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SEQUENCE SELECTOR FOR AUTOMATIC PHONOGRAPHS

Filed July 24, 1937

3 Sheets-Sheet 1

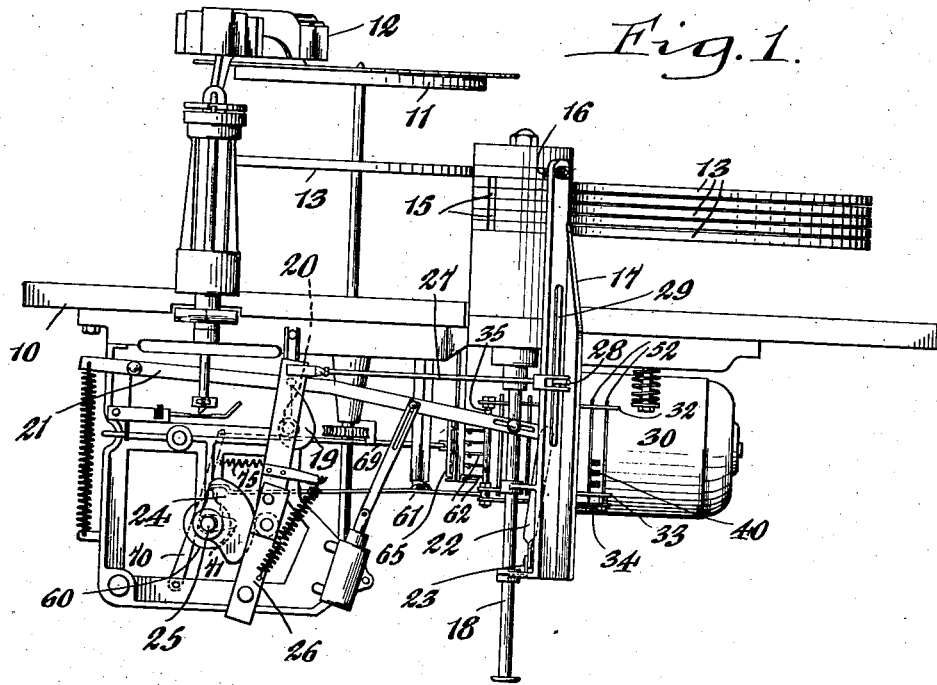
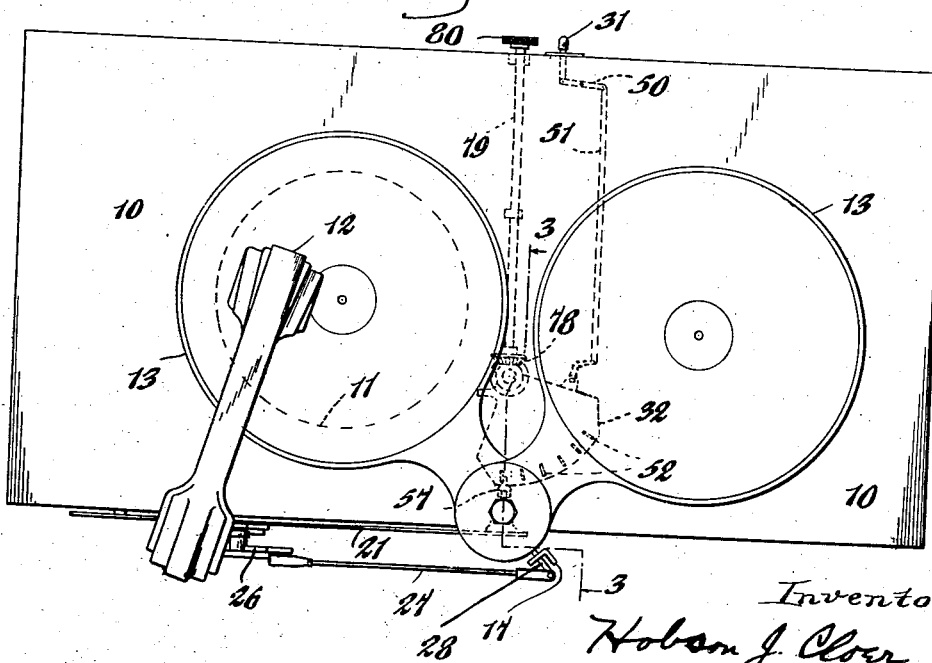


Fig. 2.



