

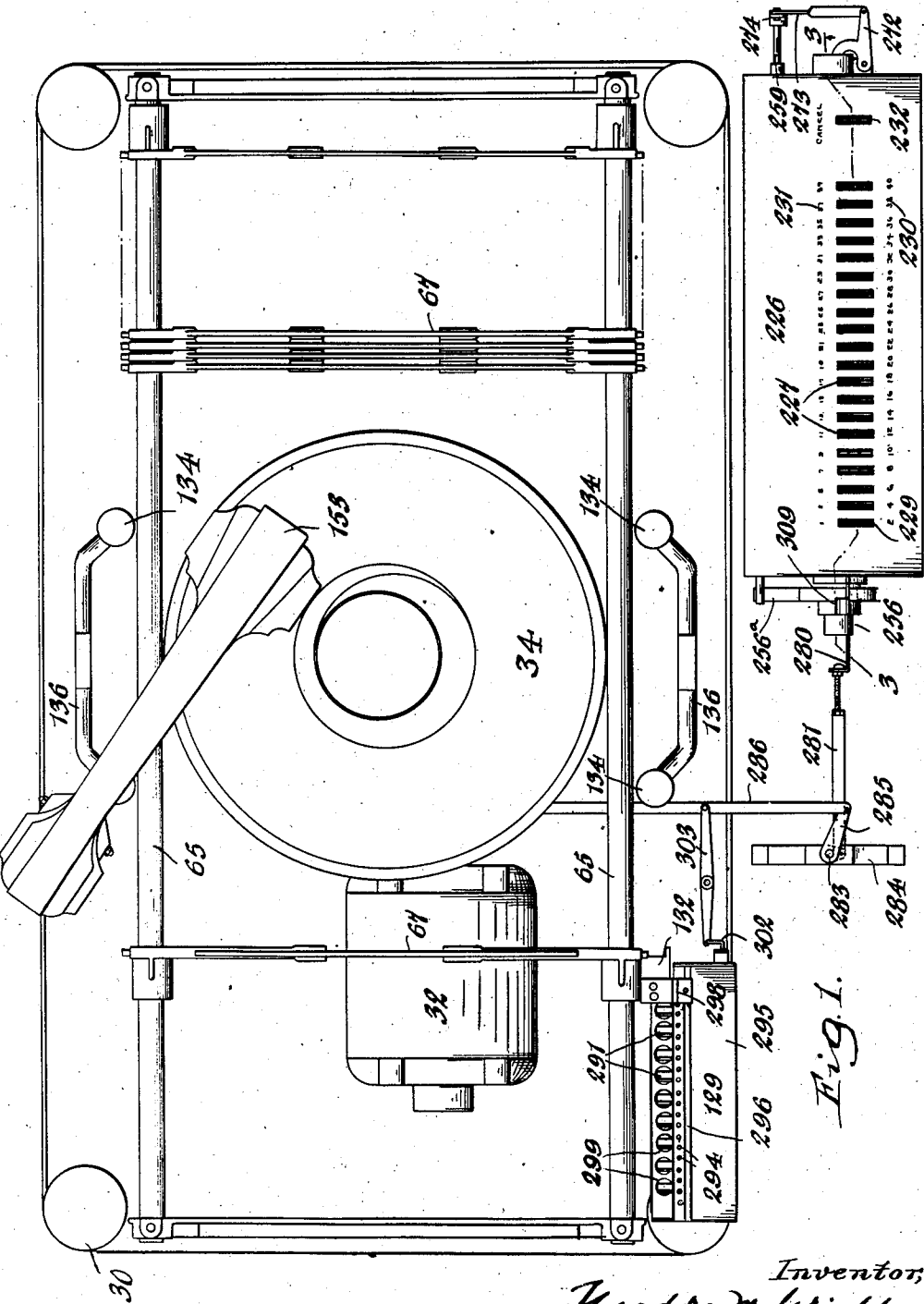
March 13, 1945.

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2,371,491

SELECTOR MECHANISM FOR AUTOMATIC PHONOGRAPHS

Original Filed Jan. 10, 1939 . 6 Sheets-Sheet 1



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SELECTOR MECHANISM FOR AUTOMATIC PHONOGRAPHS

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6 Sheets-Sheet 2

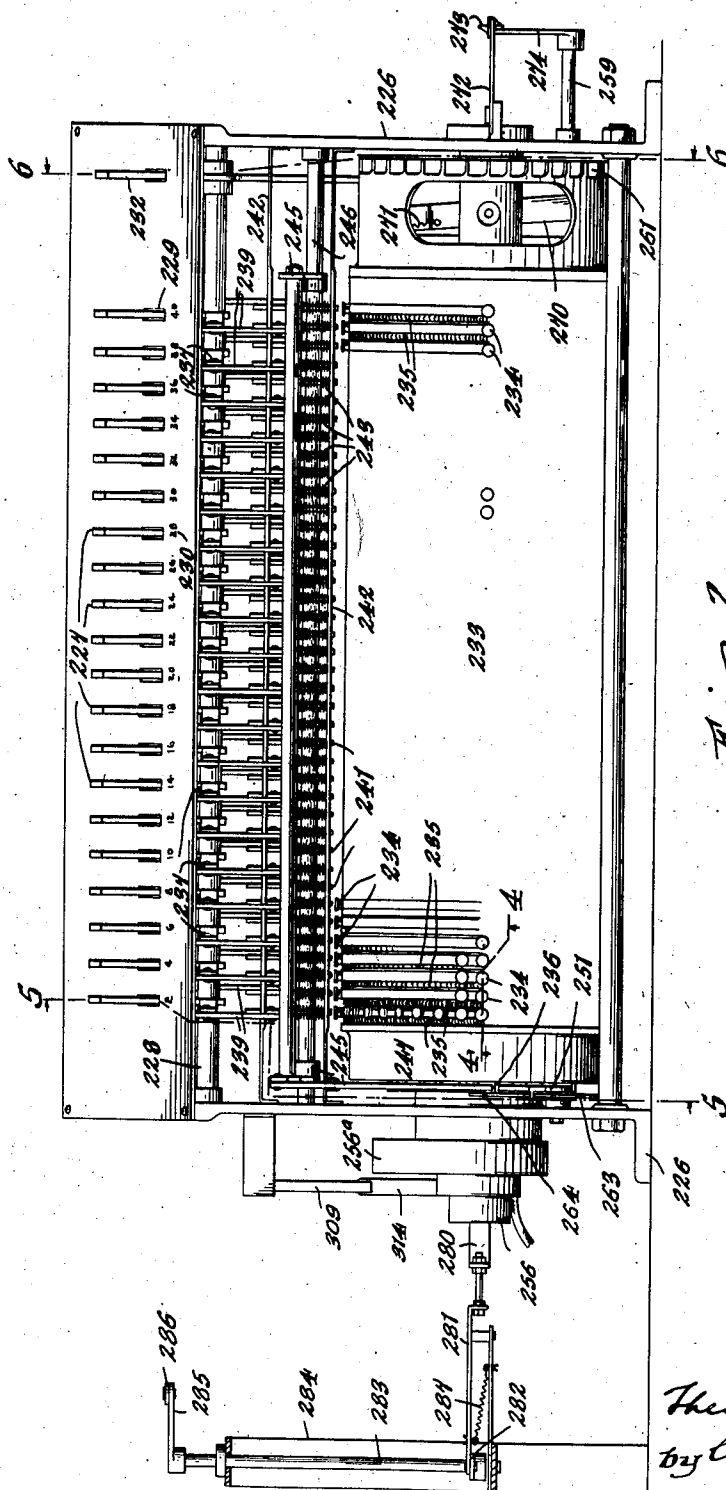


Fig. 2.

