Feb. 6, 1940. H. F. MAURER 2,189,077

AUTOMATIC PHONOGRAPH

Filed Aug. 27, 1937 5 Sheets-Sheet 1

Fig. 1.

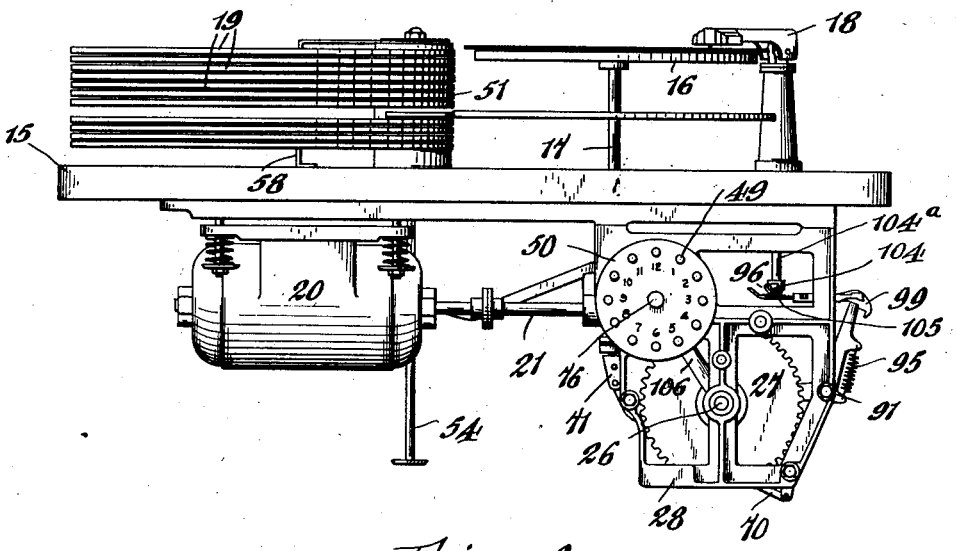
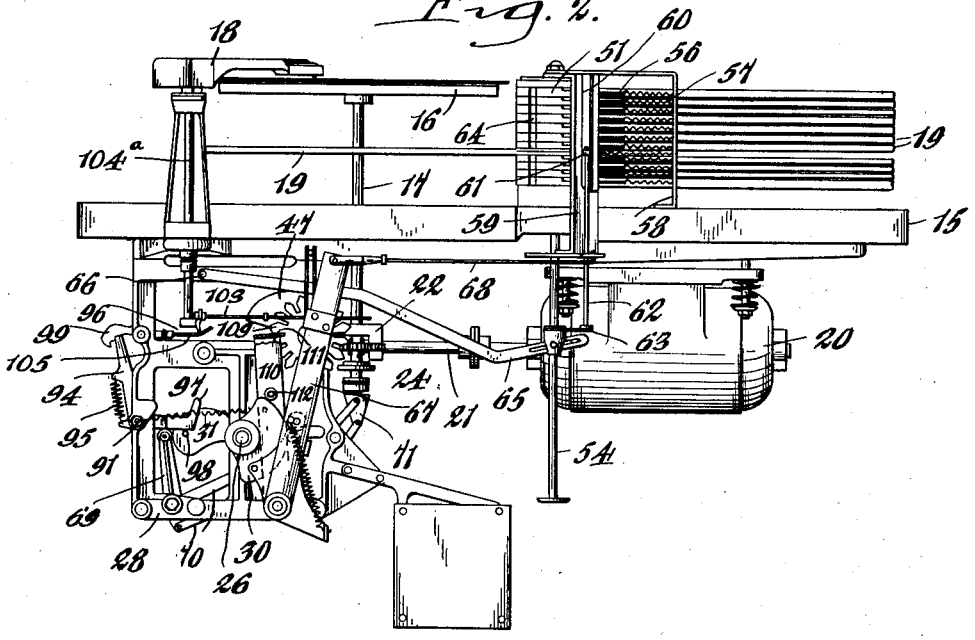


Fig. 2.



Inventor:
Howard F. Maurer,
by Walter P. Sayer
Attorney.

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AUTOMATIC PHONOGRAPH

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Fig. 3.