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3 Sheets-Sheet 2

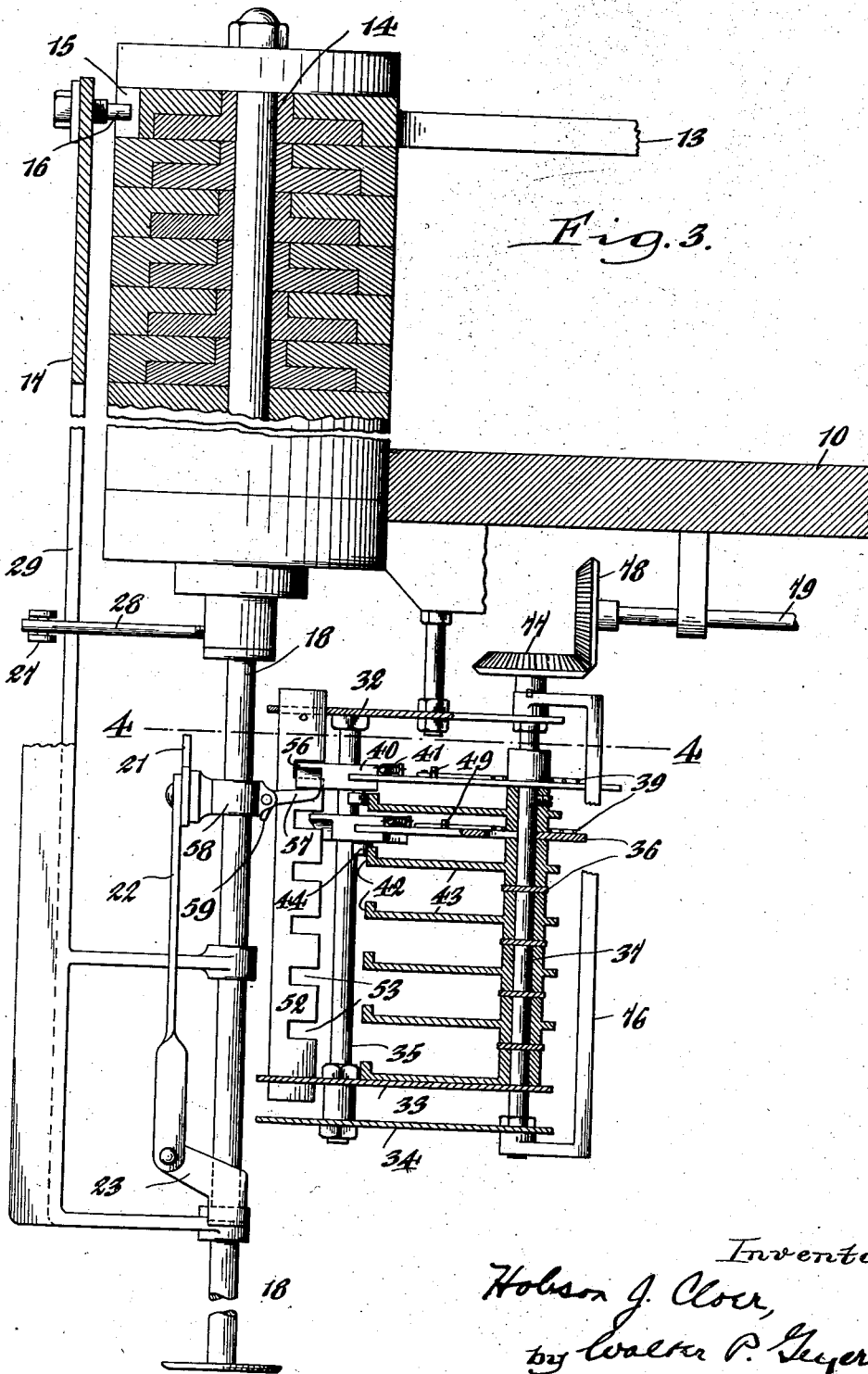


Fig. 3.