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SELECTOR MECHANISM FOR AUTOMATIC PHONOGRAPHS

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6 Sheets-Sheet 3

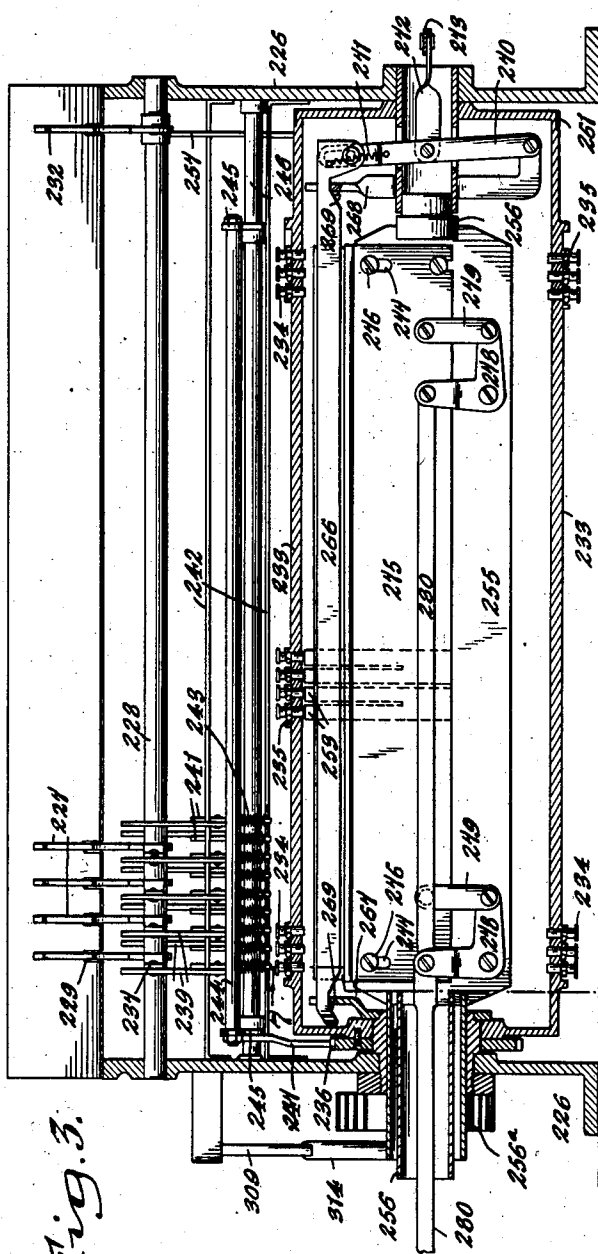
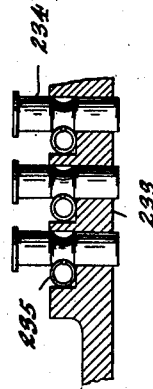


Fig. 3.

Fig. 4.



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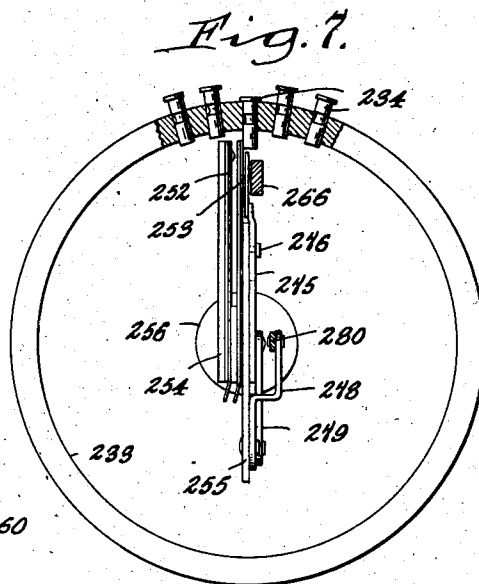
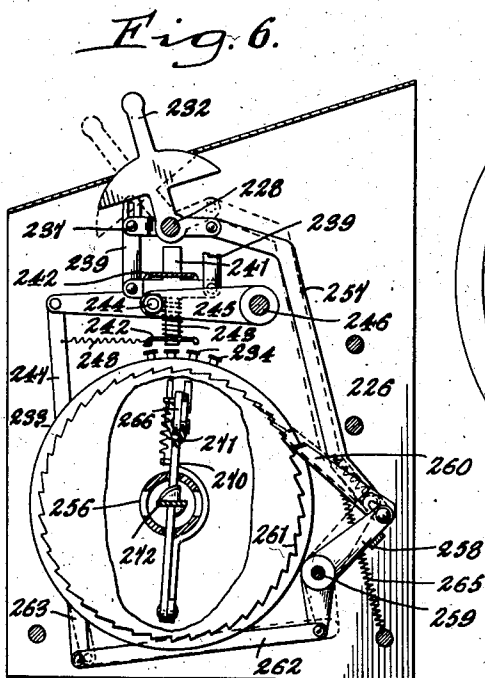
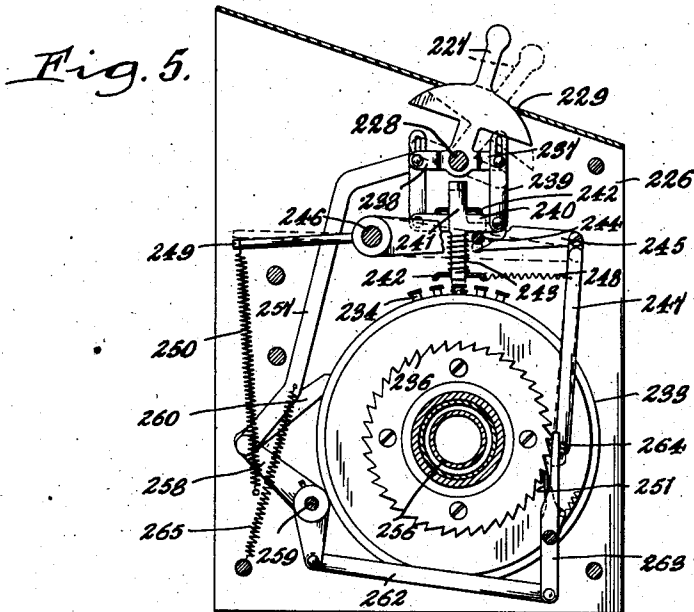
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SELECTOR MECHANISM FOR AUTOMATIC PHONOGRAPHS