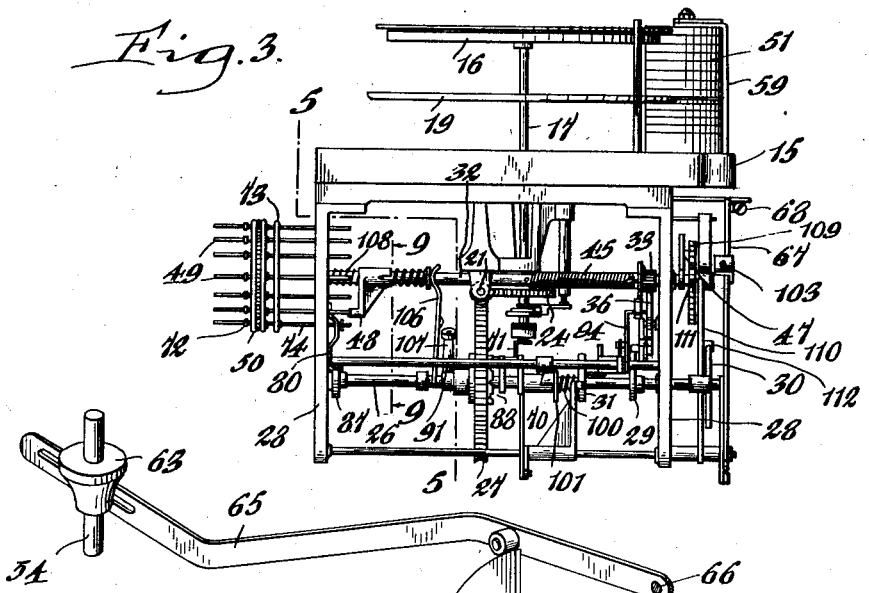
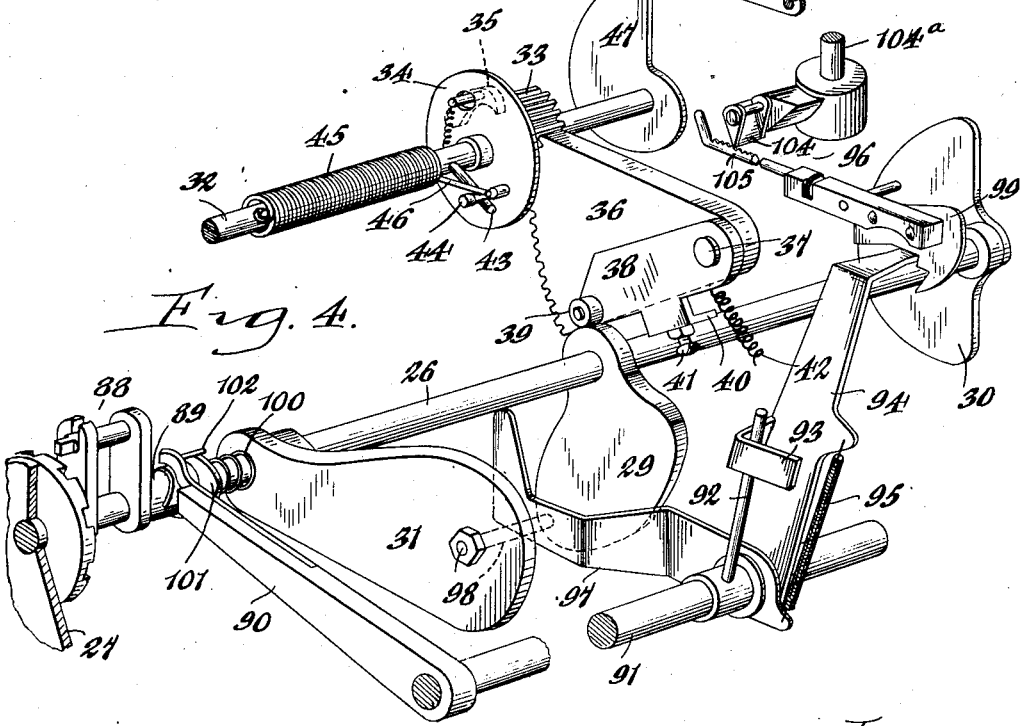


Fig. 4.



Inventor,
Howard F. Maurer,
by Walter P. Geyer
Attorney.

Feb. 6, 1940. H. F. MAURER 2,189,077

AUTOMATIC PHONOGRAPH

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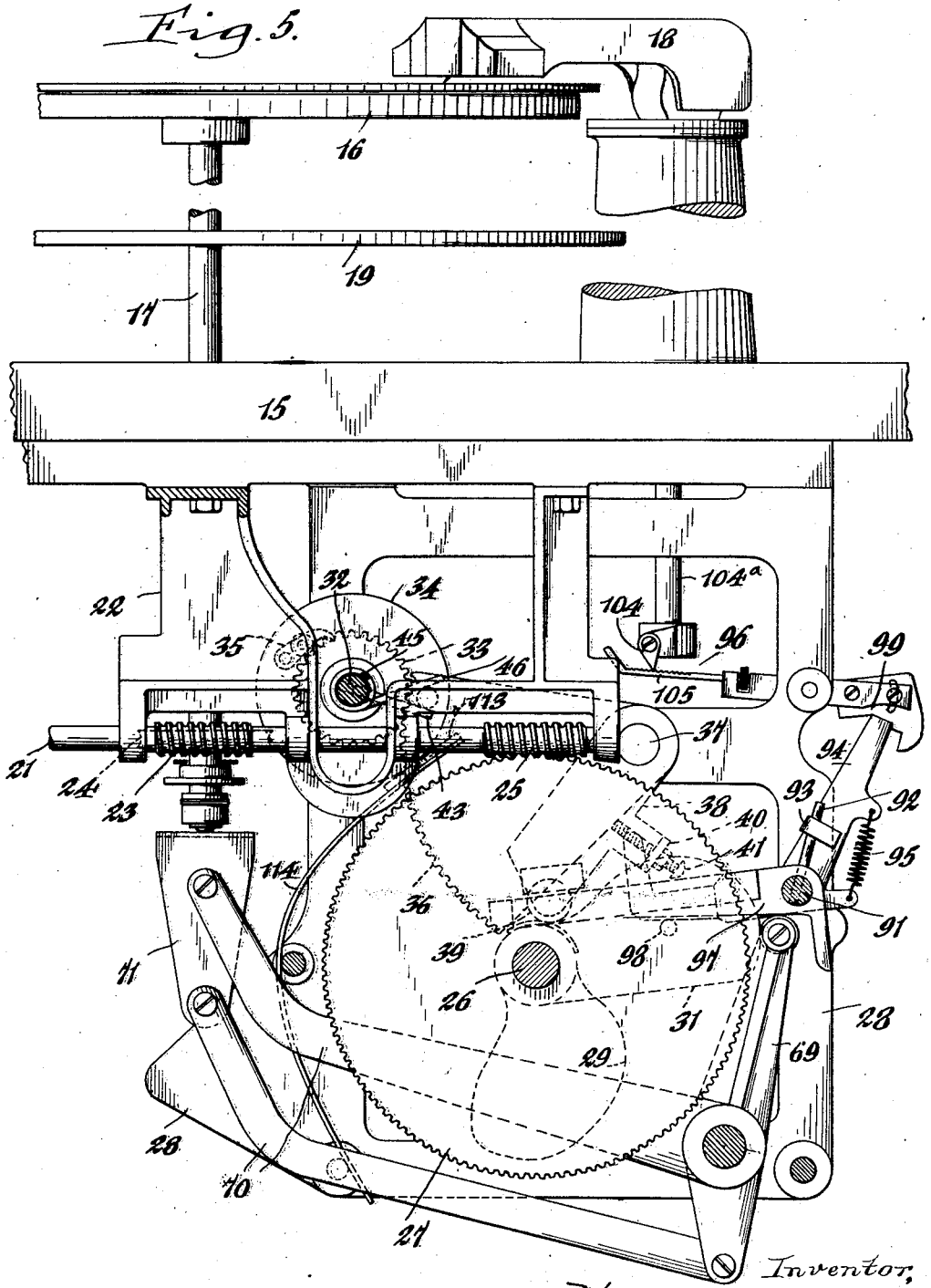
Fig. 5.