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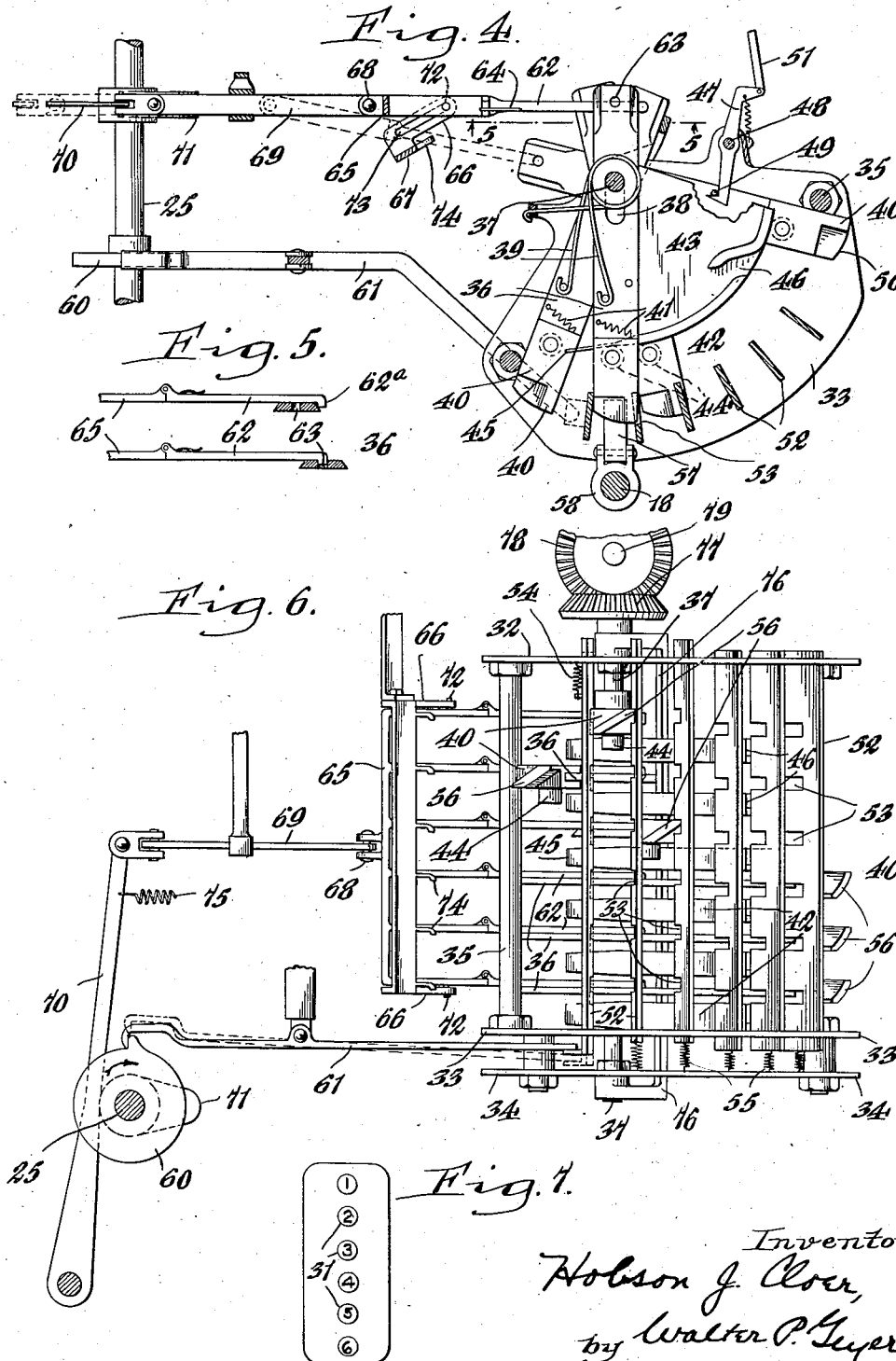
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SEQUENCE SELECTOR FOR AUTOMATIC PHONOGRAPHS

Filed July 24, 1937

3 Sheets-Sheet 3



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# UNITED STATES PATENT OFFICE

2,178,886

## SEQUENCE SELECTOR FOR AUTOMATIC PHONOGRAPHS

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Application July 24, 1937, Serial No. 155,487

10 Claims. (Cl. 274-10)

This invention relates generally to automatic phonographs but more particularly to certain new and useful improvements in the selective mechanism thereof.

5 It has for its chief object to provide a selective mechanism for automatic phonographs which is so designed and constructed as to effect the playing of the records in a definite order as pre-  
10 determined by their selection, that is, to effect the sequence playing of the records in the order pre-selected.

Another object of the invention is the provision of a sequence selector mechanism for phonographs which is simple and compact in construction,  
15 which is reliable in operation, and which is adaptable to the selective or multi-record playing phonographs now in use.

Other features of the invention reside in the construction and arrangement of parts herein-  
20 after described and particularly pointed out in the appended claims.