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6 Sheets-Sheet 4



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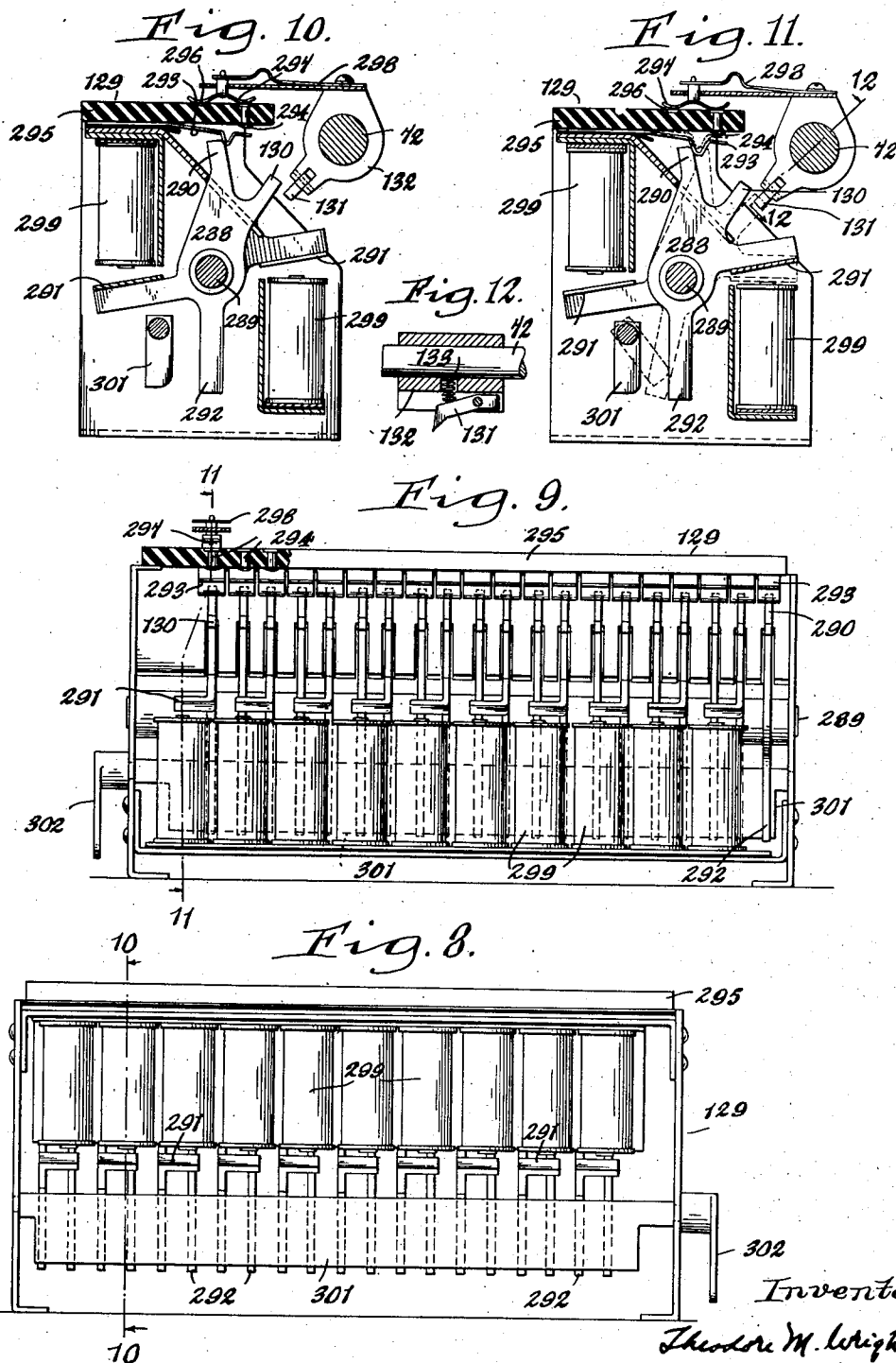
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SELECTOR MECHANISM FOR AUTOMATIC PHONOGRAPHS

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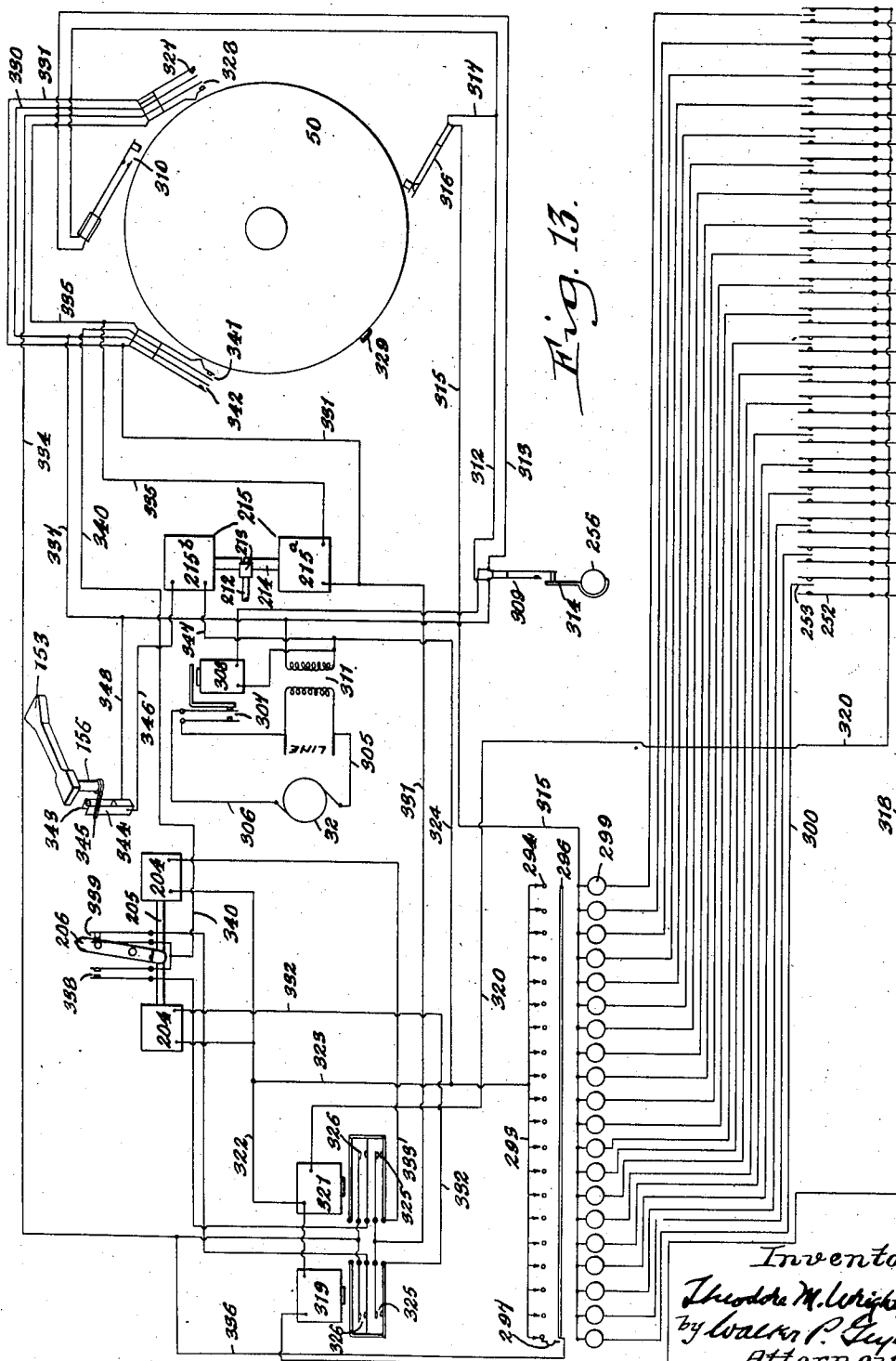
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SELECTOR MECHANISM FOR AUTOMATIC PHONOGRAPHS

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UNITED STATES PATENT OFFICE

2,371,491

SELECTOR MECHANISM FOR AUTOMATIC
PHONOGRAPHS

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Original application January 10, 1939, Serial No.
250,252, now Patent No. 2,298,447, dated Octo-
ber 13, 1942. Divided and this application
March 20, 1942, Serial No. 435,489

10 Claims. (Cl. 177—353)

This invention relates to certain new and useful improvements in selector mechanisms designed for use in connection with automatic, multi-record phonographs.

It has for one of its objects to provide a phonograph selective mechanism which is so designed and constructed as to permit the patron to pre-select a plurality of record programs in any predetermined order or sequence desired, whether such programs be on one side or the other of the record, and to effect as well the selective repetition of any given record.

