United States Patent [19]

Petri

[11] **3,789,363**

[45] **Jan. 29, 1974**

[54] **SELECTOR SYSTEM FOR AUTOMATIC PHONOGRAPHS**

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[73] Assignee: **Rock-Ola Manufacturing Corporation,** Chicago, Ill.

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[52] **U.S. Cl.** ..... **340/162,** 340/365 R

[51] **Int. Cl.** **G11b 19/08,** H04g 3/02

[58] **Field of Search** 340/162

[56] **References Cited**

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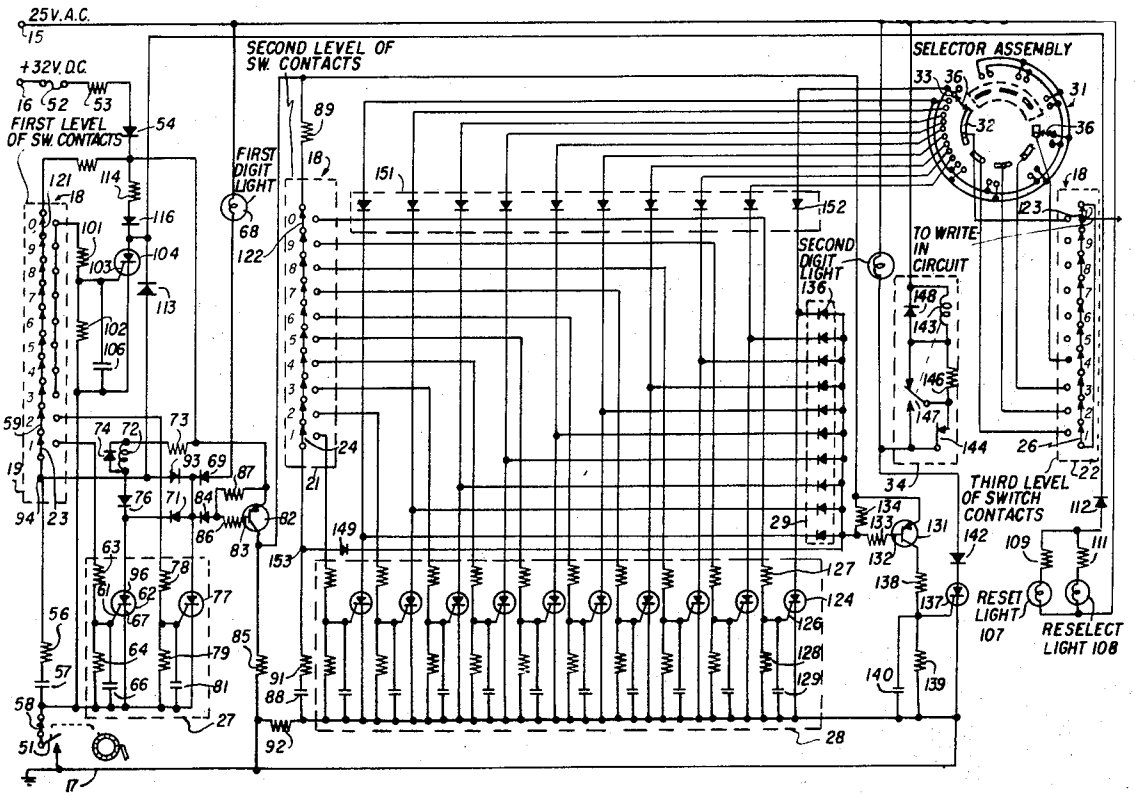
Primary Examiner—Donald J. Yusko

Attorney, Agent, or Firm—Davis, McCaleb & Lucas

[57] **ABSTRACT**

A selector system for coin-operated automatic phonographs employing a plurality of manually operated pushbutton control switches, representing selection digits in conjunction with associated electronic circuitry having a "memory" or information storage capability whereby the activation of a record selector assembly and transfer mechanism to effect the play of a selected recording is preconditioned on predetermined operational sequencing of multiple control switches and circuits as programmed by specific digit combinations.

17 Claims, 10 Drawing Figures



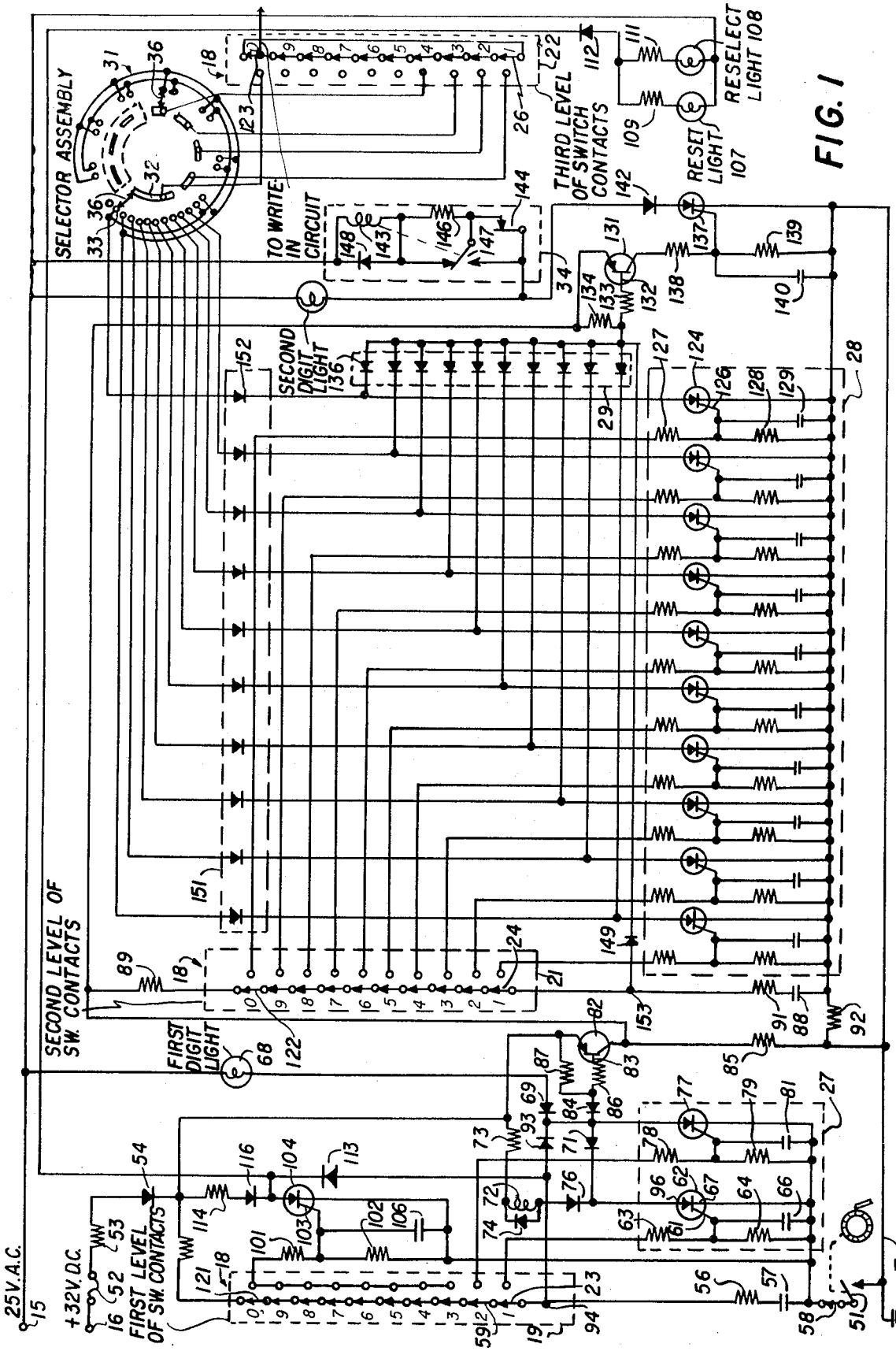

SELECTOR ASSEMBLY
TO WRITE IN CIRCUIT
THIRD LEVEL OF SWITCH CONTACTS
RESET LIGHT 107
RESELECT LIGHT 108
SECOND DIGIT LIGHT 136
SECOND LEVEL OF SW. CONTACTS
FIRST DIGIT LIGHT
FIRST LEVEL OF SW. CONTACTS
25V. A.C.
+32V. D.C.

