises the tone arm from the record and swings it outwards clear of the record. Then the record changing mechanism places a new record on the turntable and the tone arm mechanism swings the tone arm inwards over the edge of the new record and lowers it until the reproducing needle engages in the initial groove of this record after which the playing of the new record is started.

Such phonographs are often provided with means for repeating the playing of the same record one or more times and also with means for prolonging at will the interval between successive playings, the last mentioned means being referred to as delay means.

When the repeating mechanism is in action the record changing mechanism is inactive whereas the tone arm mechanism is allowed to work. Thus, no new record will be placed upon the turntable between successive playings, but the tone arm will be swung outwards and returned inwards and lowered into the initial groove of the record just played whereupon a new playing of the same record is started.

When the delay means is caused to function the record changing mechanism as well as the tone arm mechanism are put out of action during as long a period as it is contemplated to prolong the interval between successive playings.

Phonographs of the above-mentioned type are usually provided with a cam disc having a plurality of cam surfaces coacting with cam followers which are adapted to control the movements of the record changing mechanism as well as those of the tone arm mechanism.

When the repeating mechanism is caused to function the transfer of motion from the cam disc to the record changing means is interrupted.

When, in constructions hitherto known, the delay means is caused to function this has the effect of arresting the cam disc during as long a period as it is contemplated to prolong the interval between successive playings. In this connection it is necessary to provide a counter mechanism of some kind which is automatically put in action when the cam disc is arrested and which causes the latter to be re-started at the end of the delay period.

This counter must be arranged so as to be driven by some part of the phonograph which is still

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moving when the cam disc is at rest. The fact that the counter cannot be driven from the cam disc is a disadvantage inasmuch as the mechanism will be de-centralized, which leads to a more complicated construction.

Therefore it has already been proposed to arrange the record changing mechanism in such a way that it will be disengaged from the cam disc during the delay period so that the cam disc may rotate during that period. It is then possible to arrange the counter so that the same is driven by a cam surface provided on the cam discs which leads to a simplification of the construction.

However, due to the rotation of the cam disc during the delay period the tone arm is caused to carry out its normal movements as at a normal change of records during said period, i. e. it is moved outwards and returned inwards over the record without engaging the same.

This is a disadvantage which is eliminated according to the following invention.

According to the invention the cam follower which controls the swinging movements of the tone arm mechanism is capable of moving along two different cam paths on the cam disc, one of which is so shaped that when the cam follower runs in the same the tone arm will perform its normal movements, i. e. it will be swung inwards over the initial groove of the record and after the playing of the record it will be returned outwards to a position at the side of the turntable, whereas when the cam follower runs in the other cam path the tone arm will remain in its last-mentioned swung-out position, a switch member being provided for guiding the cam follower into one of said cam paths or the other.

The invention will be fully described herein-after with reference to the accompanying drawing which illustrates a preferred form of the cam mechanism for controlling the movements of the tone arm.

Referring now to the drawing, Figure 1 is a plan view of the mechanism, Figure 2 is a plan view of the mechanism with the parts in another position, and Figure 3 is a perspective view of the cam disc, and its associated elements.

In the drawing 1 designates a cam disc having a toothed rim 17 which meshes with a pinion for rotating the cam disc when a record has been played. The cam disc 1 is rotatably mounted on a shaft 2. A tone arm, not shown, is carried by a shaft 3. The shaft 3 is connected to an arm 4 which is linked with a rod 5 by means of a stud 6. The rod 5 has a slot 7 through which the shaft 2 extends and is also provided with a

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pin 8 adapted to coast with cam surfaces on the cam disc 1. The cam disc 1 has an outer concentric flange 9 having an inner surface concentric throughout most of its periphery and an elevated cam member 10. Between the cam member 10 and the flange 9 a groove 11 is formed, as shown. A switch blade 12 is arranged so as to turn about a pin 13 carried by the disc 1. Another pin 14 is attached to the switch blade 12 and extends downwardly through a slot 15 in the cam disc 1. The switch blade 12 is furthermore provided with an up-turned lug 16. Two control members 18 and 19 are arranged for actuating the switch blade 12. The rod 18 is located on the under-side of the disc 1 and has an up-turned inclined edge 20 which may come into engagement with the pin 14. The rod 19 is provided with a bevelled surface 21 which may come into engagement with the lug 16 of the switch blade.

When a record has been played on the phonograph the shaft 3 has been turned by the tone arm 22 in an anti-clockwise direction, this having caused the rod 5 to be moved to the right from the position shown in the drawing so that the pin 8 takes a position near to the centre of the cam disc 1. The cam disc 1 is now set in rotation in an anti-clockwise direction in a manner known per se. When the cam disc 1 rotates, the edge 23 of the cam member 10 comes into contact with the pin 8 and moves the same outwards to the position shown in the figure. This has the effect of swinging the tone arm outwards clear of the played record. (It is supposed that the tone arm has first been raised from the record in a known way). Then the pin 8 runs in the groove 11. During this period the tone arm does not move. When during the revolution of the cam disc the groove 11 leaves the pin 8 the latter will come into contact with the switch blade 12 which is supposed to take the position indicated by dotted lines and designated by the numeral 24. The pin 8 is now moved inwards by the switch blade 12 such a distance that the reproducing needle of the tone arm will be above the edge of a new record which has meanwhile been placed upon the turntable.