Another object of the invention is to provide a positive, reliable and efficient electrical selector mechanism for selecting in advance one or more records for play, such mechanism being designed to be multi- and universally-selective and to predetermine the playing of the record-selections in sequence on one side or the other of the records, or to repeat any selections desired.

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

This invention is a division of my copending application, Serial No. 250,252, filed January 10, 1939.

In the accompanying drawings:

Figure 1 is a top plan view of my selector mechanism in operative association with a phonograph chassis. Figure 2 is an enlarged front elevation of the same. Figure 3 is an enlarged longitudinal section of the selector mechanism taken in the plane of line 3—3, Figure 1. Figure 4 is an enlarged fragmentary longitudinal section taken on line 4—4, Figure 2. Figure 5 is a transverse vertical section taken in the plane of line 5—5, Figure 2. Figure 6 is a similar section taken on line 6—6, Figure 2. Figure 7 is a transverse vertical section taken in the plane of line 7—7, Figure 3. Figures 8 and 9 are front and rear views, respectively, the latter being partly in section, of the unit controlled by the selector mechanism for governing the movement of the magazine to its selective positions. Figure 10 is a transverse section taken substantially in the plane of line 10—10, Figure 8. Figure 11 is a like section taken in the plane of line 11—11, Figure 9. Figure 12 is a fragmentary section taken in line 12—12, Figure 11. Figure 13 is a diagrammatic view of the electrical connections of the selector mechanisms for controlling the phonograph.

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

This multi- and universally-selective mecha-

nism has been designed for use with multi-record phonographs and the like whereby a patron may pre-select in advance, or at any time during the playing of the phonograph, any number of recordings desired, whether such recordings be on one side or the other of the records, or whether it be desired to repeat certain recordings. Furthermore, the electrical selector unit is so designed that the records may be played in any desired sequence, that is, to play, say, record No. 3 on one side, to play record No. 5 on the opposite side, to play record No. 1 on one side twice in succession, etc. This mechanism is applicable, for example, to the record-changing mechanism of an automatic phonograph shown in my copending application, wherein the records are supported edgewise in a vertical magazine disposed at one side of the turntable for adjustment relative to the turntable to selective positions and adapted to be split horizontally to provide an operating clearance for the playing of the selected record, and swiveled record-gripping means releasably engageable with and for transferring a selected record from the magazine for play and to the magazine after play and for turning the record to expose one side or the other for play as predetermined by the selector mechanism.

In Figure 1 I have shown the general disposition of the selector assembly relative to the phonograph, the numeral 30 being the chassis or bed plate of the phonograph, 32 the electric motor for operating the record-changing mechanism, 34 the turntable, 67 the magazine-forming members guided on rods 65, 66 and between which the records are supported for selective movement to a position axially over the turntable, 72 the selective-governing rod for actuating the magazine to predetermined selective positions, 134 the record-gripping means having swiveled record-receiving bails 136 thereon for turning the records to present one side or the other thereof for play, and 153 the tone arm pivoted to swing both vertically and horizontally relatively to the turntable. The arresting movements of the selective governing rod 72 to predetermine the selective positioning of the magazine for playing a given record is controlled by a mechanism indicated generally by the numeral 129 and which may consist of a longitudinal row of stop elements 130 selectively projectable into the path of a stop dog 131 pivoted to a collar 132 secured to said rod 72. A spring 133 normally projects the dog into operative position and permits the dog to swing to a receding position over a projected stop element on the return stroke of the magazine. Oper-

atively connected to this magazine positioning mechanism 129 for automatically controlling the same and to govern the record-changing mechanism of the phonograph to play the records selected is my electrically-operated selector unit which may be disposed at the front side of the phonograph chassis and is preferably constructed as follows:

The working parts of this selector unit are arranged in a suitable casing 226 in which are mounted a longitudinal row of suitably spaced selector levers 227, each pivoted for vertically-swinging movement on a common pivot shaft 228 fixed in the upper end of the casing and each movable from a normal neutral position to a forward position for pre-selecting a recording desired which is on one side of the record or to a rearward position for preselecting a recording which is on the other side of the same record. As shown in Figure 5, these levers project through corresponding slots 229 formed in the top wall of the casing and the end walls of these slots limit the movements of the levers to their respective selecting positions. These levers may be identified in any suitable manner to indicate the record recordings borne by the phonograph, and as shown in Figure 1, rows of numbers or like designations 230 and 231 may be provided which are arranged in rows along the front and rear edges of the slots 229, the even numbers indicating the recordings on one side of the records and the odd numbers indicating the recordings on the opposite sides of the records. At one end of the casing a cancelling lever 232 is provided for enabling the user to cancel any individual selection previously made.

Journalled lengthwise in the casing below the selector levers is a rotatable selector drum 233 having a plurality of rows of annular switch-controlling buttons 234, there being two rows of such buttons for each selector lever 227 and the latter being in transverse vertical alinement between companion push buttons. One row of push buttons controls the playing of one side of the record, while the companion row controls the playing of the opposite side of the record. These buttons are supported radially in the peripheral wall of the drum for movement in a radial direction to and from a selective switch-closing position and annular coil springs 235 may be seated in the drum adjoining the annular row of buttons to frictionally hold the buttons in one position or the other. The phonograph, for example, may be equipped with twenty records which make a repertoire of forty selections, and in this connection, twenty-selecting levers 227 are provided movable to one or the other of two selective positions to play one side or the other of a record and included in each annular row of switch-controlled buttons 234 are forty of such buttons so that irrespective of the angular or radial position of the drum at any given time, there is a companion push button for operative action by a given selector lever. Fixed to one end of this drum is a ratchet wheel 236 having as many teeth as there are switch-controlled buttons 234 in a given annular row, this ratchet wheel serving to successively advance the drum a distance of one tooth for each selective movement of the selector levers. The means for so controlling the movement of the drum from the selector levers is constructed as follows:

At its lower end each selector lever 227 terminates in a cross bar including opposing, laterally-offset arms 237 and 238, respectively, which

cooperate with adjoining rows of switch-controlling buttons 234, one arm acting on one or another of a registered button in a given annular row for controlling the playing of one side of the record and the companion arm acting on one or another of a registered button in the adjoining annular row for controlling the playing of the other side of the same record. Each selector lever arm is pivotally connected by a pendant, slotted link 239 to a lateral extension 240 of a button-actuating plunger 241 guided for vertical movement in upper and lower guide plates 242 secured at their ends to the casing 226, there being one of these plungers for each annular row of buttons. A spring 243 applied to each plunger normally urges it to an elevated non-selecting position. When the selected plunger is depressed, it projects the alining switch-controlling button 234 to the position of the middle button shown in Figure 7. Disposed beneath and common to the several plunger-extensions 240, is a pawl-actuating rod 244 attached at its ends to vertically-swinging arms 245 fulcrumed on a longitudinal shaft 246 supported at its end on the end walls of the casing 226, that arm adjoining the end of the selector drum 233 on which the ratchet wheel 236 is mounted having a depending drum-actuating feed pawl 247 pivoted thereon at its free end and normally held in engagement with the ratchet wheel by a spring 248. Projecting from the other end of the pawl-carrying arm is an extension 249 to which a spring 250 is connected for constantly urging the lever to rock in a direction to advance the drum counter-clockwise, viewing Figure 5, a distance of one tooth. A keeper pawl 251 normally engages the ratchet 236 to prevent its movement in a clockwise direction, viewing Figure 5, during the downward movement of the pawl 247 over the face of a ratchet tooth, so that the drum will be held against relative movement during that time. By this construction, when a selector lever 227 is manually moved in one direction or the other to a selected position, one or the other of the links 238 or 239 is displaced downwardly to in turn depress its companion plunger 241 and alined, vertically - positioned switch - controlling button 234 inwardly of the drum, and at the same time cause the plunger-extension 240 to engage the pawl-actuating rod 244, rocking the latter downwardly about its fulcrum 246 against the resistance of the spring 250 to advance the pawl 247 idly downwardly relatively to the engaging tooth of the ratchet wheel a distance of one tooth. When the user completes the selecting stroke and releases his grip on the selecting lever, the spring 250 then acts to move the pawl 247 upwardly and advance the ratchet wheel and its selector drum a distance of one tooth, and during this movement the selector lever and intermediate connections are restored to their initial positions, the depressed switch-controlling button 234, however, remaining in its selective governing position until restored by other means to be hereinafter described. With each movement of one or more of the selector levers to selecting positions, the companion switch-controlling buttons are depressed and the drum successively advanced a distance of one tooth for each selection made to properly position the buttons for effecting the sequential selection of the records desired.

