Jan. 27, 1942. H. J. FORTUNE 2,271,001

RECORD CHANGING APPARATUS FOR PHONOGRAPHS AND THE LIKE

Filed Dec. 18, 1939 2 Sheets-Sheet 1

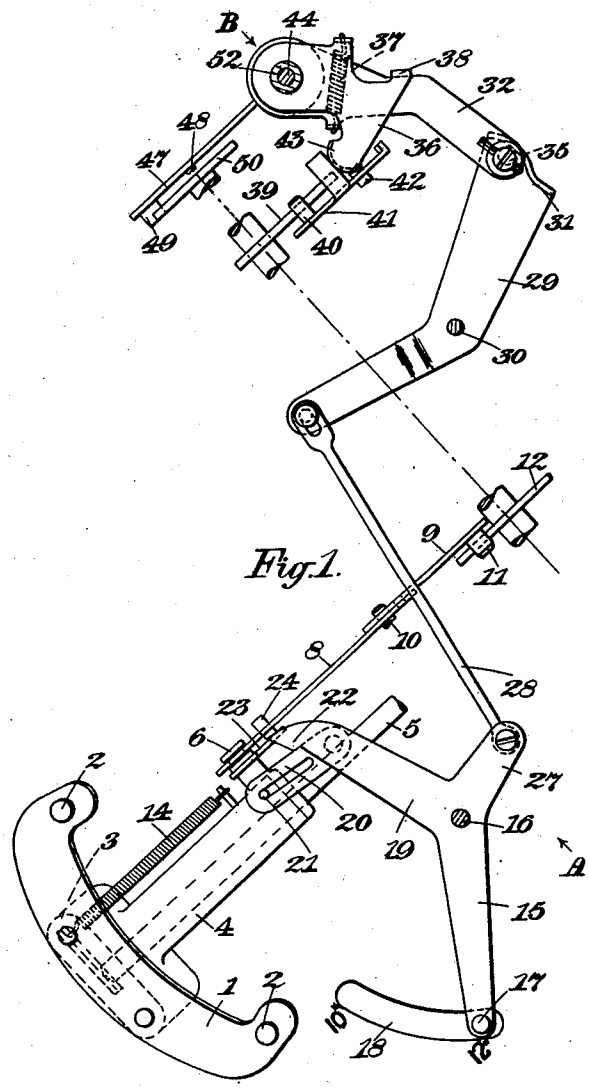


Fig. 1.

Inventor;
H. J. Fortune

By: Cascock, Downing & Seebold
Attys.

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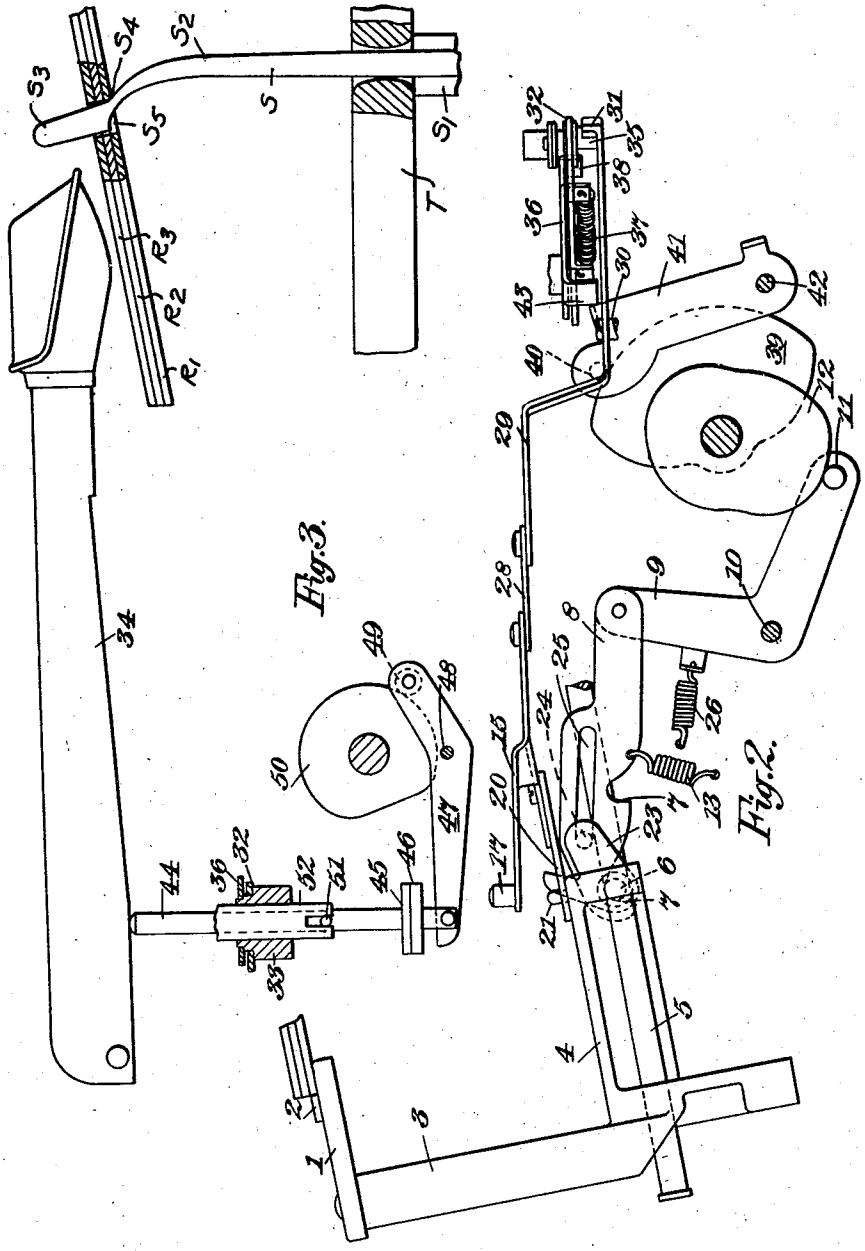