If a prolongation of the interval between successive playings is desired the control rod 18 is moved radially inwards by the delay mechanism so that the edge 20 of said control rod each time when the pin 14 passes the same actuates the pin and turns the switch blade 12 from the dotted, or active, position to the position shown in full lines (the inactive position). In this last-mentioned position of the switch blade no inward movement of the tone arm will occur since the pin 8 will pass between the switch blade and the flange 9.

Each time when the switch blade 12 passes the pin 8 the blade, owing to the shown shape of the rear part thereof, is moved back to the active position 24 shown in dotted lines. The pin 8 passes between the flange 9 and the rear part of the blade 12, pushing the said rear part inwardly.

However, before coming into engagement with the pin 8 the next time the switch blade 12 has again been shifted by the control rod 18. Thus, as long as the rod 18 takes such a position that the edge 20 thereof will actuate the pin 14 no inward movement of the tone arm will occur. When the delay period is at an end the rod 18 is drawn back from its active position so that at the next revolution of the cam disc 1

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no shifting of the switch blade 12 will occur but the same will remain in its dotted position causing an inward swinging movement of the tone arm. The inclined surface 21 actuates to push the lug 16 inwardly as the lug 16 passes the rod 19 after the latter has been moved to its inward position.

If the control rod 19 is moved inwards to such a position that it will actuate the lug 16 of the switch blade 12 during the revolution of the cam disc the switch blade will be moved to the active position 24 after having first been moved to the inactive position by the control rod 18. As will be seen from the drawing the actuation of the switch blade 12 by the control rod 19 will take place later than the actuation of the switch blade 12 by the control rod 18, the latter having previously acted on the pin 14. The control rod 19 is moved to its active position when the phonograph is adjusted for repetition and has the effect of temporarily neutralizing the action of the control rod 18.

In phonographs of the above-mentioned kind the cam disc 1 controlling the record changing mechanism usually makes one revolution during each record changing operation. In the constructions hitherto known the tone arm takes a position above the turntable at the beginning and at the end of each such revolution. An automatic stopping device adapted to stop the phonograph when all records have been played is usually arranged in such a way that it stops the phonograph during that part of a revolution of the cam disc when the tone arm is in its swung-out position.

Thus, the cam disc has two positions of rest, one corresponding to the playing of a record and another corresponding to the non-playing of the phonograph. According to the present invention it is possible to restrict these positions of rest of the cam disc 1 to a single one. To this end the stopping device may be arranged so as to move the switch blade 12 from its active dotted position 24 to the inactive position shown in full lines. The tone arm then remains in the swung-out position in spite of the cam disc 1 making a complete revolution, and the phonograph can be stopped with the cam disc in its normal position of rest and with the tone arm in the swung-out position.

What I claim is:

1. In a magazine phonograph provided with an automatic record changing mechanism for playing a series of records in succession, a tone arm controlling mechanism comprising a rotatable cam member adapted to be set in rotation after the playing of a record and provided with a cam surface, a rod connected to the tone arm and having a cam follower projecting into the path of the cam member to coast with said cam surface for controlling the outward swinging movement of the tone arm, a switch blade pivotally mounted on said cam member and assuming an inactive position ineffective on the cam follower and an active position causing the cam follower to move inwards on the cam member along an inner surface of said switch blade, and a control member projecting adjacent the cam member movable into the path of movement of said switch blade for shifting the same to said inactive position once during each revolution of the cam member, the switch blade being in the form of a two-armed pivoted lever of which one arm when in the path of the cam follower, is actuated by the latter in the inactive position

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of the switch blade, to shift the switch blade back to its active position.

2. In a magazine phonograph according to claim 1, in which a second control member is provided adjacent the cam member to be moved into the path of movement of the switch blade for shifting the same back to its active position once during each revolution of the cam member after said switch blade has first been moved to its inactive position by the first mentioned control member but before the switch blade has been able to actuate the cam follower.

3. In a mechanism for controlling the swinging movements of the tonearm of automatic phonographs, a cam follower operatively connected to said tonearm, a rotatable cam member cooperating with the follower and adapted to be set in rotation after the playing of a record and provided with a cam surface for coaction with said cam follower, and a switch blade provided on said cam member spaced from said cam surface, said switch blade being capable of assuming an inactive position ineffective on the

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cam follower, and movable to an active position in which the switch blade forms an inwardly extending eccentric cam surface, whereby the cam follower is caused by the switch blade to move inwards on the cam member along the inner surface of said switch blade, the switch blade being in the form of a two-armed pivoted lever of which one arm when in the path of the cam follower is actuated by the latter in the inactive position of the switch blade, to shift the switch blade back to its active position.

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