Arranged within the selector drum 233 is a rotatable switch assembly adapted to be turned therewith during its advancing, selecting move-

ments by a clutching of the depressed buttons 234 therewith, and having a plurality of companion, switch elements 252, 253 which are radially mounted between suitable frame pieces or plates 254 and 255, respectively, extending lengthwise of the drum and having sleeve-like journals 256 at their opposite ends which are rotatably mounted in the end walls of the casing 226, whereby the selector drum may be rotated independently of the switch assembly, and the latter in turn may be rotated jointly with the drum at predetermined times. The switch elements 252, 253, the latter one of which is movable relatively to the former to close and open the switch, are disposed side by side lengthwise within the selector drum and in the same common plane, there being one pair of switch-elements for each annular row of push buttons 234, with adjoining or companion pairs associated with each selector lever being electrically connected in common or as one, as shown in Figure 3, so that any depressed push button in a given row, governing the playing of a recording on one side or the other of a given record, is adapted at a predetermined time and in the sequence order of selection to engage and close the aligned switch to establish a circuit for selectively governing the movement of the record magazine to its selective station of adjustment corresponding to that of the record selected. These several switches are normally in an open position and are only selectively and individually closed when a companion depressed push button so closes it, the closing of the switch in each case taking place by the depressed button contacting and moving the movable switch element 253 in contact with its companion element during the rotation of the selector drum 233 a distance of one tooth of its ratchet 236, as imparted to it by the upstroke of the feed pawl 247 in the manner previously described. Simultaneously with this switch-closing movement, the switch assembly is turned as a unit in a like direction, each leading push button always being in position to so advance the switch assembly for each tooth-distance advance of the selector drum. A coil spring 256a connected to one of the journals 256 of the switch assembly tends to yieldingly resist such advancing movements, and as each leading push button of a group selected is restored to its initial position, this spring urges the switch assembly in the opposite direction against the next depressed push button and so on, thereby resulting in the sequence playing of the records selected.

Means are also provided for manually cancelling a recording, previously selected, but not yet positioned for play, and for automatically cancelling the selection after its record has been operatively positioned for play, the cancelling operation in either case being that of restoring the companion selected push button 234 to its initial non-select position. The manual cancellation of a previously selected record is effected by the cancelling lever 232 which is pivotally mounted on the same shaft 228 to which the selecting levers 227 are pivoted, and pivotally connected to this cancelling lever is a pendant link 257 whose lower end is joined to one arm of a bell crank lever 258 fixed on a shaft 259 suitably supported in the casing 226. Also joined to the same arm of this bell crank is a pawl 260 which is engageable with an annular row of ratchet teeth 261 applied to the right hand end of the selector drum 233 and which, when the cancelling lever is moved to cancelling position shown by dotted lines in Figure

6, is adapted to turn the drum in a direction opposite to that imparted by the selector levers 227 and their companion feed pawls 247, to thereby restore the drum to the same position in which it was previous to a position effected by a given selecting operation. In other words, a selected push button 234 is thereby moved in a direction away from a companion pair of switch elements 252, 253, so as to open the switch and cancel the selection. Connected to the other arm of the bell crank 258 is a link 262 which is operatively connected to a rock arm 263 arranged to engage a pin 264 projecting from the lower end of the feed pawl 247 so that during a reversed rotation of the drum by the cancelling pawl 260 the feed pawl 247 is automatically released from operative engagement with its ratchet wheel 236 so as not to interfere with the reversed cancelling movement of the drum in response to a movement of the cancelling lever 232 to a cancelling position. When the user releases his grip on the cancelling lever 232, a spring 265 restores it and its associated parts to their initial position.

Simultaneously with the movement of the selector drum to a cancelling position in the manner just described, a means is provided for restoring the companion depressed selected button 234 to its initial non-selecting position. For this purpose a button-cancelling bar 266 is disposed lengthwise within the drum 233 in cooperative relation with the inner ends of the upper central row of selector buttons, such bar being mounted for radial displacement into engagement with an aligning depressed push button to restore it to its initial non-selection position. This bar is supported at its ends on notched arms 267 and 268 for longitudinal displacement relative thereto and said bar has inclined cam faces 269 adjacent its ends and at the lower edges thereof, so that upon an endwise shifting of the cancelling bar 266 in one direction or the other it is accordingly displaced relatively to the arm-notches and radially outwardly or inwardly to and from a button-cancelling position. The longitudinal displacement of the cancelling bar is effected by a vertically-swinging rock lever 270 pivoted at its lower end to the companion end of the adjoining notched-arm 268 and connected at its upper end by a slotted joint to the adjoining end of such bar, so that when said lever 270 is rocked in one direction or the other the cancelling bar is accordingly displaced outwardly or inwardly. A spring 271 normally urges the bar to its inward position. Connected to the bar-shifting lever 270 is a horizontally-swinging bell crank 272 which is connected by a link 273 with a crank arm 274 applied to the adjoining end of the shaft 259 on which the bell crank 258 is fixed. By this construction, when the cancelling lever 232 is moved to a cancelling position to accordingly rotate the drum in a direction opposite to that effected during selection, motion is transmitted to the shaft 259 and thence to the rock lever 270 to shift the cancelling bar longitudinally and effect its radial outward displacement by the coaction of its cam faces 269 with the notched ends of its supporting arms 267 and 268. The outward displacement of the cancelling bar engages any selector buttons 234 in its path and restores them to their non-selecting positions.

The automatic cancelling or restoration of a given selector button 234, after it has performed its record-selecting function, is controlled during the movement of the tone arm into playing en-

gagement with the selected record. Mounted on the switch-carrying plate 255 is a vertically-displaceable cancelling plate 275 joined thereto by screw and slot connections 276, 277 and engageable at its upper edge when displaced radially outwardly with an aligned depressed push button 234. The vertical displacement of this cancelling plate is effected by a pair of bell crank levers 278 fulcrumed on the lower end of the switch-carrying plate 255, one arm thereof being connected by tie links 279 with the cancelling plate and the other arm of each of said levers being connected by a link 280 disposed substantially axially of the selector drum 233 and including a swivelly-joined adjustable extension 281, the latter being arranged exteriorly of the selector drum and connected with a crank arm 282 fixed on the lower end of an upright shaft 283 supported in a suitable bracket 234. At its upper end this shaft 283 has a crank arm 285 connected by a link 286 with the means for controlling the movement of the tone arm to and from playing position. A spring 287 connected to the extension 281 of the link 280 serves constantly to urge the latter in a direction to retain the cancelling plate 275 in an inoperative position. However, when the tone arm is swung inwardly to a play position, motion is simultaneously transmitted to the link 280 through the intermediate connections just described to in turn rock the levers 278 in a direction to shift the cancelling plate 275 outwardly and restore the aligned push button 234 to its initial non-selective position.