FIG. 1

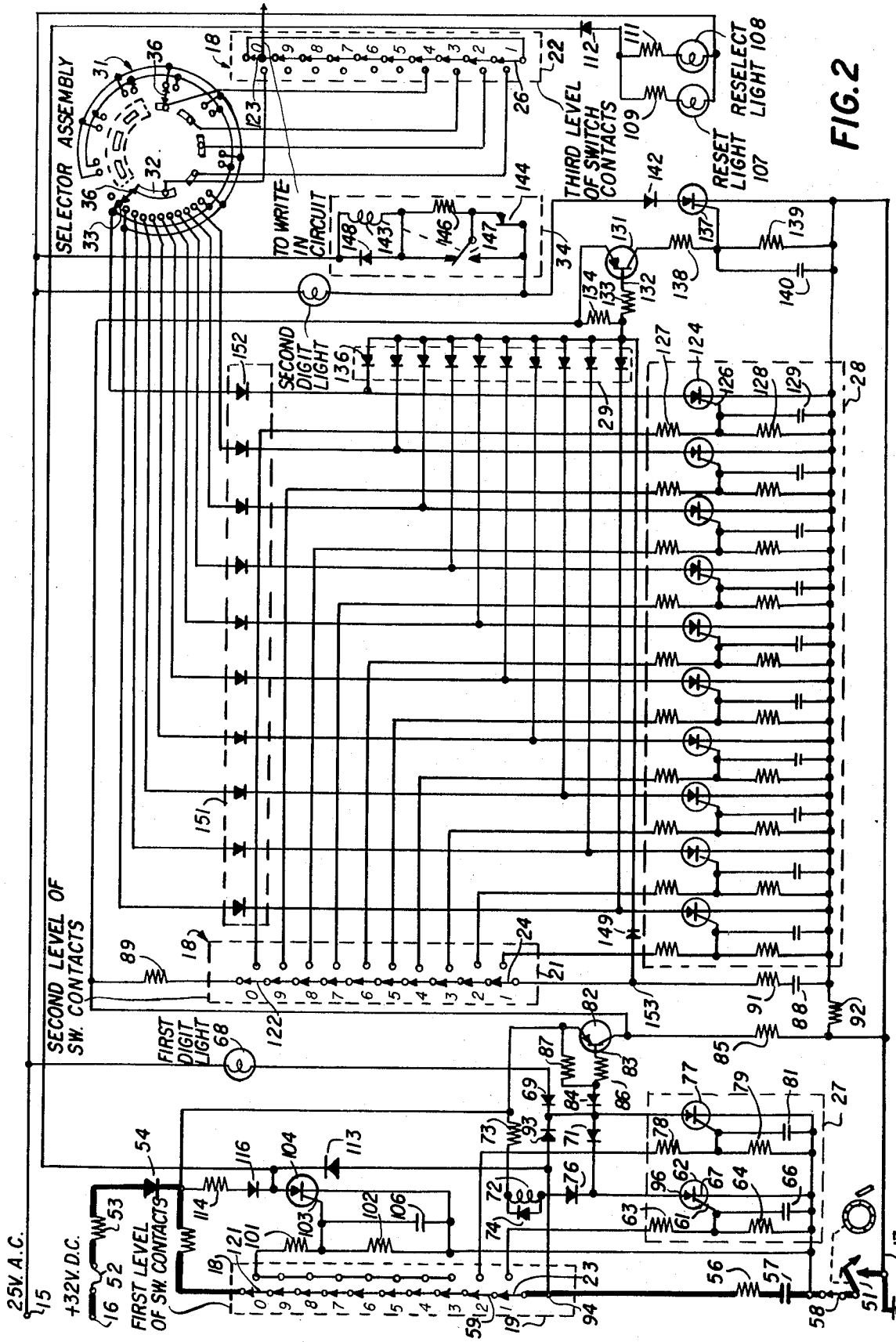

SELECTOR ASSEMBLY
TO WRITE IN CIRCUIT
THIRD LEVEL OF SWITCH CONTACTS
RESET LIGHT 107
RESELECT LIGHT 108
SECOND DIGIT LIGHT 136
SECOND LEVEL OF SW. CONTACTS
FIRST DIGIT LIGHT
FIRST LEVEL OF SW. CONTACTS
25V. A.C.
+32V. D.C.

FIG. 2

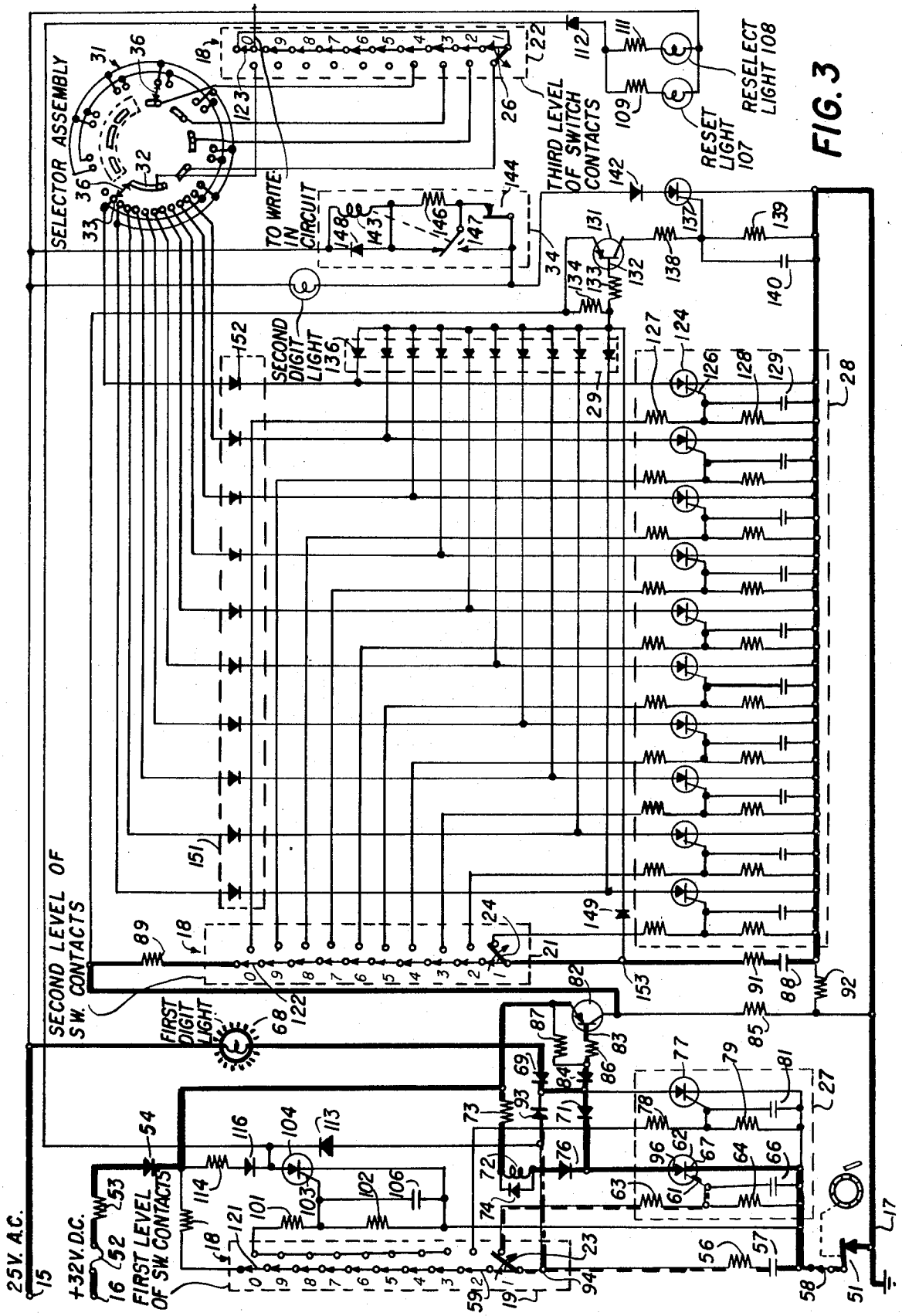

SELECTOR ASSEMBLY
TO WRITE IN CIRCUIT
THIRD LEVEL OF SWITCH CONTACTS
RESET LIGHT 107
RESELECT LIGHT 108
SECOND DIGIT LIGHT 136
SECOND LEVEL OF SW. CONTACTS
FIRST DIGIT LIGHT
FIRST LEVEL OF SW. CONTACTS
25V. A.C.
+32V.D.C.