Fig. 3.

Fig. 2.

Inventor:
H. J. Fortune

by: Glascock Downing & Seebold
Attys.

Patented Jan. 27, 1942 2,271,001

UNITED STATES PATENT OFFICE

2,271,001

RECORD CHANGING APPARATUS FOR PHONOGRAPHS AND THE LIKE

Henry James Fortune, Swindon, England, assignor to The Garrard Engineering & Manufacturing Company Limited, Swindon, Wiltshire, England

Application December 18, 1939, Serial No. 309,879
In Great Britain January 25, 1939

8 Claims. (Cl. 274—10)

This invention relates to record-changing apparatus for phonographs and other sound reproducers of the kind in which records in stack formation are carried upon a platform or other support which is movable relatively to the stack to cause lateral displacement and release of the records therefrom. Apparatus of this kind may comprise for example, a movable support at one side of the stack and an offset post engaging the centres of the records as described in United States Patent No. 2,063,199 issued on December 8, 1936, to G. Slater for "Automatic gramophone and the like."

One of the main objects of the present invention is to provide a simple and reliable record-changing mechanism which is adjustable to take records of different diameters. Another object is to provide an improved and simplified mechanism for setting the pick-up or tone arm of the phonograph or the like for playing records of different diameters.

In the accompanying drawings which show by way of example one convenient mode of carrying the invention into effect,

Figure 1 is a plan view of the mechanism for adjusting the position of the record support and setting the pick-up arm;

Figure 2 is an elevation of the said mechanism, viewed in the direction of arrow A;

Figure 3 is an elevation of the pick-up arm showing the mechanism for raising the same, viewed in the direction of arrow B in Figure 1.

In carrying the invention into effect according to one convenient mode as applied by way of example to record changing mechanism having a central offset post as described in Patent No. 2,063,199 referred to above, for example, the platform which supports one edge of the record stack comprises a plate 1 having a pair of abutments 2 thereon for engaging the edge of a record and is mounted for sliding movement towards and away from the centre of the stack. The platform itself may be slightly inclined to the horizontal as illustrated and is secured to an upright 3 mounted on a frame 4 slidable upon a guide rod 5 extending radially with respect to the centre of the record stack. The rod 5 is inclined at the same angle as the platform.

The record stack comprises a series of records R1, R2 and R3 supported at their edges as aforesaid on the platform and at their centers upon offset spindle S. The spindle S is supported in a bearing S1, passes through a centrally apertured turntable T, and is curved upwardly, as shown at S2, to terminate in a straight inclined portion S3, which is offset with respect to the aforesaid curved portion S2 for forming a pair of shoulders on flats S4 and S5 facing upwardly and downwardly respectively; the perpendicular distance between these flats being slightly greater than the thickness of a record, the length of the straight inclined portion S3 being such that the required number of records can be conventionally accommodated by threading thereon and the portion of the spindle S which lies between the flats S4 and S5 being oval or flattened in shape.