During the angular displacement of the switch assembly, due to the selection of a plurality of records in advance, the cancelling plate 275 moves bodily therewith and the axially-swivelled connection between the link 280 and its extension 281 permits such displacement without affecting the position of the extension 281 and the parts associated therewith. The manually-controlled cancelling bar 266, however, always assumes a position vertically below the selecting levers 277 being retained in that position by its notched supporting arms 267 and 268, and the connection of the rock lever 270 to the adjoining lever 272 is disposed substantially axially of the selector drum.

The means for automatically controlling the selector unit 129 and its selective-controlling stop elements 130 to govern the sequence playing of the recordings selected in advance by the selector levers 227 is preferably constructed as follows:

Disposed in a longitudinal row in the selector assembly 129 are a plurality of individual, vertically-swinging, electrically-governed rocker arms 288 to which the selectively-projectable stop elements 130 are applied and which correspond in number to the records and the selector levers 227, each being governed by a companion selector lever. These rocker arms are fulcrumed on a common horizontal pivot-shaft 289 and each includes, in addition to its stop element 130 for arresting the magazine at the corresponding record-selecting station, a switch-controlling finger 290, an armature element 291 and a cancel-governing finger 292. The finger 290 of each rocker arm controls the closing and opening of a switch 293, 294, the movable element 290 thereof being in the form of a yieldable blade and the fixed element being in the form of a contact post toward and from which the movable element is actuated to close or open a circuit in response to the selecting and cancelling movements im-

parted to the rocker arm in one direction or the other. These contact-posts 294 are attached to an insulating panel 295 and are adapted to be selectively bridged across a common longitudinal conductor strip 296, seated in said panel alongside such posts, by a bridge bar 297 fixed to the collar 132 of the magazine-governing rod 72. A spring 298 acts on this bridge bar for urging it in contact with the parts 294 and 296.

Disposed in operative relation to the armature element 291 of each rocker arm 288 is an electromagnet 299, there being ten of such magnets disposed in a longitudinal row in the upper position and at one side of the selector unit 129 for cooperation with certain of said rocker arms, while the remaining ten magnets are disposed in parallel relation to the first row but at the lower and opposite side of the selector unit for cooperation with alternately-arranged rocker arms, whereby, when one or another of the magnets is energized, its companion armature 291 is attracted and the corresponding rocker arm is moved in a clockwise direction, viewing Figures 10 and 11, to present its stop element 130 into the path of travel of the stop dog 131 and arrest the magazine at the selected station. Each electromagnet 299 is connected by a wire 300 to adjoining pairs in common of the companion selector-lever-controlled switch 252, 253, so that when a selector lever 227 is moved to a position to select one side or the other of the companion record, the corresponding magnet will be energized by one or the other of the affected pair of push buttons 234 to project the corresponding stop lug 130 into position for arresting the magazine at such station where the record selected will be in axial transverse alinement with the turntable.

The cancel-governing finger 292 of each selectively-set rocker arm 288 is adapted, at a predetermined time after the completion of a selective operation, to be tripped by a vertically-swinging tappet bar 301 disposed alongside and common to the several rocker-fingers 292 so as to restore such rocker arm to its initial or non-selective position. This tappet bar has a crank arm 302 at one end thereof which is connected to one end of a horizontally-swinging lever 303, the other end of the latter being connected to the link 286 of the crank arm 285 which operates the cancelling plate 275 in a direction to cancel a given push button 234. By this construction, the movement of the tone arm to play position not only cancels the selected button but at the same time effects the restoration of the companion rocker arm 288 to its initial position, the tappet bar being rocked in a direction to turn such rocker arm to that position.

The electrical circuit for automatically controlling the operation of the phonograph upon the selection of one or more recordings is shown in Figure 13 and is constructed and arranged as follows:

The motor 32 which drives the various movable parts of the phonograph is connected by wires 305 and 306 to a source of power and includes a normally-open main switch 307 adapted to be closed by a relay 308 which is in turn rendered operative or energized to close the main switch by one or the other of two switches 309 or 310 included in the circuit of such relay. This relay circuit derives its power from a transformer 311 and includes the wires 312, 313 to which the switches 309, 310 are connected in parallel. The switch 309 is controlled from the electrical se-

lector unit mounted in the casing 226 and is adapted to be moved from a normally open position, when the phonograph is at rest, to a closed position in response to the advancing movements of the switch assembly 252—255 and associated parts imparted to it by the selecting levers 227 and push buttons 234, and remains closed until the last record of a selected group has been brought into play, at which time the return movement of the switch assembly is such as to again open such switch. To accomplish these ends, this switch 309 is controlled by a tappet arm 314 radially mounted on the outer end of one of the journals 256 of the switch assembly, such arm having its outer end in the path of the movable element of said switch to normally hold it open, while upon the turning movement of the switch assembly to sequence selecting positions, as called for by the selecting levers 226 operated, the tappet arm recedes from the movable yieldable element of the switch 309 and causes it to close by spring pressure. The companion switch 310 is controlled by a part of the record-changing mechanism so as to be closed during the playing-period of a record and automatically opened at a predetermined time, as when a played record has been restored to its initial position in the record-magazine, and remains open until the next record is brought out for play, when it is again closed. Should no other records be registered for play, the phonograph will then stop, because at such time the companion selective-controlled switch 309 is also opened. However, should other records be registered for play, the motor circuit will remain closed through such companion switch 309, which, under such conditions, is still closed, and remains closed until the last record of a selected group has been positioned for play, at which time said switch is automatically opened.

The circuit including the electromagnets 299 for actuating the rocker arms 288 to project their stop elements 130 into the path of the magazine stop dog 131 to arrest the magazine at the selected record stations consists of the selector lever and push button controlled switch elements 252, 253, each of the elements 253 being connected by the companion wire 300 to one end of the coil of the companion electromagnet. The other end of this coil is connected to a feed wire 315, common to the several electromagnets, which is connected to the terminal of a normally closed switch 316, the other terminal thereof being connected by a branch wire 317 to the wire 312 leading to one terminal of the transformer 311. This circuit is then completed, depending on whether a given selector lever 226 is pushed forwardly or backwardly to play an even-numbered recording, that is, the recording on one side or the other of the selected record, through the closing of the companion pair of switch elements 252, 253 by the respective push button 234 which was depressed for selection. One of the switch elements 252 of a pair, controlled by one or the other of adjoining push buttons associated with each selector lever 226, is connected by a wire 318, common to the whole group of such switch elements, to a relay 319 for governing the playing of the odd-numbered selections or one side of a selected record, while the companion switch element of a given pair is connected to a like common wire 320 to a similar relay 321 for governing the playing of the even-numbered selections or the opposite side of a selected record. Each of these relays is connected to a wire 322 which leads through a wire 323 and 324 to the other