FIG. 3

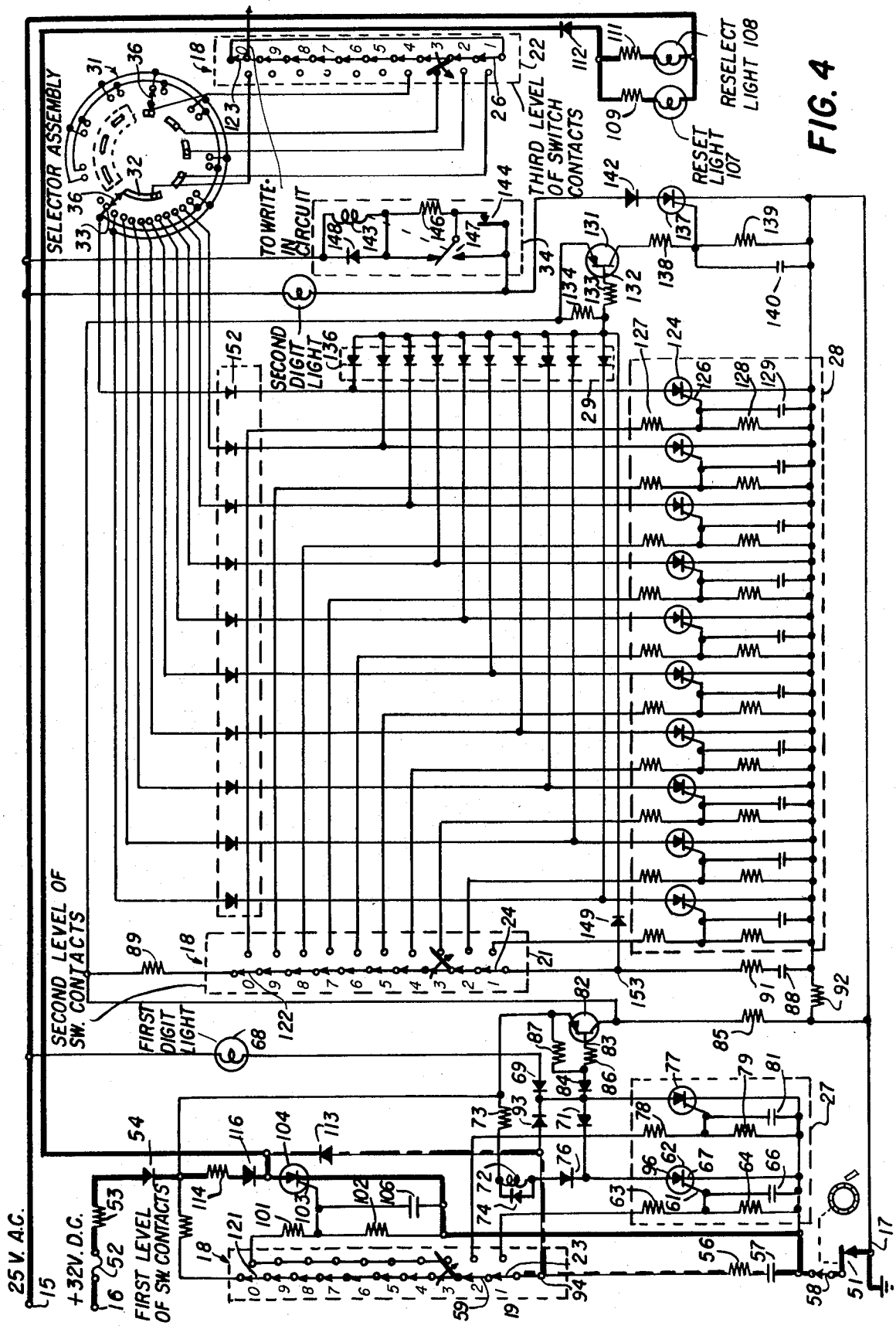

SELECTOR ASSEMBLY
TO WRITE-IN CIRCUIT
THIRD LEVEL OF SWITCH CONTACTS
RESELECT LIGHT 108
RESET LIGHT 107
SECOND DIGIT LIGHT
SECOND LEVEL OF SW. CONTACTS
FIRST DIGIT LIGHT
25 V. A.C.
+32V. D.C.
FIRST LEVEL OF SW. CONTACTS