Inventor,
Howard F. Maurer,
by Walter P. Geyer
Attorney.

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AUTOMATIC PHONOGRAPH

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Fig. 6.

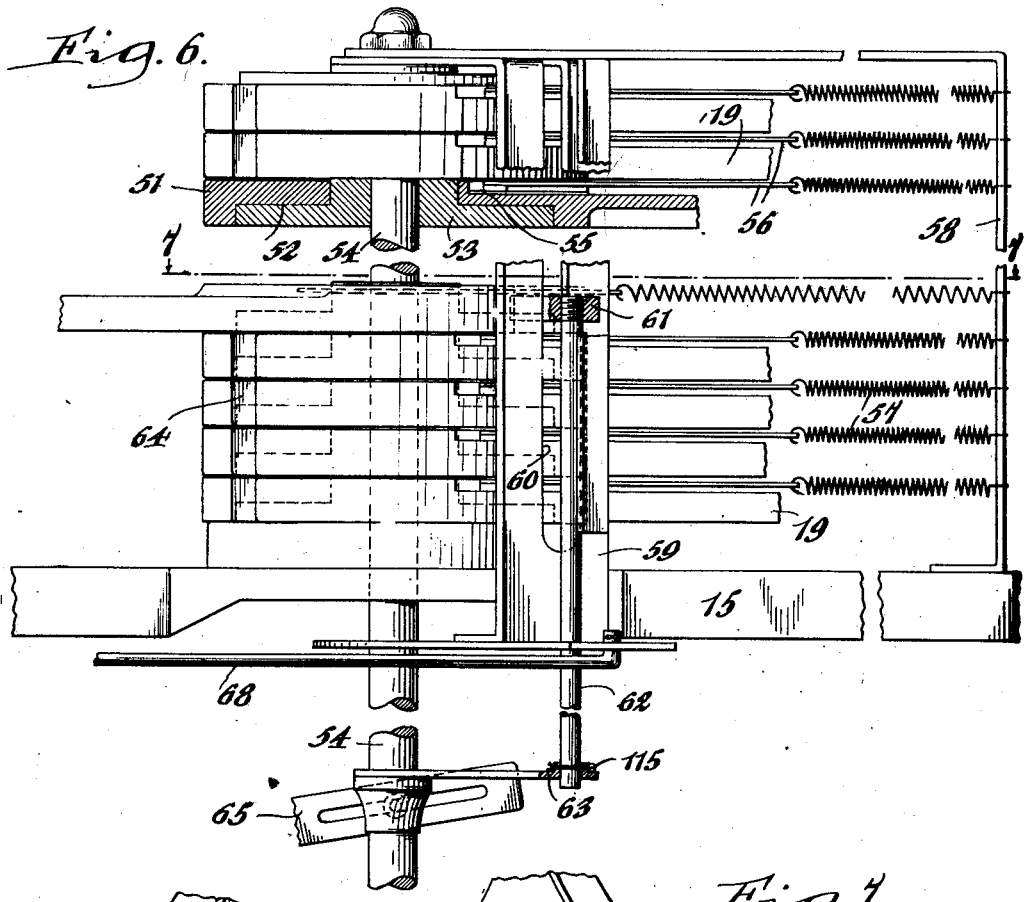
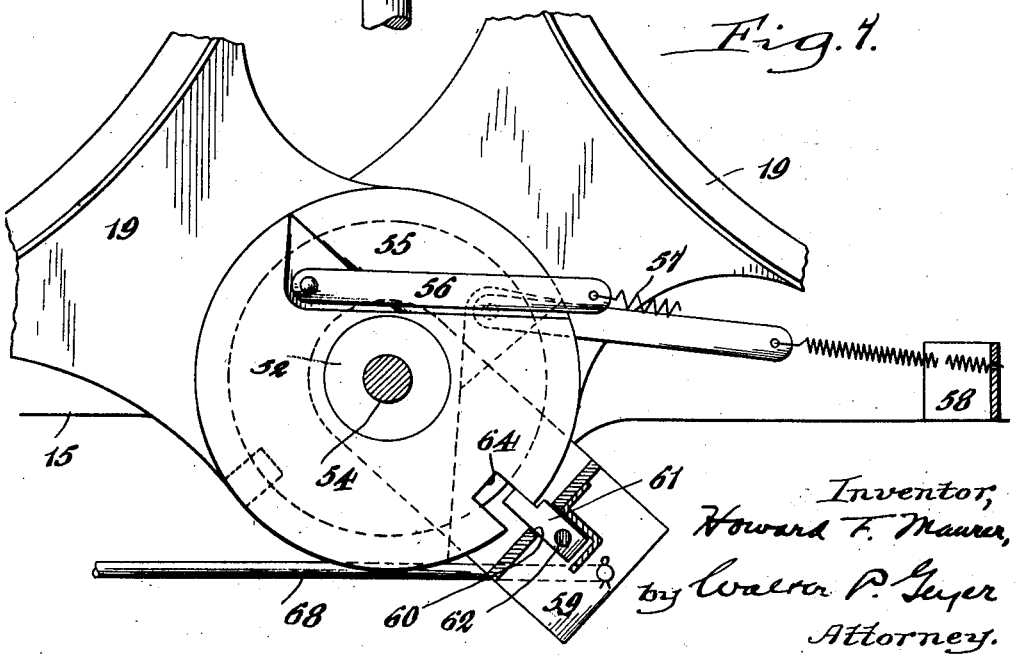