Secured to one side of the frame 4 is a stud 6 engageable by the teeth 7 of a ratchet or drag link 8. One end of the link 8 is pivotally connected to a bell crank lever 9 pivoted at 10 and having on its other arm a stud 11 which bears upwardly on a rotatable plate cam 12. In an apparatus intended for ten inch and twelve inch records, as is here illustrated, the drag link 8 has two downwardly directed ratchet slots 7, either of which may be engaged with the aforesaid stud 6. The drag link 8 is urged downwardly by a spring 13, and another spring 14 urges the platform frame 4 outwardly. In this way the drag link is always maintained in engagement with the stud. The drag link 8, bell crank lever 9 and plate cam 12 all lie substantially in a vertical plane.

A platform setting lever 15 is pivoted at 16 for movement in a horizontal plane and has a handle 17 which may be conveniently arranged to extend through a slot 18 in the plate which conceals the mechanism or in the motor board. This lever has an arm 19 which is connected to the platform frame 4 by a slotted link 20 which engages with a pin 21. The arm 19 is formed with an extension 22 which engages with an auxiliary lever 23 pivoted on the stud 6. The auxiliary lever 23 has a pin 24 engaged within a slot 25 in the drag link 8. It will be seen that when the handle 17 of the setting lever is moved to the left as viewed in Figure 1 the frame 4 will be drawn to the right and will move the platform 1 towards the record stack. The stud 6 on the frame will force the drag link 8 upwardly until it is engaged by the second ratchet slot. When the setting lever is moved in the opposite direction the extension 22 thereof engages and lifts the auxiliary lever 23 which thereby raises the link 8 and permits the frame 4 to move outwardly under the action of spring 14 until the stud 6 engages with the further ratchet slot. A spring 26 secured to the bell crank lever 9 maintains the latter in engagement with the plate cam 12.

The setting lever 15 has a second arm 27 connected by a link 28 to a selector lever 29 pivoted at 30. This lever is formed at its outer end with a raised cam surface 31 having portions corresponding to ten inch and twelve inch positions of the pick-up arm. An arm 32 is pivoted freely on a mounting 33 to rotate about the axis of the pick-up arm 34, and has a downwardly directed stud 35 which is engaged with either of the aforesaid portions of cam surface 31 according to the position of lever 29. A second arm 36 is movable about the same axis as the arm 32 and is connected to the pick-up arm 34. A spring 37 connects the two arms and tends to hold them in the position shown in Figure 1 wherein a turned-down portion 38 of the arm 36 engages the arm 32.

A plate cam 39 rotatable in a vertical plane engages a stud 40 on an arm 41 pivoted at 42 which engages a turned-down portion 43 of arm 36. This cam 39 controls the lateral movements of the pick-up arm in a manner to be described.

Vertical movement of the pick-up arm is controlled by a lifting rod 44 which engages the underside of the arm and has fixed to its lower end a friction disc 45. This disc rests on a second friction disc 46 secured to a lever 47 pivoted at 48 and having at its further end a stud 49 engaged by a rotatable plate cam 50. The lifting rod 44 carries a pin 51 engaging a slot formed in a sleeve 52 which rotates with the pick-up arm 34.

The operation of the pick-up actuating and setting mechanism is as follows. The pick-up arm 34 is swung outwardly by the plate cam 39 acting through the vertical lever 41 on the arm 36, which is connected to rotate with the pick-up arm. As the arm 36 moves outwardly the spring 37 is tensioned and the arm 32, which is free on the mounting 33, is also forced outwardly until the stud 35 thereof is brought up against the cam surface 31 of the selector lever 29. The final position of the arm 32 will be determined by the position of the selector lever which in turn depends upon the position to which the manual setting handle 17 has been moved. As the cam 39 continues to rotate the arm 36, and with it the pick-up arm, is returned under the action of the spring 37 until the lug 38 engages the lever 32 when the inward movement of the pick-up arm will be arrested in a position, determined by the position of the selector lever 29, in which when the pick-up arm is lowered the stylus will engage the playing groove of a record of the size selected.

The raising and lowering of the pick-up arm is effected by the cam 50 acting through the pivoted lever 47. This raises the disc 46 which is in frictional engagement with the disc 45 and thereby lifts the rod 44 to raise the pick-up arm. The friction between the discs 45 and 46 prevents the pick-up arm from being moved laterally accidentally when it has been positioned correctly for the selected record size. The friction is effective only while the pick-up arm is in the raised position. As soon as the weight of the pick-up arm has been taken by the record the friction opposing lateral movement of the arm is released and the weight of the lifting rod 44 suffices to keep the discs 45, 46 in contact.