FIG. 4

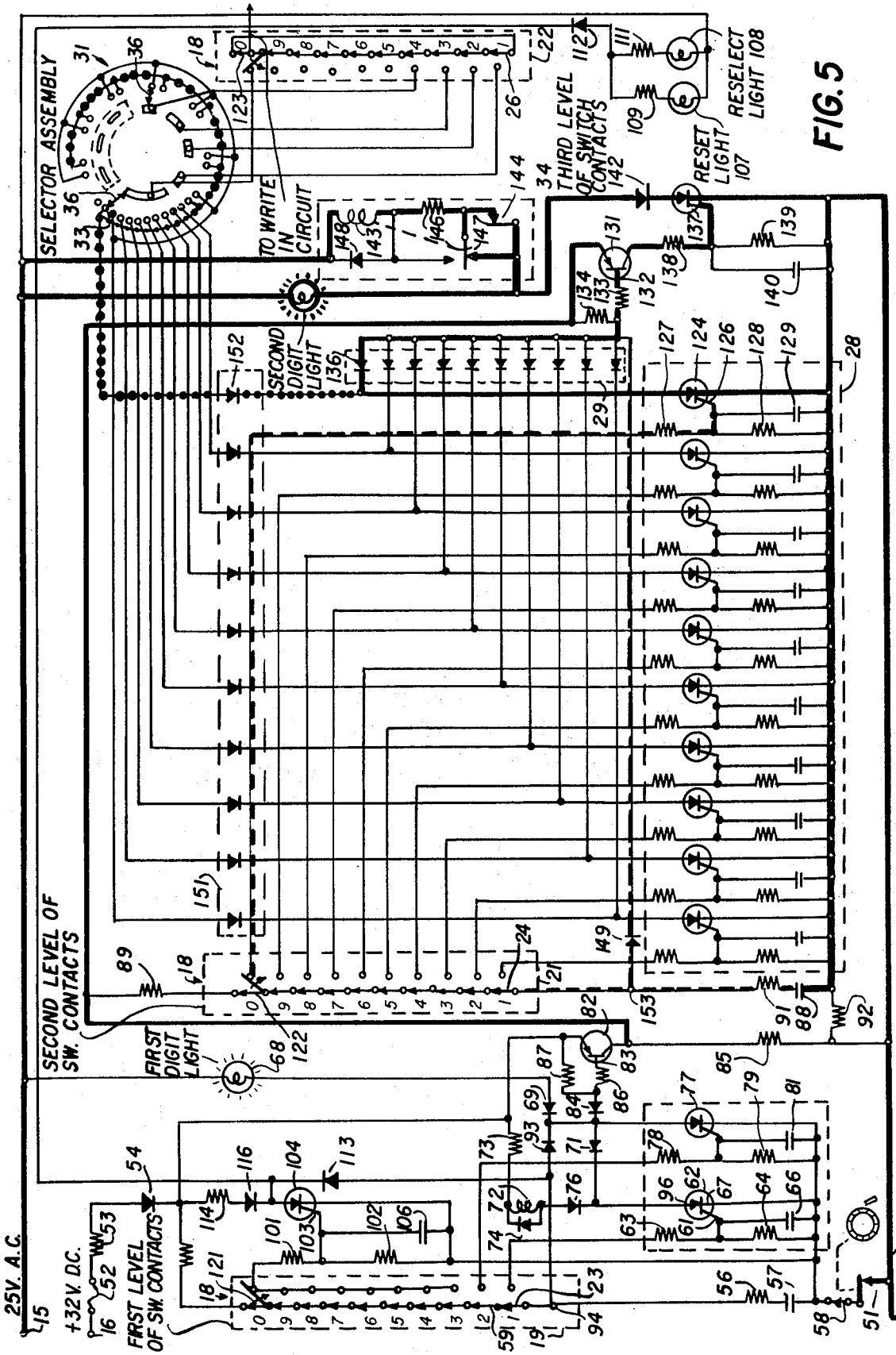
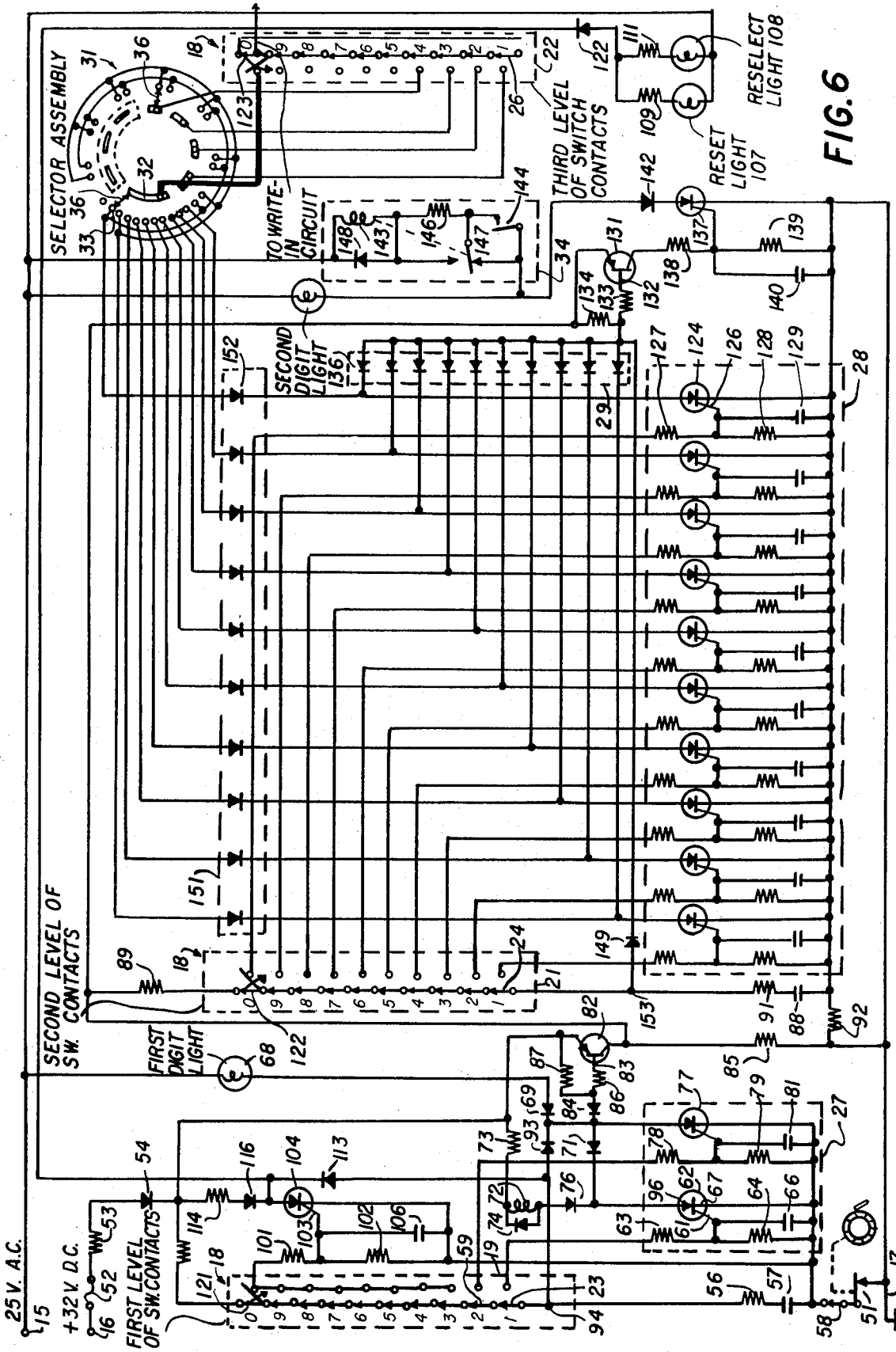

SELECTOR ASSEMBLY
TO WRITE IN CIRCUIT
THIRD LEVEL OF SWITCH CONTACTS
RESET LIGHT 107
RESELECT LIGHT 108
SECOND DIGIT LIGHT 136
SECOND LEVEL OF SW. CONTACTS
FIRST DIGIT LIGHT
FIRST LEVEL OF SW. CONTACTS
25V. A.C.
+32 V. D.C.

FIG. 5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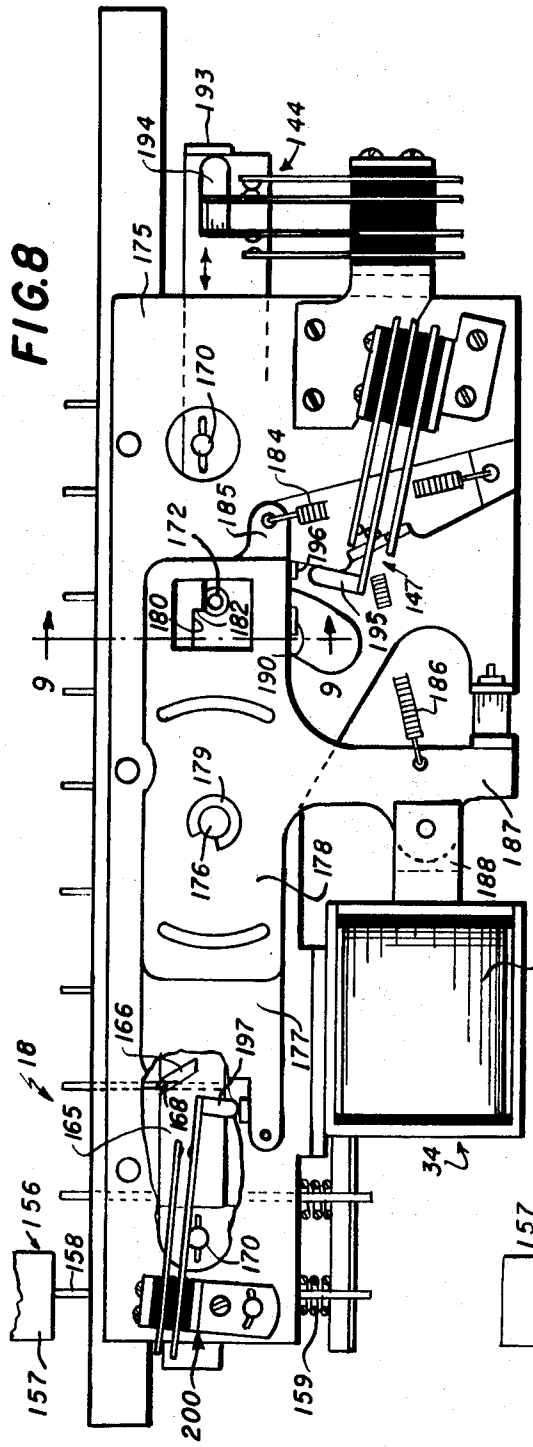
RESELECT LIGHT 108
RESET LIGHT 107
TO WRITE-IN CIRCUIT
SECOND DIGIT LIGHT 136
SECOND LEVEL OF SW. CONTACTS
FIRST DIGIT LIGHT
FIRST LEVEL OF SW. CONTACTS
25 V. A.C.
+32 V D.C.