Fig. 7.



Inventor,
Howard F. Maurer,
by Walter P. Geyer
Attorney.

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AUTOMATIC PHONOGRAPH

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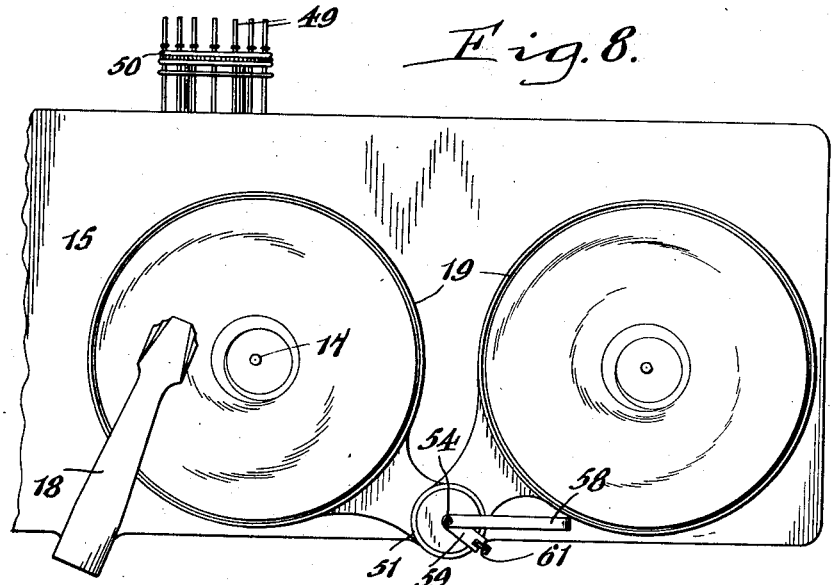
Fig. 8.



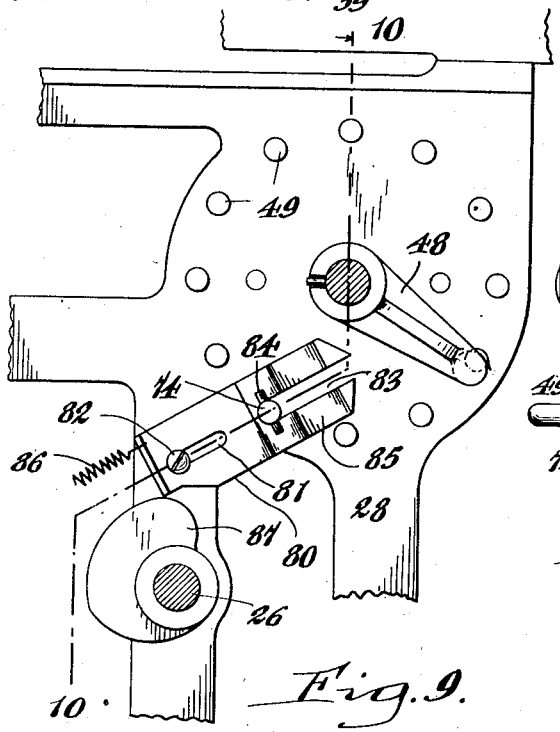


Fig. 9.

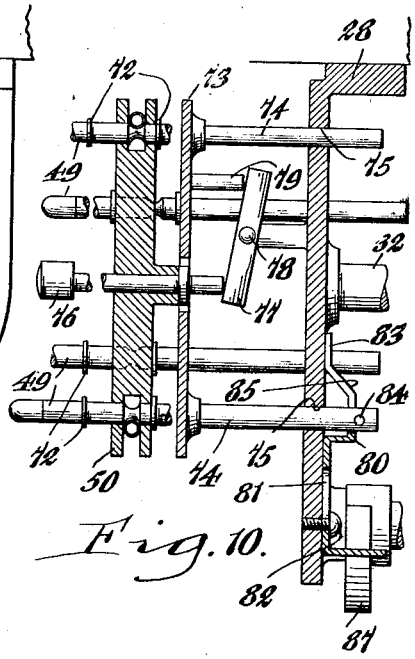


Fig. 10.

Inventor,
Howard F. Maurer,
by Walter P. Geyer
Attorney.

Patented Feb. 6, 1940

2,189,077

UNITED STATES PATENT OFFICE

2,189,077

AUTOMATIC PHONOGRAPH

Howard F. Maurer, North Tonawanda, N. Y., assignor to The Rudolph Wurlitzer Company, North Tonawanda, N. Y., a corporation of Ohio

Application August 27, 1937, Serial No. 161,305

9 Claims. (Cl. 274—10)

This invention relates generally to automatic phonographs and more particularly to certain new and useful improvements in phonographs of the multi-selective type.