It will be understood from the preceding description that the invention provides a very simple and reliable mechanism for adjusting the movable record support for different sizes of records and at the same time for setting the pick-up arm appropriately with respect to the support. However, other mechanism for setting the pick-up arm may be employed if desired. It is also to be understood that although the invention has been described as applied to mechanism comprising an inclined central support as described in Patent No. 2,063,199, referred to above, it is not confined thereto but may be applied to any form of record releasing mechanism having a lateral support for the records and arranged to release records by inward displacement thereof.

I claim:

1. In a record changing apparatus of the class described, wherein at different times there are supported at their centers upon a shouldered spindle in pile formation and in groups of common diameter, records of one or another diameter, a reciprocable carrier member adjacent the edges of the records of the pile, and movable substantially along the level of the lowermost record of the pile, a guide member along which said carrier member slides, means connecting the guide member and the carrier member for biasing the carrier away from the spindle, a mechanism acting against the tension of said biasing means for moving the carrier member towards the spindle, whereby the lowermost record of the pile is abutted at its edge and displaced from the shoulder of the spindle by the carrier member, said mechanism comprising a periodically operable driving member, and a movable link member adjustably connected at one end to the carrier member and at its other end disposed in displaceable contact with said driving member, said connection between the carrier and link members comprising a male element on one of said members and a series of female elements on the other of said members with which said male element may interlock, and means operatively connected to at least one of the members of the connection for selectively moving the male element of one of the members into interlocking relationship with one of the female elements of the other member, whereby to adjustably set the carrier member at different distances from the spindle.

2. In a record changing apparatus of the class described, wherein at different times there are supported at their centers upon a shouldered spindle in pile formation and in groups of common diameter, records of one or another diameter, a reciprocable carrier member adjacent the edges of the records of the pile, and movable substantially along the level of the lowermost record of the pile, a guide member along which said carrier member slides, means connecting the guide member and the carrier member for biasing the carrier away from the spindle, a mechanism acting against the tension of said biasing means for moving the carrier member towards the spindle, whereby the lowermost record of the pile is abutted at its edge and displaced from the shoulder of the spindle by the carrier member, said mechanism comprising a periodically operable driving member, and a movable link member adjustably connected at one end to the carrier member and at its other end disposed in displaceable contact with said driving member, said connection between the carrier and link members comprising a male element on said carrier member and a series of female elements on said link member with which said male element may interlock, and means

operatively connected to at least one of the members of the connection for selectively displacing the male element of the carrier member into interlocking relationship with one of the female elements of the link member, whereby to adjustably set the carrier member at different distances from the spindle.

3. In a record changing apparatus of the class described, wherein at different times there are supported at their centers upon a shouldered spindle in pile formation and in groups of common diameter, records of one or another diameter, a reciprocable carrier member adjacent the edges of the records of the pile, and movable substantially along the level of the lowermost record of the pile, a guide member along which said carrier slides, means connecting the guide member and the carrier member for biasing the carrier member away from the spindle, a mechanism acting against the tension of said biasing means for moving the carrier member towards the spindle, whereby the lowermost record of the pile is abutted at its edge and displaced from the shoulder of the spindle by the carrier member, and a movable link member adjustably connected at one end to the carrier member and at its other end disposed in displaceable contact with said driving member, said connection between the carrier and link members comprising a locking projection on said carrier member and a series of notches on said link member in which said locking projection may rest, and means operatively connected to at least one of the members of the connection for selectively displacing the projection of the carrier member into one of the notches of the link member, whereby to adjustably set the carrier at different distances from the spindle.

4. In a record changing apparatus of the class described, wherein at different times there are supported at their centers upon a shouldered spindle, in pile formation and in groups of common diameter, a reciprocable carried mounted to support at their edges a group of records of one diameter, a guide member along which said carrier member slides, an abutment on said carrier member of the thickness of one record and against which the peripheral edge of the lowermost record of the pile rests, means connecting the guide member and the carrier member for biasing the carrier away from the spindle, a mechanism acting against the tension of said biasing means for moving the carrier member towards the spindle, whereby the lowermost record of the pile is contacted by and displaced from the shoulder of the spindle by the abutment of the carrier member, and a movable link member adjustably connected at one end to the carrier member and at its other end disposed in displaceable contact with said driving member, said connection between the carrier and link members comprising a male element on one of said members and a female element on the other of said members with which said male element may interlock, and means operatively connected to at least one of the members of the connection for selectively displacing the male element of one of the members into interlocking relationship with one of the female elements of the other member, whereby to adjustably set the carrier at different distances from the spindle.