FIG. 6

FIG.8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18
165
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200
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FIG.10

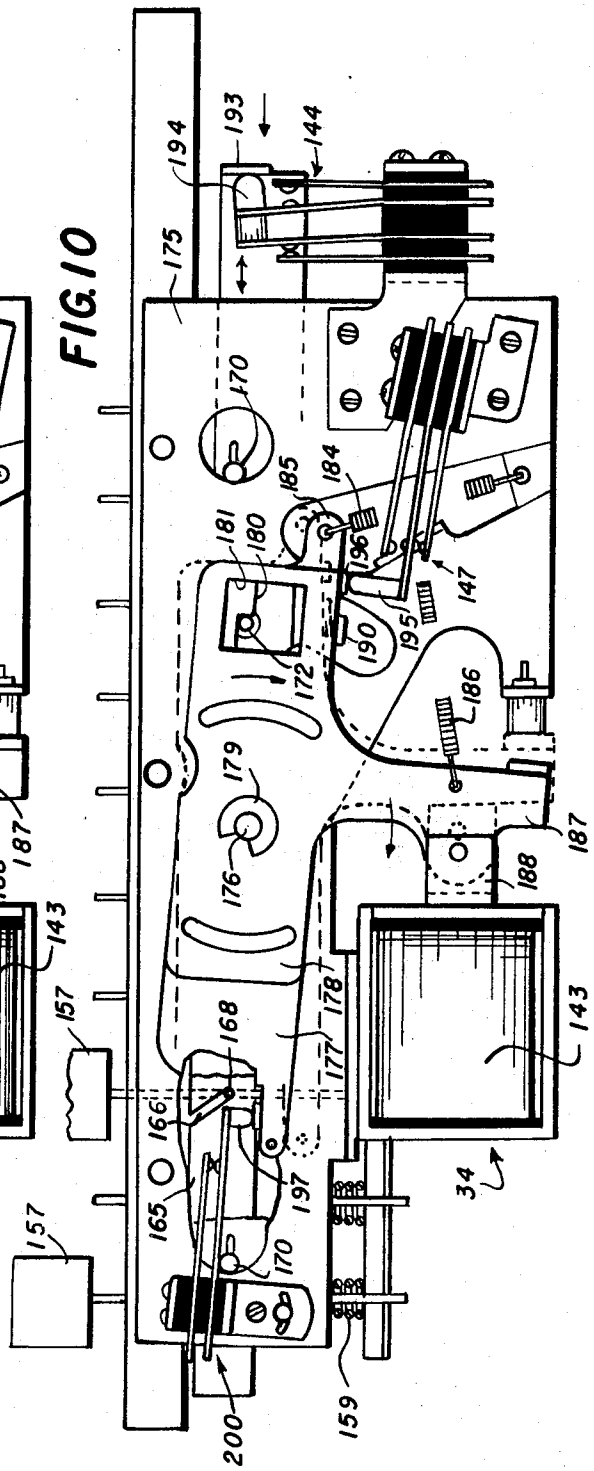
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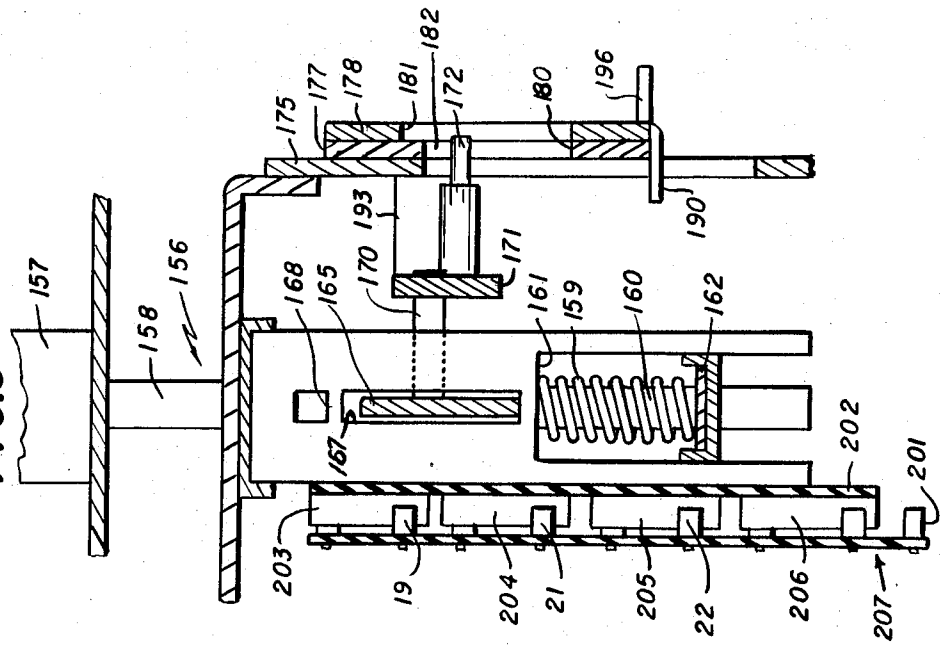
FIG. 9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167
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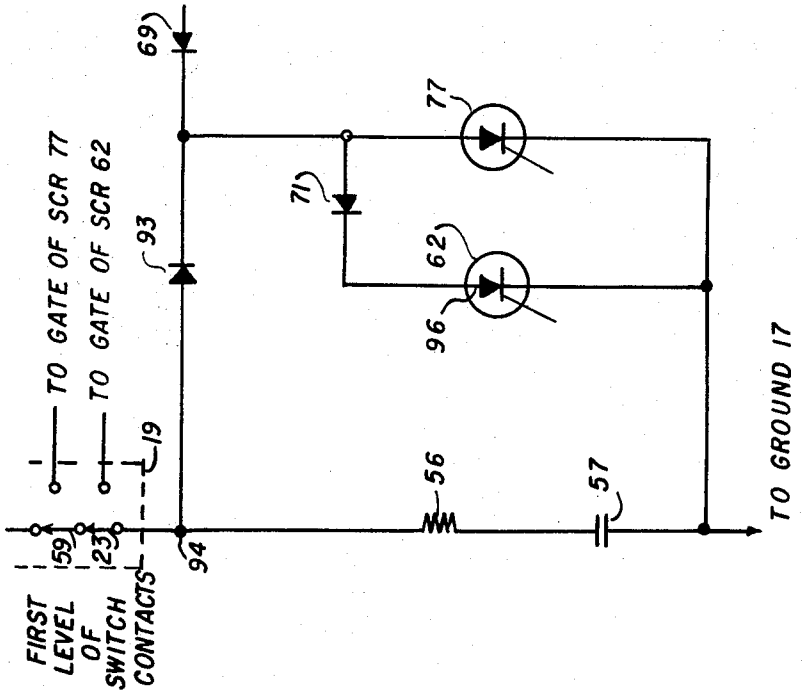
FIG. 7


TO GATE OF SCR 77
TO GATE OF SCR 62
19
FIRST LEVEL OF SWITCH CONTACTS
59
23
94
69
93
71
77
62
96
56
57
TO GROUND 17

SELECTOR SYSTEM FOR AUTOMATIC PHONOGRAPHS

This invention relates generally to automatic coin controlled phonographs and more particularly to improved means for selecting a recording for play.

In general the present invention comprises novel electronic circuitry controlled by manually operated switches for permitting the operator of an automatic coin controlled phonograph, of the order taught in U.S. Pat. No. 3,183,005 issued May 11, 1965, for example, to select particular recordings by sequentially actuating predetermined combinations of control pushbuttons, each pushbutton representing a specific digit. Electronic information represented by a particular sequence of digits, productive of a particular sequential operation of control switches, is utilized to sequentially enable a succession of electronic circuits arranged to activate a selector assembly and record transfer mechanism capable of removing a selected recording from a record storage magazine, placing the record in proper play side "up" position on the phonograph turntable and returning the record to storage upon completion of the play. The control circuitry of this invention comprises particular circuit arrangements utilizing silicon controlled rectifiers, or SCR's, to perform switching functions necessary to enable the selector assembly to activate the record transfer mechanism; the SCR's having an electrical characteristic that, once having been triggered or activated, they remain in a state of conductivity under certain circuit conditions. Utilizing this "memory" feature permits multiple operations of one or more control switches to produce a desired sequencing of digital combinations regulative of associated circuits for determining a particular record "play".

It is an important object of this invention to provide an improved digital selector system for use in automatic coin controlled phonographs.

Another important object of this invention is to provide a digital selector system employing electronic memory functions to precondition the selection and play of musical recordings on predetermined combinations and sequences of control switch and circuit operations.