It has for one of its objects to provide improved means for supporting the record carriers in stack-like fashion at one side of the turntable together with simple and reliable means for effecting the selective movement of the record carriers to and from a position in operative relation with the turntable.

Another object of the invention is to improve the selective mechanism of phonographs of the multi-selective type.

A further object of the invention is to provide a multi-selective phonograph having means for cancelling selections once made, but which means is so designed and constructed as to prevent the cancelling of selections during the automatic selection of previously selected records.

Other features of the invention reside in the construction of parts hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a front elevation of the chassis of a multi-selective phonograph embodying my improvements. Figure 2 is a rear elevation thereof. Figure 3 is an end view of the same. Figure 4 is an enlarged perspective view of a selector shaft and associated mechanism. Figure 5 is an enlarged vertical section taken on line 5—5, Figure 3. Figure 6 is a fragmentary sectional elevation showing the record carrier hub structure and associated selector mechanism for swinging the carrier to and from the position in operative relation to the turntable. Figure 7 is a horizontal section taken in the plane of line 7—7, Figure 6. Figure 8 is a fragmentary top plan view of the phonograph. Figure 9 is an enlarged fragmentary vertical section taken on line 9—9, Figure 3. Figure 10 is a transverse vertical section taken substantially in the plane of line 10—10, Figure 9.

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

Referring now to the drawings, 15 indicates the platform or supporting frame of the phonograph chassis on which the working parts of the phonograph mechanism are mounted and which chassis is usually mounted in a cabinet not shown, my invention being an improvement on the multi-selective phonograph disclosed in the Wilcox Patent No. 2,002,236, dated May 21, 1935. Rising above the platform is a vertically-movable turntable 16 carried by a spindle 17 which is guided in and extends below the platform. Also mounted on the latter is the customary tone arm or reproducer 18, and mounted on the platform at one side of the course of travel of the turntable are a plurality of pivoted record carriers 19 normally disposed in stack-like fashion adapted to be selectively swung horizontally to a position over the turntable, whereby the latter, upon being elevated, picks the record from the selected carrier and brings it into play position with the needle of the reproducer. After the playing of the record is completed, the turntable is lowered and the played record is deposited on its carrier, after which the latter is swung to its position in the record stack.

Suspended from the bottom of the platform 15 is an electric motor 20 which drives the moving parts of the phonograph, its shaft 21 being journaled in suitable bearings formed in a bracket 22 and having a worm 23 thereon meshing with a worm wheel 24 which transmits motion to the turntable-spindle 17 to rotate the turntable. This motor shaft also has a worm 25 which transmits motion through a suitable clutch to a cam shaft 26 through the medium of a worm wheel 27, this cam shaft being journaled in a suitable frame 28 depending from the platform and provided with cams 29, 30 and 31 which automatically control, respectively, the selective mechanism for predetermining the selection of a given record which has been preselected, the swinging of the selected carriers to a position over the turntable and the raising of the turntable to pick up the selected record from its carrier and bring it into engagement with the needle of the reproducer so that the record may be played. These cams also govern the return movement of these respective parts to their initial position after the playing of the record and simultaneously with the return of the selected carrier to the stack, the tone arm is likewise restored to its initial position, as in the Wilcox patent.

The selector mechanism controlled by the cam 29 consists of a selector shaft 32 journaled in the frame 28 in substantially parallel relation to the cam shaft 26 and having a combined pinion and ratchet 33 loosely mounted thereon. Also loosely mounted on this selector shaft alongside the pinion is a wheel 34 to which is pivoted a spring-pressed pawl 35 normally in engagement with the teeth of the pinion. Cooperating with the pinion is a gear segment 36 for intermittently actuating the selector shaft 32 to record-selective positions, said segment being loosely pivoted on a stud shaft 37 and including an adjustable arm 38 likewise fulcrumed on said stud shaft and

having a roller 39 for engagement with the cam 29. This adjustable arm 38 is provided with an angular extension 40 on which is mounted an adjusting screw 41 whose free end abuts the lower edge of the segment 36, whereby the arm 38 may be readily adjusted, when desired, in properly timed relation with the cam 29 in effecting the selective movements of the selector shaft 32. A spring 42 applied to the segment tends to swing it downwardly or toward the axis of the cam shaft 26.

Projecting radially from selector shaft 32 is a pin 43 and projecting from the face of the wheel 34 is a companion pin 44 which is adapted to abut against said radial pin 43. Coiled about the selector shaft 32 is a torsional spring 45, one end of which is secured to the shaft while its opposite end terminates in an arm 46 normally bearing against that side of the pin 44 opposite to that which abuts against the radial pin 43. At its rear end, the selector shaft is provided with a selector cam 47 which functions to control the selection of the records, that is, it functions to control a vertically-adjustable means hereinafter described for engaging one or another of the record carriers which have been pre-selected. At its opposite or front end the selector shaft is provided with a substantially radial stop arm 48 arranged in the path of a plurality of selector rods or push pins 49 corresponding in number to the records and disposed in an annular row at the front end of the machine and guided in the front end of the frame 28 and in a plate structure 50 suitably supported from that frame as seen in Figure 3. The arm 48 and push rods 49 function to control the amount of rotation of the selector shaft 32, the rods being longitudinally movable, either manually or otherwise, to a record-selecting position into the path of rotation of the selector arm 48, so that as the latter is rotated with the selector shaft it successively encounters one or another of the selected rods to thereby arrest the further turning of the selector shaft and pre-set the selector cam 47 to in turn position the vertically-adjustable means at the elevation for selecting the record corresponding to that of the selected push rod. During the cycle of operations of the machine, the cam 29 engages the roller 39 associated with the gear segment 36, thereby causing the pinion 33 and the wheel 34 to be rotated as a unit and the pin 44 of the latter to in turn actuate the arm 46 of the torsional spring 45 and thereby provide a coupling to effect the turning of the selector shaft 32 therewith until such time as its arm 48 encounters the first selector push rod 49 in its path. At such time the further movement of the selector shaft is arrested, the cam 47 is set in a corresponding position for selecting the chosen record, and any further movement imparted by the cam 29 to the sector 36 is transmitted idly to the torsional spring 45 by the wheel-pin 44 and spring-arm 46 to store up energy therein to return the wheel 34 and its associated parts to their initial position, shown in Figure 4, when the segment 36 is returned by its spring 42 due to the cam-engaging roller 39 following inwardly toward the axis of the cam shaft 26. During the downward travel of the segment the pinion 33 merely ratchets idly over the pawl 35.