terminal of the transformer, thereby completing the circuit established by a depressed selector lever 226. When the odd relay 319 is energized to play one side of a record, it closes pairs of relay-contacts 325 and 326 which control the selected side of the record to be played. Included in the circuit of the pair of contacts 325 is a switch having two sets of contacts 327 and 328 which is adapted to be closed at a predetermined time by a master cam 50 through the medium of a projection 329 formed thereon. Leading from the set of switch contacts 327 are wires 330 and 331, the wire 330 being connected to one terminal of the transformer 311, and the companion wire 331 being connected to one of the relay-contacts 325 of each relay 319 and 321, the companion contacts thereof being connected by wires 332 and 333, respectively, with the companion odd and even-governing coils of a double-acting solenoid 204, which selectively governs the shifting of the swiveled record-receiving bails to present one side or the other of the record for play, the other end of each coil thereof being connected to the wires 323 and 324 leading to the other terminal of the transformer. Thus, when a given selector lever 226 is moved to a select position, say, to play the odd-numbered side of that record, the companion switches 252 and 253 are closed by the affected button 234 to, first, set the magazine at the record-selecting station in the manner heretofore described, and, secondly, to energize the companion odd relay 319 to close the contacts 325 and 326 thereof and accordingly energize the companion odd coil of the solenoid 204 to shift its plunger 205 in a direction to initiate the swiveling movements of the record-bails or grippers 136 in a direction to present the odd-numbered side of the record for play. Conversely, should the even-numbered side be selected, the even coil of solenoid 204 is correspondingly rendered operative to effect a swiveling of the grippers to present such side of the record for play. It should be stated here, however, that the circuit of the solenoid 204 for governing the playing of one side or the other of the record is not completed until the projection 329 on the master cam 50 has reached a radial position for closing the switch contacts 327, 328.

Leading from the set of switch contacts 328 are wires 334 and 335, the wire 334 being connected to one of the contacts 326 of the relays 319 and 321. Branching from wire 334 in advance of its connection to the relay-contacts is a wire 336 which is connected to the conductor bar 296 associated with the selective terminal posts 294. The wire 335 is connected to the record-repeating coil 215^a of a double-acting solenoid 215, which functions to control the master cam 50 and the record changer mechanism in selectively bringing a record to and from play position. In a selected position, the bar 296 is connected across the companion post 294 by the bridge bar 297 to complete the circuit through the coil 215^a governed by the switch-contacts 328. This circuit emanates from the transformer 311 through wire 337 to wire 330 and contacts 327 and then through wire 331 to the coil 215^a and through wire 335 to contacts 328 to wires 334, 336 and to conductor bar 296, bridge bar 297 and corresponding terminal post 294 and back through wire 324 to the other terminal of the transformer.

Operatively associated with the double-acting solenoid actuated lever 206, which governs the playing of one side or the other of the selected

record, are switches 338 and 339, the switch 339 being closed by said lever 206 when the odd-numbered side of the record has been selected, at which time the other switch 338 is open and vice versa. One set of companion elements of these switches are connected by a wire 340 to one side of a cam-actuated switch 341, the other side of the latter being connected to the wire 335. The other set of companion elements of the switches 338 and 339 are connected to the companion contacts 326 of the relays 321 and 319, respectively. Disposed alongside the switch 341 is a switch 342 which is connected in parallel with the switch 327, one contact of said switch 342 being also connected to wire 331 while its other contact is also connected to wire 337.

Associated with the tone arm, for initiating the return of a record to the magazine after play, is a switch including a fixed contact 343 and a movable contact 344 controlled by a tappet arm 345 movable with the tone arm, the movable contact being connected by a wire 346 with one end of the cancel-coil 215^b of the double-acting solenoid 215, while the other end of said coil is connected by a wire 347 with the transformer 311. The fixed switch contact 343 is connected by a wire 348 to wire 337 leading to the other terminal of the transformer.

The normally closed switch 316, which is included in the circuit of the selector magnets 299, functions to de-energize said magnets when the tone arm is in playing engagement with a record, and is moved to open position for that purpose at a predetermined time by the tone arm moving mechanism.

In the at rest position of the phonograph, the master cam 50 is clutched to turn in a clockwise direction. When a record is selected and the motor is started by the closing of the switch 309, the master cam momentarily revolves in a clockwise direction and then in a counter-clockwise direction, in which direction the cam rotates during the selective-transferring and positioning movements of a record for play. During a single revolution of the master cam in a counter-clockwise direction, the record magazine is shifted to record-selecting position, the magazine is split horizontally to provide for turntable clearance, the record is turned from a vertical to a horizontal playing position in one direction or the other depending on which side the selected recording is arranged, the turntable is lifted to the elevation of the record, and the tone arm is swung in for play, the counter-clockwise movement of the master cam is arrested so that the cam is at rest during the playing of the record. When the playing of the record is completed, the tone arm closes the switch 343, 344 to energize the cancelling coil 215^b of the solenoid 215, resulting in a clutching operation to rotate the master cam in a clockwise direction for restoring the parts to their initial position with the played record returned to the magazine.

When the projection 329 of the master cam contacts the switches 327, 328 during its counter-clockwise movement, it momentarily closes them by an impulse contact to energize one or the other of the coils of the double-acting solenoid 204 so as to govern the positioning of the record for properly playing its selected side. Thereafter, the cam continues in its counter-clockwise direction and while the projection 329 encounters the switches 341, 342, no further effect is produced. When the cam cycle has been completed, the cam is stopped and remains in such position

during the playing of the record. If, after playing it, that record is to be repeated, then, on the initial clockwise movement of the cam 50, the cam-projection 329 closes the switch contacts 341, 342 which results in the companion coil of the double-acting solenoid 204, which was previously energized, to simply be energized again, while the coil 215^a is energized to cause the cam to turn in a counter-clockwise direction. If the same selected record is to be then played on the opposite side, the initial clockwise movement of the cam closes the switches 341, 342 and causes the circuit including the other coil of the double-acting solenoid 204 to be established, but at that time the record-swiveling control is still in its previously set position and the solenoid is not capable of responding to its energization. Also, at this time the coil 215^a is not energized due to the fact that the circuit is broken at the switch 338, so that the cam continues in its clockwise direction until its projection 329 encounters the switches 327, 328, which then causes the circuit of the solenoid 204 to be rendered active to shift the parts controlled thereby and to energize the coil 215^a and cause the cam to rotate in its counter-clockwise direction to accomplish the record-changing act or that of presenting the record for play.

I claim as my invention:

1. A selector mechanism, comprising a rotatable selector drum having a plurality of annular rows of switch-governing push buttons thereon, a plurality of selector elements disposed in operative relation to said push buttons for actuating them to a selective-governing position, means operatively connected to and initiated by the movement of a selector element to a selecting position for advancing said drum a predetermined distance, a rotatable switch assembly rotatable with and housed in said drum including a longitudinal row of switches companion to and aligned with said rows of push buttons for successive actuation by selected buttons in predetermined sequence to switch-closing position during an advance movement of said drum, means mounted on and rotatable with the switch assembly for restoring a pre-selected switch-governing button to its non-selective position, a manual selection-cancelling member, a cancelling bar fixedly mounted with respect to the drum for movement to and from a button-cancelling position, and means initiated by said cancelling member and operatively connected to said cancelling bar and the drum for simultaneously rendering the former operative to a button-cancelling position and for turning the drum in the opposite direction a like distance to bring a selected button out of switch-closing contact when it is desired to cancel a selection.

2. A selector mechanism, comprising a rotatable selector drum having a plurality of annular rows of switch-governing push buttons thereon, a plurality of selector elements disposed in operative relation to said push buttons for actuating them to a selective-governing position, means operatively connected to and initiated by the movement of a selector element to a selecting position for advancing said drum a predetermined distance, a rotatable switch assembly housed in said drum including a longitudinal row of switches companion to and aligned with said rows of push buttons for successive actuation by selected buttons in predetermined sequence to switch-closing position during an advance movement of said drum, means operatively connected to the selector drum for turning it in the opposite direction a like distance to bring a selected

button out of switch-closing contact when it is desired to cancel such selection and including a manual selection-cancelling member for actuating the same, and means operatively connected to said cancelling member and in the path of a pre-selected switch-governing button for restoring it to its non-select position.