In accompanying drawings:

25 Figure 1 is a rear elevation of a multi-record phonograph showing my sequence selector mechanism associated therewith. Figure 2 is a top plan view of the same. Figure 3 is an enlarged cross section taken substantially in the plane of line 3-3, Figure 2. Figure 4 is a horizontal section taken on line 4-4, Figure 3. Figure 5 is a  
30 fragmentary sectional view taken on line 5-5, Figure 4. Figure 6 is an enlarged rear elevational view of the sequence selector mechanism. Figure 7 is a face view of the button-selector panel and buttons.

35 Similar characters of reference indicate corresponding parts throughout the several views.

By way of example, I have shown my sequence selector in connection with a multi-selective  
40 phonograph, the numeral 10 indicating the platform or supporting frame of the phonograph-chassis, 11 the vertically movable turntable, 12 the reproducer or tone arm carrying the usual record-engaging needle, and 13 a plurality of  
45 pivoted record-carriers normally disposed in stack-like fashion at one side of the turntable and adapted to be selectively swung horizontally to a position over the turntable, whereby the latter, upon being elevated, picks the record from  
50 the carrier and brings it into play position with the reproducer, and after the playing of the record the turntable is lowered and deposits that record on its carrier, after which the latter is swung to its position in the record-stack.

The record carriers 13 are pivoted in super-  
55 posed relation on an upright post 14 and each

has a notch 15 in its hub with which a coupling pin 16 of a combined vertically adjusted and horizontally swinging selector member or yoke 17 is adapted to engage. This selector member is guided on an upright post 18 which depends be-  
5 low the platform 10. The means for selectively actuating the selector yoke in a vertical direction consists of a selector cam 19 mounted on a selector shaft 20 and a vertically swinging lever 21 in contact intermediate its ends with said cam  
10 and connected at its free end with the selector yoke 17 through the medium of a link 22 and attaching lug 23, whereby the yoke is raised and lowered to bring its coupling pin 16 into en-  
15 gagement with the selected carrier. The means for swinging the yoke 17 to project the selected carriers over the turntable consists of a cam 24 mounted on a shaft 25 and a vertically swinging lever 26 in contact intermediate its ends with  
20 said cam and connected at its free end with the yoke through the medium of a link 27, the latter being connected to a radial arm 28 freely mounted on the post 18 and engaging an upright slot 29 in the yoke, whereby the latter may move vertically relative to this yoke-swinging mechanism.  
25 Motion is transmitted to the shafts 20 and 25 and to the vertically movable turntable 11 by an electric motor 30, this drive mechanism being substantially the same as that shown in the Wilcox Patent No. 2,002,236, dated May 21, 1935, and  
30 as it forms no particular part of the present invention, it has not been deemed necessary to show it in detail.

The sequence selector mechanism is associated  
35 with the selector yoke 17 and is so constructed as to select a plurality of records at one time in advance and then have the machine automatically play those selected records in the same sequence  
40 as selected, the numeral 31 indicating the selector buttons suitably arranged on the front side of the machine or cabinet, so that if a user selects records corresponding to buttons, numbers 6, 1 and 3, the records will be played in that selected sequence. In its preferred form, this sequence  
45 selector mechanism is constructed as follows:

50 Disposed below the platform 10 and adjacent to the selector yoke 17 is a frame for supporting the working parts of the mechanism, this frame consisting of a top plate 32, vertically spaced lower plates 33, 34 and spacer posts 35. Pivotal-  
55 ly mounted for individual, horizontally-swinging movement between the frame-plates 32, 33 are a plurality of selector levers 36 corresponding in number to the record-carriers 13 and selector buttons 31 and mounted in spaced vertical rela-

tion on a pivot post 37 for a range of movement determined by the posts 35, as seen in Figure 4. At their pivoted ends, these levers are slotted at 38 to permit of a limited longitudinal displacement of the levers during their fore and aft swinging movements. A spring 39 applied to each lever 36 tends to swing it in a clockwise direction viewing Figure 4. Each of these levers is provided at its outer end with a pivoted trip finger 40 having a spring 41 applied thereto for urging it to a position aligned with its lever. During its fore and aft swinging movement, each lever 36 is in guiding contact with an arcuate flange 42 applied to a segmental plate 43 secured to the pivot post 37, the lever having a follower or projection 44 thereon which rides the outer face of its companion flange during its clockwise movement and both the inner and outer faces of such flange during respective portions of its counter-clockwise movement. At the end of its clockwise stroke, the lever-projection 44 rides off the spring or tail-like extension 45 of the segmental flange 42, so that on the return stroke of the lever such projection engages the inner face of said spring and flange, displacing the lever bodily inward, until its projection encounters a by-pass or notch 46 in such flange, whereupon the projection again engages the outer side of the guide flange, at the same time shifting the lever 36 bodily outward to its normal position seen at the right side of Figure 4.