The record carriers 19 are substantially ring-shaped to support the records and they are provided with hubs 51 which are recessed on their underside, as indicated at 52, and which are individually supported on companion collars 53 mounted in juxtaposed relation on an upright post or shaft 54 disposed at one side of the turntable and extending downwardly through the platform 15. The collars are somewhat thicker than the carrier hubs 51 and such collars bear one upon another so that each tray is individually journaled and supported on its own collar independently from the others and can swing freely to and from record-selecting position. Each hub is provided with a segmental recess 55 in its top side and arranged in such recess is a pivoted link 56 connected by a coil spring 57 with a bracket 58 secured to and rising from the platform and tied at its upper end to the corresponding end of the hub-bearing post 54. Pivoted to the latter to swing in an arcuate path about the carrier-hubs is a yoke 59 which is supported from the top of the post so as to be held against movement axially of the post and which is provided with a longitudinal slot 60 in which is guided a vertically-adjustable coupling finger 61 secured to a vertically-adjustable upright rod 62 rising from and supported on a guide member 63 slidably mounted on the lower end of the post 54. In their peripheries the carrier hubs 51 are provided with radial notches 64 which, in the normal alined position of the carriers at one side of the turntable, are in vertical alinement to form one continuous groove in which the coupling finger 61 is adapted to travel during the vertical adjustment of the rod 62 to a selective elevation.

The vertical adjustment of the record-carrier actuating rod 62 and the swinging of the yoke 59 to in turn swing a selected carrier to a position over the turntable are effected by the cams 47 and 30, respectively. To this end, a vertically-swinging lever 65 is disposed in operative engagement with the selector cam 47, being pivoted at 66 and having its free end connected to the slidable guide member 63 from which the rod 62 rises, so that when the latter is elevated to a pre-selected position, its finger 61 registers with the corresponding notch 64 of the selected record carrier 19. Cooperating with the cam 30 for effecting the swinging of the yoke 59 is a lever 67 whose free end is connected by a link 68 with the lower end of such yoke, so that during the cycle of operations the yoke is swung about the axis of the carriers to in turn swing the coupled selected carrier over the turntable. Thereafter, the turntable 16 is elevated to pick the record from the selected carrier into playing engagement with the needle of the tone arm 18. This elevation of the turntable is accomplished by the cam 31 through the medium of a lever 69 having parallel link connections 70 with a bearing member 71 upon which the lower end of the turntable-spindle 17 is seated.

Associated with the selector rod or button assembly of the phonograph is a selector-rod cancelling mechanism which functions to permit the cancellation of any pre-selection made by the patron at the push button dial except during that cycle of operations of the machine when a record-carrier is selectively actuated to and from a selector or playing position. The selector rods have stop collars 72 thereon for limiting their movement in either direction to selective and retractive positions by contact with the opposite sides of the plate structure 50, as shown in Figure 10. Interposed between said plate structure and the

frame 28 is a shiftable cancelling member or plate 73 common to all of the selector rods and having guide pins 74 extending rearwardly therefrom and guided in openings 75 formed in the frame 28. The selector rods 49 extend freely through openings in the cancelling plate and in their projected or selected positions, the inner collars 72 of the buttons abut the front face of the plate 73. Extending axially through the plate structure 50 and plate 73 is a manually-actuated cancelling button or rod 76 whose inner end abuts one arm of a rock lever 77 pivoted intermediate its ends at 78 to the frame and having its other arm abutting a projection 79 extending rearwardly from the plate 73. Normally, when the cancelling button is depressed it functions to shift the plate 73 outwardly so that any projected selector buttons are automatically returned to their initial non-selecting positions.

For the purpose of preventing such cancellation or restoration of the selector buttons 49 when the record-changing mechanism is operating, there is provided a latching device for locking the cancelling plate 73 against movement. This latch preferably consists of a shiftable cam-plate 80 disposed adjacent one of the guide pins 74 at the rear side of the adjoining portion of the frame 28 and having a slot 81 at one end through which an attaching screw 82 extends and a notch 83 at its opposite end through which the adjoining guide pin 74 extends in the manner shown in Figures 9 and 10. Said pin 74 has a stop or peg 84 thereon which bears against the rear face of the cam-plate 80, the latter being laterally offset or inclined as indicated at 85 so that when the latch-plate is shifted laterally toward such pin 74 it will create a wedge-like action and cause the cancelling-plate to be shifted axially inward to latch the cancelling-plate in a position so that the cancelling button 76 is locked against movement to a cancelling position. A spring 86 applied to the cam-plate 80 serves to constantly urge it to an unlatched position where cancelling of selections is permitted. The projection or actuation of the cam-plate to its latched or cancel-preventing position is preferably effected during the turning of the cam shaft 26 to effect the record-changing operation, and to this end a cam 87 is fixed on the front end of such shaft for engagement with the outer end of the cam-plate to project it into latched position during the period of the cycle of operations when the record trays are being moved to and from record-selecting positions.