3. A selector mechanism, comprising a rotatable selector drum having a plurality of annular rows of switch-governing push buttons thereon, a plurality of selector elements disposed in operative relation to said push buttons for actuating them to a selective-governing position, means operatively connected to and initiated by the movement of a selector element to a selecting position for advancing said drum a predetermined distance, a rotatable switch assembly housed in said drum to turn therewith including a longitudinal row of switches companion to and aligned with said rows of push buttons for successive actuation by selected buttons in predetermined sequence to switch-closing position during an advance movement of said drum, means operatively connected to the selector drum for turning it in the opposite direction a like distance to bring a selected button out of switch-closing contact when it is desired to cancel such selection and including a cancelling bar fixedly mounted with respect to the drum and the switch assembly for radial displacement to and from a cancelling position in the path of a pre-selected switch-governing button, means connected to said bar for normally urging it to its non-cancelling position, and means operatively connected to said bar for displacing it to cancelling position.

4. A selector mechanism for automatic phonographs and the like, comprising a casing, a selector drum journaled in said casing for movement in step by step fashion to predetermined selective positions, annular rows of selector-governing buttons disposed side by side lengthwise of said drum and selectively projectable to selected positions, a plurality of manually-actuated selector elements mounted on said casing in correlation to said buttons for movement to and from a selective-governing position, means connected to said selector elements for normally urging them from a selective to a non-selective position, connections between said selector elements and said buttons for projecting the latter to a selective position upon the movement of companion selector elements to select positions, a pair of cancelling members disposed lengthwise within said drum and projectable to positions for restoring a projected button to its initial position, one of the cancelling members being fixed with respect to the rotatable drum and the other being connected with the drum to rotate therewith, means operatively connected to the relatively fixed cancelling member for manually actuating it to a button-restoring position, means initiated by the phonograph and operatively connected to the companion drum-rotatable cancelling member for automatically actuating it to a button-restoring position, and connections between said selector elements and the selector drum for advancing it a selective step upon the movement of a given selector element from a selective position to a non-selective position.

5. A selector mechanism for automatic phonographs and the like, comprising a casing, a selector drum journaled in said casing for movement in step by step fashion to predetermined selective positions, annular rows of selector-govern-

ing buttons disposed side by side lengthwise of said drum and selectively projectable to selected positions, a plurality of manually-actuated selector elements mounted on said casing in correlation to said buttons for movement to and from a selective-governing position, ratchet feed means for advancing said drum intermittently to selective positions, a second ratchet means for causing the return of said drum intermittently subsequently to its advance to a selective position, connections between said selector elements and said buttons for projecting the latter to a selective position upon the movement of companion selector elements to select positions, connections between said selector elements and said first-named ratchet feed means for actuating the latter to advance the drum a selective step upon the movement of a given selector element from a selective position to a non-selective position, a manual selection-cancelling member, means operatively connecting said member with said second ratchet means for rendering the latter operative to cause the return of said drum subsequent to its respective, selective advance movements one step for each actuation of the cancelling member, and means operative by said cancelling member for each actuation thereof for restoring buttons in successive rows to their non-selective positions.

6. A selector mechanism for automatic phonographs and the like, comprising a casing, a selector drum journaled in said casing for movement in step by step fashion to predetermined selective positions, annular rows of selector-governing buttons disposed side by side lengthwise of said drum and selectively projectable to selected positions, a plurality of manually-actuated selector elements mounted on said casing in correlation to a pair of adjoining rows of said buttons for movement to one or the other of two selective positions, means for restoring said selector elements to their normal position after movement to a selective position, actuating plungers disposed in alining relation with said rows of buttons, operative connections between each of said selector elements and adjoining plungers for projecting an alined plunger and its companion button to a selective position in response to a movement of a given selector element to a corresponding selective position, and connections between said selector elements and the selector drum for advancing it a selective step upon the movement of a given selector element from its selective position to its restored normal position.

7. In a device of the character described, a casing, a selector drum journaled in said casing for movement in step by step fashion to different selective positions, a plurality of annular rows of selector-governing buttons guided in the periphery of said drum for projection to and from selective position, a plurality of manually-actuated selector elements mounted in said casing in correlation to said buttons for movement to and from a selective-governing position, normally-retractable plungers aligned with said buttons and operatively connected to the companion selector elements for actuation thereby to a button-depressing position, a ratchet feed means for advancing said drum intermittently to selective positions, an operative connection between said ratchet feed means and said plungers, and common to the latter, for causing the actuation of said feed means as an incident to the movement of the selector elements to a selective-governing position, a radially-displaceable member

mounted lengthwise within said drum and engageable with one or another of the selectively-positioned buttons for restoring them to their initial position, and means operatively connected to said displaceable member for actuating it to and from its button-restoring position.

8. In a device of the character described, a casing, a selector drum journaled in said casing for movement in step by step fashion to different selective positions, a plurality of annular rows of selector-governing buttons guided in the periphery of said drum for projection to and from selective positions, means for selectively projecting said buttons to a selective-governing position, means for advancing said drum a given distance in response to the projection of a button to a selectively-projected position, a radially displaceable cancelling plate disposed lengthwise within said drum and projectable to a position for restoring a projected button to its initial position, a ratchet feed means for moving said drum in the opposite direction, a cancelling lever operatively connected to said ratchet feed means for actuating it, and an operative connection between said ratchet feed means and said cancelling plate for actuating the latter to its button-restoring position when said lever is moved to its cancelling position.

9. In a device of the character described, a casing, a selector drum journaled in said casing for movement in step by step fashion to different selective positions, a plurality of annular rows of selector-governing buttons guided in the periphery of said drum for projection to and from selective positions, means for selectively projecting said buttons to a selective-governing position, means for advancing said drum in step by step fashion in response to the projection of a button to a selectively-projected position, a rotatable switch assembly housed within said drum including a longitudinal row of switches in bridging relation to and for alining contacting engagement with said buttons, when in a selective projected position, for successive actuation by said but-

tons to a switch-closing position during an advance movement of the drum, the depressed buttons, acting as clutch elements when contacting companion switches to advance the switch assembly jointly with the advancing movement of the drum, and means operatively connected to said switch assembly for yieldingly resisting its advancing movement.

10. In a device of the character described, a casing, a selector drum journaled in said casing for movement in step by step fashion to different selective positions, a plurality of annular rows of selector-governing buttons guided in the periphery of said drum for projection to and from selective positions, means for selectively projecting said buttons to a selective-governing position, means for advancing said drum in step by step fashion in response to the projection of a button to a selectively-projected position, a rotatable switch assembly housed within said drum including a longitudinal row of switches in bridging relation to and for alining contacting engagement with said buttons, when in a selective projected position, for successive actuation by said buttons to a switch-closing position during an advance movement of the drum, the depressed buttons acting as clutch elements when contacting companion switches to advance the switch assembly jointly with the advancing movement of the drum, means operatively connected to said switch assembly for yieldingly resisting its advancing movement, a radially-displaceable member mounted lengthwise within said drum alongside said switch assembly and engageable endwise with one or another of the selectively-positioned buttons for restoring them to their initial position, and means operatively connected to said displaceable member for actuating it to and from its button restoring position, said yieldingly resisting means acting to urge the switch assembly in the opposite direction upon the restoration of a projected button to its initial position and against the next projected button.

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