These levers are releasably held in their normal retracted or non-selected position by companion dogs 47 pivoted intermediate their ends at 48 and each having their hooked inner end disposed for latching engagement with a pin 49 on the companion lever 36. These dogs are releasably controlled by the selector buttons 31 and for this purpose each button is connected to its companion dog by a rock arm 50 and link 51, so that upon depression of a selector button, the companion dog is released and the associated lever 36 is swung by spring pressure in a clockwise direction to a selective position.

Cooperating with the selector levers 36, and functioning to control the sequence playing of the records in the order called for by the selector buttons depressed, are companion selector bars 52, one for each lever, which are disposed in an upright position radially relatively to the pivot-post 37 and are guided for independent vertical displacement in openings formed in the frame-plates 32, 33. These bars are disposed in the path of movement of the lever-fingers 40 and each is provided in its inner edge with a vertical row of notches 53, one for each lever-finger, the left hand or outermost bar, viewing Figure 4, being normally held by a spring 54 in an elevated position with its notches out of horizontal alignment with the notches of the remaining bars and likewise out of line with the respective lever-fingers, so that this outermost bar forms an abutment and arrests the movement of whatever lever 36 happens to be released in accordance with the first selection made by a given push button. The remaining selector bars are normally held in a lowered position by companion springs 55, in which position their respective notches 53 are transversely aligned and in the plane of movement of the companion levers 36, so that when one or another of these levers is released by the push buttons 31, they will freely traverse the aligned notches of the normally-depressed bars 52.

The selector bars 52 are so spaced circumferentially that the lever-fingers 40 bridge adjoining

bars and when the first-released lever is swung in a clockwise direction upon actuation of its companion push button 31, it will travel through the series of notched bars until it reaches the endmost one, when it will be arrested thereby. In this position, the finger of that lever is adapted to engage a notch of the juxtaposed bar 52 and elevate the latter to a position wherein its notches are out of line with those of the remaining bars to the right. For this purpose, each finger 40 has a transversely inclined or angular tip 56, the leading end of which abuts the left hand bar of a pair, viewing Figure 4, while the trailing end thereof registers with an adjoining notch of the right hand bar of such pair, thereby lifting and sustaining said last-named bar in a position wherein its notches are out of line with the remaining bars. Subsequently with the pressing of another push button and the release of the companion lever 36, the latter will come to rest in abutting engagement with said right hand bar of the first-named pair and in the same manner the trailing end of the finger of the last-selected lever will engage the next adjoining bar to the right and sustain it in an elevated position and so on.

With the selector levers 36 in their respective projected positions for predetermining the sequence selection of the records chosen, the record changing mechanism of the phonograph, including the vertically and horizontally movable selector yoke 17, is brought into action for swinging the selected carriers to and from play position. For this purpose, I provide a pivoted stop arm 57 which is applied to a collar 58 slidable on the yoke-carrying post 18 and which moves vertically with the yoke in response to the movements imparted to it by the cam 19 and lever 21. This stop arm is so positioned or guided on the post 18 that it travels in a vertical plane between the two endmost selector bars 52, as shown in Figure 4, and it has a tail 59 thereon which limits its downward-swinging movement but which permits it to swing upward, as during the downward movement of the selector yoke and associated parts. As the yoke 17 travels upwardly to a given record-selecting position, the stop arm 57 abuts the finger 40 of the endmost projected or first-selected lever 36 and arrests the yoke at the elevation for coupling it to the corresponding record-carrier 13, after which the carrier is swung out over the turntable 11 by the cam 24, lever 26 and link 29. As in the Wilcox patent referred to, the turntable then rises, picks the record from the carrier and into contact with the reproducing needle. After the playing of the record is completed the turntable is lowered, the played record is deposited in its carrier and the latter swung back to the stack, after which the next record to be played is brought out.