A still further object of this invention is to provide a selector system utilizing digital control pushbuttons as encoder means in which multiple digit combinations are used to identify specific musical selections stored on records in a multiple record storage system.

Still another important object of this invention is to provide a selector system for automatic coin controlled phonographs in which the playing of a musical selection is preconditioned on the deposit and acceptance of predetermined coin values and the sequential operation of predetermined combinations of control switches.

Having thus described this invention the above and further objects, features and advantages thereof will be recognized by those familiar with the art from the following description of a presently preferred embodiment representing the best mode presently known to enable those of skill in this art to make and practice the same, reference being had to the accompanying drawings.

IN THE DRAWINGS:

FIG. **1** is a schematic circuit diagram illustrating the selector system of this invention;

FIGS. **2–6** are additional circuit diagrams, similar to FIG. **1**, with portions thereof shown in heavy lines to illustrate energized portions of the circuit during successive operational conditions;

FIG. **7** is an enlarged showing of the disabling circuit shown in operating condition in FIG. **3**;

FIG. **8** is a front elevational view of a pushbutton assembly utilized with the circuit of FIG. **1**;

FIG. **9** is a cross-sectional view taken at vantage line **9—9** of FIG. **8**; and

FIG. **10** is another front elevational view, similar to FIG. **8**, showing operational positioning of certain components thereof.

Reference is now made to FIG. **1**, which illustrates schematically a preferred embodiment of the digital selector system according to this invention. It will be understood therefrom that electric energy in the order of 25 volts AC, at power input terminal **15** and +32 volts DC at power input terminal **16** is supplied over an appropriate supply circuit, having return ground terminal **17**.

A manually operable pushbutton assembly indicated at **18** and generally of the order of the manual selection means disclosed in U. S. Pat. No. 3,247,737, issued Apr. 26, 1966 may be utilized, with slight modification, to include ten push-buttons each operating multiple banks or levels of switch contacts, three of which are indicated schematically in FIG. **1** at **19, 21** and **22.** The several levels of switch contacts are mechanically interconnected or ganged such that pressing any one pushbutton operates corresponding switch contacts in each of the switch levels.

The preferred embodiment illustrated requires a particular selection sequence of three predetermined digits on pushbutton assembly **18** to make each record selection. Each level of switch contacts responds to a related selection in the three digit input for the pushbutton assembly: that is, the first level **19** responds to the first digit, the second level **21** responds to the second digit, and the third level **22** responds to the third digit, in a manner illustrated in FIGS. **2** through **6**, to be described in detail presently. Briefly, however, in each level of contacts, each switch, typified at **23, 24** and **26,** in levels one, two and three, respectively, corresponds to one of ten particular digits reading from **0** through **9** inclusive. In the herein illustrated case, the intelligence represented by three digits is necessary to make a record selection as follows:

The first digit determines the side of the record to be played. Since there are only two such sides, only the first two digits in switch level **19,** such as digit numerals **1** or **2** are used for first digit determination of any three-digit selection combination. As will appear later, the first level of switch contacts **19** operates a first level SCR bank **27** which ultimately causes the proper side of the record to be played. If a digit higher than **2** is used, the operator is required to reinitiate the selection procedure by operating a reset switch.

The second and third digits in the three-digit sequence combine to determine which record contained in the record magazine will be played. In the present instance the preferred embodiment requires two such pieces of information for this purpose because of a

large number of records contained in the record magazine, typically in the order of **80** records. It is recognized, however, that smaller record magazines may be employed whereby only one additional digit beyond the first digit may suffice to make a record selection.

The second level of switch contacts **21**, actuated in response to depression of the second digit pushbutton, operates the second level SCR bank **28**, in a manner to be described in greater detail hereinafter. In general, however, the second level SCR bank **28** operates to connect a circuit, through diode bank **29**, to the selector assembly generally designated **31**. As shown, selector assembly **31** comprises a series of separate conducting segments, of which segment **32** is typical. Each such segment is in angular correspondence with a series of electrical contacts, of which contact **33** is typical. Each particular selector contact in turn is in circuit with all of the numerically identical contacts of the other segments in the selector assembly. Each such series of particular contacts is also connected to its corresponding SCR in the second level SCR bank **28**. Pressing the second digit on the selector pushbutton assembly **18**, therefore, connects a circuit, through the second level SCR bank **28** and diode bank **29**, to numerically corresponding interconnected contacts of the selector assembly, thereby refining the selection process to one record in each segment.

At this point one further piece of information is required to complete the selection process, that is, the selection of the proper segment of the multiple selector assembly. This information is supplied by the third digit selection which determines the particular segment of the selector assembly by way of the third level of switch contact **22**. A lockbar solenoid system, shown schematically at **34**, operates to lock the selector pushbutton assembly when the third digit button is depressed, preventing depression of any further pushbuttons and maintaining the selection circuit in activating condition until released by completing the record selection process.

At this state of operation of the phonograph, the selection circuit is completed at the selector assembly **31** by means of a pair of bridge wiper contacts **36** which are rotated or moved by a known search motor system (not illustrated in the drawings). The detailed operation of such a selector assembly and the write-in and read-out functions are fully described in the aforeindicated U.S. Pat. No. 3,183,005. In general, however, the presently preferred embodiment utilizes a selector pushbutton assembly having four levels of switch contacts. The fourth level (not shown in FIGS. **1–6**) activates the known write-in system which "sets" a movable selector element in the selector assembly for a particular record. The read-out system then senses the selector element previously set by the write-in system and operates the record transfer mechanism which removes the selected record from the record magazine, places it with its proper side on the phongraph turntable, and replaces the record in the magazine after the record had been played.

DETAIL DESCRIPTION

The detailed operation of the digital selector circuitry will now be described with reference to FIGS. **1** through **7**. Each of FIGS. **2** through **6** illustrates a particular stage or feature in the record selection process; the darkened lines in each figure indicating the portion of the circuit activated in each state of operation. For purpose of illustration, the selection of the record play corresponding to the three digit number **100** will be described.

CLOSING CREDIT SWITCH

FIG. **2** illustrates a first stage of operation initiated by closing of a credit switch **51** in response to a predetermined coin value deposit. Upon closing of switch **51**, circuit is established allowing direct current to flow from the DC power input terminal **16** to the ground lead **17** by way of fuse **52**, resistor **53**, diode **54**, the first level of switch contacts **19** of the selector pushbutton assembly **18**, resistor **56**, capacitor **57**, reset switch **58** and closed credit switch **51**. This energized circuit charges capacitor **57**, which subsequently discharges to trigger certain SCR's as will appear later.

FIRST DIGIT SELECTION

FIGS. **3** and **4** illustrate the circuit conditions when the first digit pushbutton of the selector pushbutton assembly **18** is depressed, thereby momentarily closing a related switch in each level or bank of switch contacts.

FIG. **3** shows the result of pressing the first digit pushbutton corresponding to digit numeral **1**. As indicated earlier, only numerals **1** or **2**, corresponding respectively to switches **23** and **59** of the first level of switch contacts **19**, are effective to determine the side of the record to be played. Pressing the pushbottom corresponding to the first numeral digit momentarily closes switches **23, 24** and **26** of the first, second and third levels of switch contacts respectively. As soon as the pushbutton is released it returns to its "up" position returning switches **23, 24** and **26** to their normal non-actuated positions of FIG. **1**. This momentary switch operation of switch **23** allows the previously charged capacitor **57** to provide an enabling pulse to gate **61** of SCR **62** in the first level SCR bank **27** by discharging through resistors **56, 63** and **64**, as shown by the dashed lines in FIG. **3**. Such pulse voltage at gate **61** causes SCR **62** to conduct, and normally to remain in the state of conduction until completion of the selection cycle. It should be noted here that the capacitor **66** connected from the gate **61** to the cathode **67** of SCR **62** prevents SCR **62** from being triggered by spurious voltages induced by external electric circuit, or "noise" voltages. All SCR's in the digital selector system have similarly connected capacitors for the same purpose.

The conduction of SCR **62** has several functions. First of all, the first digit light **68** is turned on by completing the circuit from AC power input terminal **15** through diode **69**, diode **71**, SCR **62**, reset switch **58**, and credit switch **51** to ground.