5. In a record changing apparatus of the class described, wherein at different times there are supported at their centers upon a shouldered spindle in pile formation and in groups of common diameter, records of one or another diameter, a reciprocable carrier member mounted to support at their edges a group of records of one diameter, a guide member along which said carrier member slides, an abutment on said carrier member of the thickness of one record and against which the edge of the lowermost record of the pile rests, means connecting the guide member and the carrier member for biasing the carrier member away from the spindle, a mechanism acting against the tension of said biasing means for moving the carrier member towards the spindle, whereby the lowermost record of the pile is contacted by and displaced from the shoulder of the spindle by the abutment on the carrier member, said mechanism comprising a periodically operable driving member and a laterally movable link member connected at one end to said carrier member and at its other end disposed in displaceable contact with said driving member, said connection comprising a locking projection on said carrier member and a series of notches on said link member in which said locking projection may rest, and means operatively associated with at least one of the members of the connection for selectively displacing the projection of the carrier member into one of the notches of the link member, whereby to adjustably set the carrier member in spaced relationship to the spindle for supporting record piles of one or another diameter.

6. In a record changing apparatus of the class described, wherein at different times there are supported at their centers upon a shouldered spindle, in pile formation and in groups of common diameter, records of one or another diameter, a reciprocable carrier member mounted to support at their edges a group of records of one diameter, a guide member along which said carrier member slides, an abutment on said carrier member of the thickness of one record and against which the edge of the lowermost record of the pile rests, means connecting the guide member and the carrier member for biasing the carrier member away from the spindle, a mechanism acting against the tension of said biasing means for moving the carrier member towards the spindle, whereby the lowermost record of the pile is contacted by and displaced from the shoulder of the spindle by the abutment on the carrier member, said mechanism comprising a periodically operable driving member and a laterally movable link member connected at one end to said carrier member and at its other end disposed in displaceable contact with said driving member, said connection comprising a locking projection on said carrier member and a series of notches on said link member in which said locking projection may rest, and means operatively associated with at least one of the members of the connection for selectively displacing the projection of the carrier member into one of the notches of the link member, whereby to adjustably set the carrier member in spaced relationship to the spindle for supporting record piles of one or another diameter, and a pin and slot arrangement formed respectively between the carrier member and the last named means, whereby the periodic movement of the carrier member for record discharging and return, does not alter the setting of the carrier member in its selected spaced relationship with respect to the spindle.

7. In a record changing apparatus of the class described, wherein at different times there are

supported at their centers upon a shouldered spindle, in pile formation and in groups of common diameter, records of one or another diameter, a reciprocable carrier member mounted to support at their edges a group of records of one diameter, a guide member along which said carrier member slides, an abutment on said carrier member of the thickness of one record and against which the edge of the lowermost record of the pile rests, means connecting the guide member and the carrier member for biasing the carrier member away from the spindle, a mechanism acting against the tension of said biasing means for moving the carrier member towards the spindle, whereby the lowermost record of the pile is contacted by and displaced from the shoulder of the spindle by the abutment on the carrier member, said mechanism comprising a periodically operable cam and a laterally movable link member connected at one end to said carrier member and at its other end disposed in riding contact with said cam, said last named connection comprising a locking projection on said carrier member and a series of notches on said link member in which said locking projection may rest, and means operatively associated with at least one of the members of the connection for selectively displacing the projection of the carrier member into one of the notches of the link member, whereby to adjustably set the carrier member at different directions from the spindle.

8. In a record changing apparatus of the class described, wherein at different times there are supported at their centers upon a shouldered spindle, in pile formation and in groups of common diameter, records of one or another diameter, a reciprocable carrier member mounted to support at their edges a group of records of one diameter, a guide member along which said carrier member slides, an abutment on said carrier member of the thickness of one record and against which the edge of the lowermost record of the pile rests, means connecting the guide member and the carrier member for biasing the carrier member away from the spindle, a mechanism acting against the tension of said biasing means for moving the carrier member towards the spindle, whereby the lowermost record of the pile is contacted by and displaced from the shoulder of the spindle by the abutment on the carrier member, said mechanism comprising a periodically operable cam and a laterally movable link member connected at one end to said carrier member and at its other end disposed in riding contact with said cam, said last named connection comprising a locking projection on said carrier member and a series of notches on said link member in which said locking projection may rest, and means operatively associated with at least one of the members of the connection for selectively displacing the projection of the carrier member into one of the notches of the link member, whereby to adjustably set the carrier member at different directions from the spindle, and a pin and slot arrangement formed respectively between the carrier member and the last named means, whereby the periodic movement of the carrier member for record discharging and return, does not alter the setting of the carrier member in its selected spaced relationship with respect to the spindle.

HENRY JAMES FORTUNE.