Immediately after the carrier bearing the played record is returned to the record-stack, it is necessary to release the companion selector-lever 36 from between the first pair of bars 52 and bring the next selected lever from its adjoining position to that held by the first-named lever to thereby effect the projected selection of the next carrier in the sequence selected. To this end, it is necessary to lower the normally elevated or endmost bar 52 to bring its notches in aligning register with the notches of the remaining bars, so that the first-projected lever 36 will be released through an adjoining notch in its abutting bar and continue to swing in a clockwise direction until arrested by the left-hand spacer rod 35, viewing Figure 4. This lowering of the

endmost bar is only momentary, merely sufficient to release the selector lever abutting it, after which it is returned to its elevated position by its spring 54 to form an abutment for the next selected lever 36. This lowering of the endmost selector bar may be effected through a properly timed cam 60 mounted on the cam shaft 25 and engageable with a trip lever 61 whose free end abuts the offset lower end of said bar to momentarily lower it so as to release the first-projected lever. During the movement of this lever through its escaping bar-notch, the next adjoining bar 52 is lowered by its spring 55 to bring one or another of its notches 53 into register with the next lever, thereby releasing that lever and causing it to swing clockwise until arrested by the endmost bar, which, at this stage, is in its normal elevated position to arrest that second lever in the position previously held by the first-selected one. In this position of the sequence selector mechanism, the next record in order for play is then brought out of the stack and played in the manner previously described. This same cycle of operations continues until the entire program selected has been played, and in this connection the records are played in the order or sequence originally determined at the selector button panel.

Any desirable means may be employed for returning the selector levers 36 to their original positions, after abutting the left-hand post 35, in readiness of re-selection. The means shown in the drawings consist of pull rods 62, having downwardly bent ends 62<sup>a</sup>, one for each selector lever, and each of which is adapted to engage a corresponding opening 63 in the inner end of the lever, so that when a pull is exerted on such rod, its coupled selector lever will be swung counter-clockwise until its pin 49 latches behind the companion spring-pressed, button-controlled, dog 47. During this counter-clockwise movement, the lever projection 44 engages the inner face of the arcuate flange 42 and retracts the lever bodily inwardly to bring its trip finger 40 out of the path of the inner edges of the selector bars 52. Adjacent the end of this return stroke, the projection 44 is again directed through the flange-notch 46 to shift the lever bodily outward to bring the trip finger in position for selective control and in the operating path of the selector bars.

The several pull rods 62 are flexibly connected by springs 64 with a common frame member 65 guided at its top and bottom on ledges 66 provided at the corresponding ends of a bracket 67 suitably attached to the chassis of the machine. This frame member is pivotally connected at 68 to a link 69 with a lever 70 which bears against a cam 71 fixed on the shaft 25, the cam functioning to rock said lever to exert a pull on the frame member and its rods 62 to in turn swing a coupled selector lever 36 therewith to its initial position. In the position of the parts shown in Figures 4 and 5, the ends of the pull rods are in position for coupling engagement or register with any one of the companion selector levers which have reached the position shown at the extreme left in Figure 4. The pivoted frame member 65 carries pins 72 at its top and bottom which engage corresponding oblique slots 73 in the bracket-ledges 66, so that when the frame member is pulled in one direction or the other it is compelled to laterally swing in or out. When a coupled selector lever 36 is restored to its initial position and latched to its dog 47, the companion pull rod 62 may be re-

leased or displaced from the lever-opening 63 by a corresponding cam face 74 formed on the bracket 67 and arranged in the final path of inward swing of the frame member 65. As shown in Figure 4 the opposite side edges of the inner arms of the selector levers are preferably beveled to enable the pull rods to ride idly over the same during their fore and aft strokes. The return stroke of the pull rods and associated parts is effected by a spring 75 attached to the actuating lever 70. The cam 71 is so timed in the cycle of operations of the machine as to be rendered operative during the period between that of playing a given record and bringing another record in position for play.

Means are also provided for cancelling a given selection or selections once made should the user decide to change his program selection, these means acting to restore the projected selector levers 36 to their initial non-selective position. To this end, I provide a yoke or tie member 76 movable about the axis of the selector levers to successively engage and swing them to their starting or initial position. This yoke is freely mounted on the pivot post 37 and is fixedly connected to a gear 77 meshing with a companion gear 78 fixed on a shaft 79 having an actuating knob 80 thereon, whereby upon turning said shaft motion is transmitted to the yoke 76 to turn it through the operating path of the selector levers and engage those which happen to be in its path for restoring them to their initial positions. During such restoring movement, the trip fingers 40 merely trip past the selector bars 52, being adapted to freely swing about their pivots and being restored to normal position by their springs 41. As shown in Figure 2, the cancelling knob 80 is positioned for convenient operation adjacent the selector buttons 31.