Secondly, the first level SCR bank determines the side of the record which the operator has selected to be played. In the preferred embodiment, the bottom side of the record always will be played unless specific circuits are connected for playing the top side. These later circuits, which are not part of the present invention, are completed by closing a set of relay contacts, not shown, which are operated by the record side relay coil **72**, energized when SCR **62** conducts. The record side relay coil **72** is energized by a circuit from the DC power input terminal **16** over fuse **52**, resistor **53**, diode **54**, resistor **73**, relay coil **72**, diode **76**, conducting SCR **62**,

reset switch **58** and the closed credit switch **51** to ground.

It is apparent from FIG. **3** that closing the second switch **59**, corresponding to the numeral **2** in the first level of switch contacts **19** will cause SCR **77** to conduct in a manner similar to that described for SCR **62**. The conduction of SCR **77** does not energize the record side relay coil **72**, however, and, therefore, the bottom side of the record will be played. In all other respects, however, the functions of SCR **77** and its associated circuit components are identical to those of SCR **62**.

A third function of an SCR in the first level SCR bank **27** is to energize the second level SCR bank **28**. Conduction of either SCR **62** or SCR **77** causes transistor **82** to conduct by application of the proper voltage to its base **83** over resistor **86**. Transistor **82** conducts to charge capacitor **88** when switch **24** of the second level of switch contacts **21**, for example, returns to its original position by completing the circuit from DC power input terminal **16**, fuse **52**, resistor **53**, diode **54**, conducting transistor **82**, resistor **89**, the second level of switch contacts **21**, and resistor **92** to ground terminal **17**.

In order to prevent further operation of any other SCR in the first level SCR bank **27**, by simultaneous or subsequent pushbottom operations, a novel disabling circuit is provided, which is illustrated in both FIGS. **3** and **7**. This circuit prevents further conduction of any other SCR in the same level SCR bank by clamping the voltage across the triggering capacitor **57** at a level too low to enable further SCR triggering, as shown by the alternately dashed and dotted lines in FIG. **3**. This function is accomplished essentially by diode **93** which maintains the voltage at junction **94**, at the switch end of resistor **56**, to about +2 volts DC, as illustrated in FIG. **7**. The voltage at the typical anode **96** of SCR **62** is approximately +30 volts DC when SCR **62** is nonconducting with this anode voltage dropping to approximately +1 volt DC when SCR **62** conducts. Without diode **93**, capacitor **57** would be charged to about 30 volts DC whenever any of the switches of the first level of switch contacts **19** returned to its normal position after each pushbutton operation. Similarly, if SCR **77** were conducting upon operation of the first digit pushbutton, diode **93** would prevent triggering SCR **62** upon subsequent pushbutton operations. Similar disabling circuits are used for the other SCR's in the digital selector system.

FIG. **4** illustrates the circuit conditions when a first digit pushbutton is pressed which corresponds to a numeral **3** or higher, or zero, which operation is ineffective to select a record side. Pressing pushbuttons corresponding to numerals **3** through **9**, or zero all have the same effect, as shown in FIG. **4**. Capacitor **57** discharges through resistors **56**, **101** and **102** to provide a pulse to the gate **103** of SCR **104**, as shown by the dashed lines in FIG. **4**, thereby causing SCR **104** to conduct; this conduction causes the double filament reset and reselect light, designated at **107** and **108**, to be turned on by completing the circuit from AC power input terminal **15**, resistors **109** and **111**, diode **112**, conducting SCR **104**, reset switch **58**, and credit switch **51** to ground lead **17**. The reset light **107** instructs the operator to reset the system to starting conditions by momentarily opening reset switch **58**, which has the effect of turning off SCR **104**. The operator is also instructed by the reset and reselect light to make another first digit selection after resetting the system to starting conditions. Proper first digit selection requires selection of either numerals **1** or **2** in the illustrated case.

In the same manner described earlier and illustrated in FIG. **7**, diode **113** serves to clamp the voltage at junction **94** to about +2 volts DC in conjunction with resistor **114** and diode **116**, as shown by the alternately dashed and dotted lines in FIG. **4**. This voltage is too low to trigger any SCR in the first level SCR bank **27** until the system is returned to starting conditions by means of momentarily opening the reset switch **58**.

SECOND DIGIT

FIG. **5** illustrates the circuit conditions when the second digit pushbutton of the selector pushbutton assembly is pressed, thereby momentarily closing a corresponding switch in each level of switch contacts. FIG. **5** shows the effects of pressing the pushbutton corresponding to the numeral 0. Since the results of pressing any other pushbutton are very similar, such need not be described herein in order to understand this invention.

When the second digit pushbutton corresponding to the numeral 0 is pressed, switches **121**, **122** and **123** of the first, second and third levels of switch contacts, respectively, are closed. Closing switch **121** has no effect on the first level SCR bank because the triggering voltage at junction **94** has been clamped to a value too low to trigger any other SCR by prior selection of the first digit and operation of the disabling circuit (see FIG. **7**).

As described earlier, capacitor **88** is charged when the first digit pushbutton is returned to its original position. When the second digit pushbutton corresponding to the numeral 0, for instance, is pressed, switch **122** triggers SCR **124** in the second level SCR bank **28**, causing capacitor **88** to provide a pulse to the gate **126** of SCR **124** by discharging through resistors **91**, **127** and **128**, as shown by the dashed lines in FIG. **5**. This voltage at gate **126** causes SCR **124** to conduct and to remain in a state of conduction for the remainder of the selection cycle. Capacitor **129** prevents SCR **124** from being triggered by any "noise" voltages.

Conduction of SCR **124** results in several functions. First of all, transistor **131** is turned on by application of the proper voltage to its base **132** through resistor **133**. Note that each diode in diode bank **29** is connected to the anode of its corresponding SCR in the second level SCR bank **28**.

Conduction of transistor **131** in turn triggers SCR **137** through resistor **138**, causing SCR **137** to conduct. The second digit light **141** is then turned on by completing the circuit from AC power input terminal **15** though diode **142**, conducting SCR **137**, to ground terminal **17**.

When the second digit pushbutton is released, the lockbar solenoid **143** of lockbar solenoid system **34** is energized through normally closed lockbar switch **144**, by completing the circuit from AC power input terminal **15** over resistor **146**, normally closed lockbar switch **144**, diode **142**, and conducting SCR **137**, to ground terminal **17**. The lockbar solenoid **143** is then maintained in an energized condition by lockbar solenoid holding switch **147**, which is mechanically closed when the lockbar solenoid is initially energized. The

operational purpose of the lockbar solenoid will be described in detail later.

When the second digit is thus selected, diode **149** clamps a potential of about +2 volts DC at junction **153**, as shown by the alternately dashed and dotted lines in FIG. **5**, and prevents triggering of any other SCR in the second level SCR bank **28** when the third digit pushbutton is depressed, all in the manner described earlier for the selection of the first digit and subsequent selection of the additional digits.

Each of the other SCR's in the second level SCR bank **28** operates in a manner similar to that of SCR **124.** The preferred embodiment contains a series of ten such SCR's in the second level SCR bank **28,** but is is recognized that an operational embodiment of the present invention may be constructed with fewer or greater numbers of such SCR's.

The primary function of the second level SCR bank **28** in the herein disclosed embodiment is to refine the selection process to one of eight records, from the information produced by the second digit pushbutton. Each diode of diode bank **151,** of which diode **152** is typical, is connected to three elements: its corresponding SCR (typified by SCR **124** in second level SCR bank **28**), its corresponding diode in diode bank **29** (of which diode **136** is typical) and finally, to one or more corresponding contacts in selector assembly **31,** of which contact **33** is typical.

As indicated earlier, the typical selector assembly of the preferred embodiment **31** comprises a series of conducting segments, such as segment **32,** only several of which are illustrated for purpose of clarity. Each such segment is associated with a series of ten electrical contacts, of which contact **33** is typical. Each contact (such as **33**) is electrically connected to all of its numerically corresponding contacts in the other selector segments; for example, contact **33** is connected to seven other segment contacts corresponding to the digit 0. All eight such numerically corresponding and interconnected contacts are in circuit with a related SCR in bank **28** (SCR **124** in this instance), which is the SCR corresponding to the digit O, through a diode of bank **151** (in this instance diode **152**). There is, therefore, a ready circuit, as illustrated by the large dotted line in FIG. **5,** from each of eight numerically corresponding selector segment contacts for digit **O,** through diode **152** and conducting SCR **124** to ground terminal **17.** Pressing the third digit pushbutton will complete the selection process by connecting a write-in circuit to a particular one of these eight numerically corresponding segments, as will be presently described more fully. It should be noted that pressing any other pushbutton for the second digit will operate its corresponding SCR and connect its corresponding contacts on selector assembly **31** in a manner similar to that just described for the second digit numeral 0.