During the complete cycle of the record-changing operation, that is, projecting a carrier from the stack, playing the record and returning the carrier to the stack, the cam shaft 26 makes one revolution and for this purpose a suitable clutch mechanism 88 is provided between the shaft and the continuously rotating worm wheel 27, the clutch being released when the turntable reaches its playing elevation and the cam shaft remaining stationary until the record has been played, after which the clutch is automatically engaged to again start the cam shaft rotating to lower the turntable and restore the played record and its carrier to the stack. Cooperating with a cam surface on the shiftable spring-pressed member 89 of the clutch is an actuating arm 90 mounted on an oscillatory shaft 91 having a radial rod 92 projecting therefrom in operative engagement with a lug 93 formed on a lever 94 pivoted to said shaft and having a spring 95 applied thereto for urging it in a direction to bring its lug 93 in abutting engagement with the rod 92. At its upper or free end this lever is engageable with the customary tone arm trip mechanism indicated generally by the numeral 96. The spring 95 is also connected to an L-shaped lever 97 pivoted to the oscillating shaft 91 and engaging a pin 98 projecting from the turntable actuating cam 31. In the playing position of the phonograph, the pin 98 on the turntable-actuating cam holds the lever 97 in a position to place the spring 95 under tension, so that when the record has completed its play, the tone arm trip mechanism is rendered operative to release its pivoted trip dog 99 from the lever 94, whereupon said spring actuates such lever to in turn rock the shaft 91 and release the actuating arm 90 from the shiftable clutch member 89 and allowing the clutch to be automatically engaged by the action of the spring 100. The clutch-actuating lever 90 is held up out of engagement with the shiftable clutch member by a cam 101 associated therewith and a pin 102 applied to such lever, in which position the parts are in readiness to begin the next cycle of operations. This phonograph is usually coin-controlled and in the position of the parts just discussed, the circuit of the motor 20 is opened through the medium of the customary magazine switch (not shown) actuated by some moving part of the record-changing mechanism when the record carrier, bearing the played record, has been restored to the stack, all as fully disclosed in the aforesaid Wilcox patent. When another record is selected at the push button dial, the motor circuit is again closed and the selected record brought out for play. At the end of this selecting cycle, the clutch actuating arm 90 swings down by gravity into engagement with the cam surface of the shiftable clutch member 89 to effect the release of the clutch and at the same time rock the shaft 91 in a direction to swing the lever 94 to its initial position in engagement with the dog 99 of the tone arm trip mechanism in readiness to be tripped when the selected record has completed its play. After the record has been played the tone arm trip functions to restore the parts to normal, as previously described, and simultaneously therewith the tone arm 18 is swung back to its initial position by a link connection 103 associated with the lever 67 which actuates the yoke 57 for swinging the carriers to and from the record-stack.

The tripping of the dog 99, upon the completion of playing a record, may be effected by a pawl 104 applied to and extending radially from the lower end of the movable tone arm post 104a and engaging a notched rod 105 of the trip assembly 96.

After the stop arm 48 has contacted a selected or projected selector rod 49 and the corresponding record is brought out for play, such arm is shifted axially of the selector shaft 32 through the medium of a resilient cam-member 106 and a cooperating revolving actuating arm 107 fixed on the cam shaft 26 to restore the projected selector rod to its initial retracted position, after which a coil spring 108 abutting said stop arm 48 returns it to initial position ready to contact the next projected selector rod. To prevent any frictional tendency of the stop arm, upon its return, to move a selector rod with it, I provide a star-shaped or bevel-toothed wheel 109 on the selector shaft and a lever 110 having a tooth-like member 111 which is movable into and out of engagement between the teeth of such wheel to impart a slight backing-up movement to such shaft.

Applied to the lever 110 is a pin or roller 112 with which the carrier-swinging cam 30 is adapted to engage for controlling its movements into and out of engagement with the toothed wheel 109. Thus, after the stop arm 48 contacts a selector rod 49, the lever 110 is subsequently moved by the cam 30 into an adjoining tooth of such wheel, the beveled edge thereof causing a recession or backing away movement of the selector shaft and its stop arm from the selector pin to effect a clearance between these parts and eliminate any tendency of projecting a selector rod upon the restoring movement of the stop arm by its spring 108.

If desired, a brake 113 carried by a flat spring 114 or the like may be provided for engagement with the periphery of the wheel 34 for holding it to the position which it is driven by the segment 36, so that when the pinion 33 is rotated to its normal position such wheel and selector shaft 32 will be held stationary relative thereto.

For the purpose of effecting an elevational adjustment of the record-carrier-hub-engaging finger 61, the latter is preferably threaded on the upper end of the vertical rod 62, as shown in Figure 6, while the lower end of this rod is supported by a cotter-pin 115 in the hub portion of the guide member 63. By removing the cotter-pin and rotating the rod 62 in one direction or the other while holding the finger 61, the latter will be raised or lowered to accordingly adjust it to the position desired, after which the rod is again set in place by the cotter-pin.

I claim as my invention:

1. In an automatic phonograph, a turntable, a plurality of superposed record carriers having notched hub members disposed at one side of the turntable and projectible to and from a position over the same, said notches being alined vertically to form a continuous groove in the normal retracted position of the carriers, and a vertically-adjustable selector rod disposed alongside said hub members and having a coupling finger thereon engageable with said notch-forming groove for adjustment to a plurality of elevations to selectively position said finger in the notch of one or another of the carriers, and a laterally-swinging support for said selector rod to move a selectively engaged carrier to a position over the turntable.