Any suitable and well known coin control mechanism may be used in connection with the phonograph for controlling the starting of the motor 30 to operate the parts controlled thereby. I claim as my invention:

1. In an automatic phonograph, a turntable, a plurality of record carriers selectively movable to and from a position over the turntable, adjustable means movable to selective positions and including a part operatively engageable with one or another of the carriers for moving them to and from a playing position, individual means corresponding in number to the carriers for selecting in advance a plurality of records to be played, adjustable sequence selector elements releasably controlled by and corresponding in number to the individual selecting means and successively movable at predetermined times to a selective-governing position in the selective path of movement of said adjustable-carrier-moving means, and yieldably mounted escapement means normally disposed in the path of the selective movement of said selector elements, the latter having means thereon engageable with said escapement means for moving them at predetermined times out of such path of selective movement.

2. In an automatic phonograph, a turntable, a plurality of record carriers selectively movable to and from a position over the turntable, adjustable means movable to selective positions and operatively engageable with one or another of the carriers for moving them to and from a playing position, individual means corresponding in number to the carriers for selecting in advance a plurality of records to be played, ad-

justable sequence selector elements corresponding in number to the individual selecting means and releasably connected thereto for movement to a selective-governing position in the selective path of movement of said adjustable carrier-moving means, and displaceable means disposed in the path of movement of said selector elements for controlling their sequence adjustment, said selector elements and said displaceable means having complementary engagement portions thereon for governing the sequence movements of the selector elements.

3. In an automatic phonograph, a turntable, a plurality of record carriers selectively movable to and from a position over the turntable, adjustable means operatively engageable with one or another of the carriers for moving them to and from such positions, and a sequence selector mechanism for governing said carrier-moving means including individual means for selecting in advance a plurality of records to be played, sequence selector elements releasably connected to and initially governed by the individual selective means for successive projection to positions in the path of and for controlling the selective engagement of the carrier-moving means in the predetermined sequence ordered by said selecting means, means engageable with said selector elements for normally retaining them in non-selective positions and operatively connected to the companion selective means for governing their release to selective positions, means for urging said selector elements to such selective positions, and displaceable means disposed in the projective path of and controlled by the selector elements for releasably governing their successive projections into the path of said adjustable carrier-engaging means, said displaceable means corresponding in number to the selector elements and adjustably displaceable by the latter at predetermined times to and from a released position in the projecting path of travel of said elements.

4. In an automatic phonograph, a turntable, a plurality of record carriers selectively movable to and from a position over the turntable, adjustable means movable to selective positions for operative engagement with one or another of the carriers for moving them to and from such positions, and a sequence selector mechanism for governing said carrier-moving means including individual means for selecting in advance a plurality of records to be played, sequence selector levers pivotally mounted in operative relation to and governed by said individual selecting means and projectable in predetermined sequence to positions in the selective path of movement of the carrier-moving means as ordered by said selecting means, and displaceable selector bars corresponding in number to said levers and disposed in the operating path thereof for successively controlling the sequence movement of the levers to a common position for selective engagement by said record-moving means, said bars and selector levers having complementary engageable means for governing such sequence movement of the levers.

5. In an automatic phonograph, the combination with a plurality of record carriers movable to and from an operative position relative to the turntable and adjustable means selectively engageable with the carriers for moving them to such position, of a sequence selector mechanism for adjustably controlling said carrier moving means consisting of a plurality of superposed,

pivoted selector levers corresponding in number to the carriers and successively movable in predetermined sequence from a normal, non-selecting position to a selecting position in the adjustable path of movement of the carrier-moving means, displaceable bars corresponding in number to said selector levers and disposed between the non-selecting and selecting positions thereof for governing the successive movements to the last-named position, means connected to said bars for normally urging them to a position to trap the movement of the levers, and complementary means on said levers and said bars for moving the latter to a non-trapping position to cause the sequence movement of said selector levers to their selective governing positions.

6. In an automatic phonograph, the combination with a plurality of record carriers movable to and from an operative position relative to the turntable and adjustable means selectively engageable with the carriers for moving them to such position, of a sequence selector mechanism for adjustably controlling said carrier moving means consisting of a plurality of superposed, pivoted selector levers corresponding in number to the carriers and movable in predetermined sequence from a normal, non-selecting position to a selecting position in the adjustable path of movement of the carrier-moving means, means for urging said levers to a selective position, displaceable means for controlling the sequence movement of said selector levers to their selective governing positions consisting of escapement members corresponding in number to the selector levers and normally disposed in the selective path of movement thereof for interrupting such movement, said levers having means thereon engageable with said escapement members for displacing them at predetermined times to non-interrupting positions, and means for restoring said levers at a predetermined time to their normal, non-selecting position.

7. In an automatic phonograph, the combination with a plurality of record carriers movable to and from an operative position relative to the turntable and adjustable means selectively engageable with the carriers for moving them to such position, of a sequence selector mechanism for adjustably controlling said carrier moving means consisting of a plurality of superposed, pivoted selector levers corresponding in number to the carriers and movable in predetermined sequence from a normal, non-selecting position to a selecting position in the adjustable path of movement of the carrier-moving means for governing its selective position, means for moving said selector levers toward their selective governing position, selector means companion to said levers and actuated by the user for selecting a program of records to be played, means actuated by said selector means for releasably retaining said selector levers in their non-selecting positions, said levers being released for movement upon the actuation of the companion selector means to record-selecting position, and displaceable selector bars disposed in the path of movement of said levers for controlling the sequence movement of the latter to selective governing positions.

8. In an automatic phonograph, the combination with a plurality of record carriers movable to and from an operative position relative to the turntable and adjustable means selectively engageable with the carriers for moving them to such position, of a sequence selector mechanism

for adjustably controlling said carrier moving means consisting of a plurality of superposed, pivoted selector levers corresponding in number to the carriers and movable in predetermined sequence from a normal, non-selecting position to a selecting position in the adjustable operative path and for governing the selective engagement of the carrier-moving means therewith, means applied to each of said levers for urging them to swing toward a selecting position, selector means associated with each lever for releasably retaining them in non-selecting position, and a plurality of displaceable selector bars corresponding in number to said levers and disposed radially about and in the path of movement of such levers in a given displaced position of such bars, said bars having a row of notches therein for the passage of one or another of the companion levers, the foremost bar of the group having its notches normally out of register with those of the remaining bars to form an abutment for successively arresting the levers in selective governing position, and the notches in the remaining bars being adapted for engagement by selected levers for successively and alternately governing the displacement of next adjoining bars to displaced positions to form abutments for following selected levers.

9. In an automatic phonograph, the combination with a plurality of record carriers movable to and from an operative position relative to the turntable and adjustable means selectively engageable with the carriers for moving them to such position, of a sequence selector mechanism for adjustably controlling said carrier moving means consisting of a plurality of superposed, pivoted selector levers corresponding in number to the carriers and movable in predetermined sequence from a normal, non-selecting position to a selecting position in the adjustable operative path and for governing the selective engagement of the carrier-moving means therewith, means applied to each of said levers for urging them to swing toward a selecting position, selector means associated with each lever for releasably retaining them in non-selecting position, a plurality of displaceable selector bars corresponding in number to said levers and disposed radially about and in the path of movement of such levers, said bars having a row of notches therein for the passage of one or another of the companion levers, means applied to said bars for yieldingly resisting their movement out of normal position, the foremost bar of the group having its notches normally out of register with those of the remaining bars to form an abutment for successively arresting the levers in selective governing position and the remaining bars

being successively displaceable by selected levers to positions for successively arresting them in predetermined radial positions, and means operatively controlled at a predetermined time in the movement of a selected record carrier for momentarily displacing said endmost selector bar to bring one or another of its notches into registering relation with the abutted lever to cause its escapement from its selective governing position and allow the next sequence positioned lever to move into abutting engagement with the endmost bar and occupy its selective governing position.

10. In an automatic phonograph, the combination with a plurality of record carriers movable to and from an operative position relative to the turntable and adjustable means selectively engageable with the carriers for moving them to such position, of a sequence selector mechanism for adjustably controlling said carrier moving means consisting of a plurality of superposed, pivoted selector levers corresponding in number to the carriers and movable in predetermined sequence from a normal, non-selecting position to a selecting position in the adjustable operative path and for governing the selective engagement of the carrier-moving means therewith, means applied to each of said levers for urging them to swing toward a predetermined selecting position, selector means associated with each lever for releasably retaining them in non-selecting position, a plurality of displaceable selector bars corresponding in number to said levers and disposed radially about and in the path of movement of such levers and constituting abutments for temporarily arresting the movement of the latter at successive radial positions, said bars having a row of notches therein in spaced relation corresponding to the selector levers, the foremost selector bar having its notches normally out of register with the levers to form an abutment for successively arresting the levers in selective governing position and the remaining bars having their notches normally in transverse alinement for registration of the respective levers therewith, those portions of the levers traversing said bar notches being inclined and bridging adjoining bars, whereby the leading edge of each lever is adapted to abut one bar and the trailing edge of such lever registers with and is adapted to displace the adjoining bar to a position wherein its notches are out of register with the succeeding lever, and means for successively restoring said levers at a predetermined time to their normal non-selecting positions.

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