2. In an automatic phonograph, a turntable, a plurality of superposed record carriers having notched hub members disposed at one side of the turntable and projectible to and from a position over the same, said notches being alined vertically to form a continuous groove in the normal retracted position of the carriers, a yoke pivoted to swing about the axis of the carrier-hubs and having an upright slot therein, a selector rod guided on said yoke to move therewith and adjustable relatively thereto to a plurality of elevations and having a coupling finger thereon guided in said yoke-slot and engageable with said notch-forming groove to selectively engage the notch of one or another of the carriers, means for governing the selective elevation of said selector rod, and means for actuating said yoke to swing a selectively engaged carrier to a position over the turntable.

3. In an automatic phonograph, a plurality of individually selectable record carriers movable into and out of a record-playing position, and means for controlling the selection of the record carriers including a selector shaft having a gear and ratchet means loosely mounted thereon, means controlled by said shaft for actuating said carriers, a torsional spring applied to said shaft having one end connected thereto and its other end in yieldable coupling engagement with said gear and ratchet means to effect the rotation of the shaft when the latter is rotated in one direction, means for rotating said gear and ratchet means a definite distance in a direction to rotate said shaft, and adjustable selector means corresponding in number to the carriers and movable to positions for stopping the rotation of said shaft at predetermined record-selecting points, the yieldable coupling between the shaft and the gear and ratchet means permitting the full distance of travel of said gear and ratchet means as determined by said rotating means.

4. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft comprising a gear loosely mounted on said shaft, a ratchet-bearing-member loosely mounted on the shaft alongside said gear, pins projecting from said shaft and said ratchet-bearing-member in normal abutting relation, a torsional spring applied to said shaft having one end connected therewith and its other end terminating in a yieldable arm abutting the pin of said ratchet-bearing-member to cause the rotation of said shaft when said gear and companion ratchet member are rotated in one direction, means for rotating said gear and ratchet member a definite distance to rotate said shaft, the torsional spring and the pin on said ratchet member constituting a driving connection for the shaft, and adjustable selector means for stopping the rotation of said shaft at pre-determined record-selecting points, the yieldable arm of said spring permitting the idle full distance of travel of said gear and ratchet-bearing-member relative to the selector shaft as determined by said rotating means.

5. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft comprising a gear loosely mounted on said shaft, means connecting said shaft with said gear to rotate said shaft when the gear is rotated in one direction, a segment for rotating said gear a definite distance in a direction to rotate said shaft, a shaft having a cam thereon for actuating said segment, a cam-engaging member applied to the segment for radial adjustment relative thereto, and means for adjusting said cam-engaging member to a set position of adjustment.

6. In an automatic phonograph, a plurality of record carriers, a turntable, means for simultaneously selecting a plurality of records to be played, means governed by said selecting means for successively moving said record carriers with the records selected to a position over said turntable, means operatively engageable with the selecting means for restoring them to inoperative position should a patron desire to cancel selections once made, latch means operatively engageable with said restoring means for rendering the latter inoperative to cancel pre-selections at predetermined times, and means operatively associated with the carrier-actuating means and engageable with said latch means for rendering it operative during the selective movement of a carrier.

7. In an automatic phonograph, a plurality of record carriers, a turntable, means including a plurality of selector rods corresponding in number to the records for simultaneously selecting a plurality of records to be played, means

governed by said selector rods for actuating the carriers of the records selected to an operative position over the turntable, and means operatively engageable with the selector rods for restoring those once selected to their normal non-selecting positions when it is desired to cancel such selections, comprising a cancelling button, means disposed in operative relation to said selector rods and actuated by said button for restoring pre-selected selector rods to their normal position, latching means engageable with and for preventing actuation of said selector rod restoring means at a predetermined time during the cycle of operations of the phonograph, means for normally urging the latching means to an unlatched position and a part movable with said carrier-moving means and engageable with said latching means for moving it to its latched position.

8. In an automobile phonograph, a plurality of record carriers, a turntable, means including a plurality of selector rods corresponding in number to the records for simultaneously selecting a plurality of records to be played, means governed by said selector rods for actuating the carriers of the records selected to an operative position over the turntable, and means operatively engageable with the selector rods for restoring those once selected to their normal non-selecting positions when it is desired to cancel such selections, comprising a cancelling button, means actuated by said button for restoring pre-selected selector rods to their normal position, a latch plate disposed for latching engagement with said selector rod restoring means at a predetermined time during the cycle of operations of the phonograph to render the cancelling button inoperative to cancel selections once made, cam means associated with the carrier actuating means for moving said latch plate to and retaining it in its latched position during the selective movement of a carrier, and means for yieldingly urging said latch plate to an unlatched position.

9. In an automatic phonograph, a plurality of record carriers selectively movable to and from a record-playing position, and means for controlling the selection of records comprising a combined rotatable and axially-shiftable member, a plurality of individual means corresponding in number to the record carriers and selectively movable to positions for operative engagement with and to stop the rotation of said rotatable member at predetermined selective positions, means engageable with said rotatable member for shifting it axially in one direction at a predetermined time to restore the then operatively-engaged individual selecting means to its initial non-selective position, means operatively connected with said rotatable member for yieldingly urging it in the opposite direction, a wheel movable with said rotatable member and having bevel-ended teeth thereon corresponding in number to the individual selector means, a lever having a tooth-like element thereon movable at predetermined times into and out of latching engagement with said toothed wheel, and means operatively connected with said lever for governing its movements, said tooth-like element during its latching stroke, encountering a corresponding beveled edge of one of the wheel-teeth to turn it and said rotatable member in a direction to free the latter from engagement with a given individual selector means.

HOWARD F. MAURER.