The reason for using diodes such as diode **152** to connect the contacts of the selector assembly to their related SCR is to prevent shorting out or bypassing of the SCR by simultaneous operation of another selector, as from a remote selector system. Such remote selector systems therefore are made compatible with the present selector system by means of diode bank **151.**

THIRD DIGIT SELECTION

FIG. **6** sets forth the final step in the record selection process, namely, the use of the third digit to select a particular segment on selector assembly **31** to refine the selection process to a particular record on the segment. The result of pressing the third digit pushbutton corresponding to the digit 0 is shown in FIG. **6.** This operation closes switches **121, 122,** and **123** of the first, second and third levels of switch contacts respectively. Because of the SCR disabling circuits described earlier, the operation of third digit pushbutton does not trigger any SCR in banks **27** or **28** of the digital selector system.

As shown in heavy lines in FIG. **6,** closing switch **123** connects the selected record write-in circuit (not illustrated) to segment **32** of the selector assembly **31.** A pair of bridge wiper contacts **36** are moved by a search motor, also not illustrated, to complete the write-in function for the selected record in a known manner. Briefly, however, while one arm of a bridge wiper is temporarily in contact with segment **32** as the wiper is being moved over the selector assembly, the other arm of the bridge wiper will touch contact **33** to complete the write-in circuit through diode **152** and SCR **124** to ground lead **17.** As soon as the circuit is completed, the search motor will stop movement of the bridge wipers. It will be understood that depressing any other third digit pushbutton switch will complete the write-in circuit for the selected record in the same manner as that described for closing switch **123.**

It will be recalled that upon release of the second digit pushbutton, the lockbar solenoid system **34,** particularly the solenoid coil **143** thereof, is energized and held in an energized condition via holding switch **147** and related circuitry. This energized condition of the lockbar solenoid system is employed eventually to positively lock a selected third digit pushbutton in its depressed state until the write-in function of the selector assembly has been completed, while at the same time mechanically preventing the depression of two or more third digit pushbuttons, either simultaneously or in sequence. Thus only one selection or record "play" may be obtained for each credit deposit. To more fully appreciate the workings of the lockbar system particular reference is hereat made to FIGS. **8** through **10** of the drawings which illustrate the principal mechanism involved in the above-mentioned interlock functions.

As shown in such drawing FIGURES, the major components of a pushbutton assembly **155** comprise a plurality of individual pushbutton means **156** arranged in a single row; there being ten such pushbuttons in the illustrated case, with each bearing a digit indicia, **0** through **9,** on an outer finger-engaging block or body **157** thereof. The blocks **157** are each fixed over the outer end of a stem or plunger member **158** arranged for sliding movement in response to manual depression of the pushbutton against the opposing biasing force of a compression spring means **159** which is held about a central elongated finger portion **160** of the stem member. Compression of the spring **159** takes place between a shoulder **161** of the stem member and an underlying support member **162** fastened to the frame of the pushbutton assembly (See FIG. **9**).

Associated with several pushbuttons of the single row thereof is a single elongated lockbar **165** mounted for longitudinal sliding movents in directions transverse to the reciprocative movements of the several pushbuttons; the lockbar moving to the left as viewed in FIG. **8** in response to depressing of any one of the pushbuttons **156.** The lockbar is formed with a plurality of in-

clined slots **166** extending inwardly of the upper margin thereof and spaced to oppose each of the pushbuttons stem members **158.** Each stem member for the several pushbuttons is formed with a slotted opening **167** receptive of the lockbar **165** (see FIG. **9**) and having a transverse element **168** disposed adjacent the upper margin of the lockbar. It will be appreciated that the several transverse elements **168** are designed to enter their respective inclined slotted openings **166** of the lockbar in response to depressing or downward movement of the associated pushbuttons thereby producing camming interengagement between each element **168** and an associate inclined slot **166.** This serves to move the lockbar longitudinally in an appropriate direction. In the particular illustrated case such lockbar movement is to the left as viewed in FIGS. **8** and **10.** Longitudinal translating movement of the lockbar is opposed by a suitable compression spring means (not shown) associated therewith between one end of the lockbar and a suitable fixed portion of the supporting frame for pushbutton assembly. Thus upon release of a depressed pushbutton the lockbar will return (to the right in FIG. **8**) to its normal, unbiased position as shown therefor in FIG. **8.**

Paralleling the lockbar **165** and supported on the latter by intervening connector rods **170,** is an elongated latchbar **171** carrying a cylindrical latchpin **172** projecting outwardly therefrom intermediate at its ends. With this arrangement longitudinally translating motion of the lockbar produces corresponding translation of the latchbar and latchpin **172.**

Also mounted adjacently parallel the latchbar is a planar support frame member **175,** which carries a pivot post **176** for supporting a pair of plate-like elements, namely, a latch-plate **177** and an actuator or crank plate **178.** A C-shaped lockwasher **179** is suitably employed to lock these plate elements to the post **176** for pivotal actuation thereabout. It will be noted that both plates **177** and **178** are provided with an opening through which the latchpin **172** projects, such opening being indicated at **180** for plate **177** and at **181** for the actuator plate **178** (see FIG. **9**). It will be further observed that the opening **181** in the latchplate **177** is configured with a stepped shoulder **182** generally opposite, but slightly offset in normal alignment from the latchpin **172.** A first tension spring means **184** is connected between one outer end portion **185** of the latchplate **177** and the frame member **175** to normally bias the latchplate **177** in a clockwise sense, as viewed in FIG. **8,** for example. Similarly a stronger second tension spring **186** connects between a crank arm portion **187** of the actuator plate **178** and the frame member **175** to bias the actuator plate **178** in a counterclockwise sense as viewed in FIG. **8.** Arm portion **187** of the actuator plate also is coupled to the lockbar solenoid assembly **34,** more particularly to the armature **188** of the solenoid means so that upon energization of the solenoid coil the armature is pulled inwardly, cocking the actuator plate **178** clockwise about the pivot post **176** until the same reaches the position therefor shown in full lines in FIG. **10.** It will be noted that the actuator plate **178** is provided with an ear or lug portion **190** which underlies the adjacent latchplate **177** substantially opposite opening **180** therein. As a consequence of this arrangement, in the normal unbiased position of the actuator plate **178** the lug **190** serves to maintain the latchplate **177** in its FIG. **8** position against the biasing force of the associated first tension spring **184.** When the actuator plate is cocked to its FIG. **10** position, however, lug **190** disengages from the lower edge of the latchplate **178,** leaving the latter to the biasing forces of spring **184.** If, however, the latchpin **172** is residing beneath the lower disposed edge of the step portion **180,** in the latchplate as shown in FIG. **8,** the latchplate will remain in its normal unbiased position, as indicated by the dotted line showing thereof in FIG. **10,** despite the cocking or described biasing movement of the actuator plate. Consequently, upon energization of the solenoid means at returning movement of the second digit pushbutton as heretofore described, the actuator plate **178** is biased to its FIG. **10** position, but the underlying latchplate **177** is held in its normal position by the latchpin **172** until the latter is translated with the lockbar and latchbar past the step shoulder **182.** This condition is illustrated by the full line showing of the members **177** and **178** in FIG. **10.**

Thus it will be understood that upon depression of the third digit pushbutton, the lockbar is translated to the left as viewed in FIG. **10** moving the latchpin **172** past the shoulder of the stepped opening **180** in the latchplate, preventing returning movement of the lockbar and latchbar to the right, or, to their FIG. **8** positions, upon release of the pushbutton. As a result, the pushbutton is positively latched in its depressed condition until the solenoid assembly **34** is deenergized which permits the tension spring **186** to return the actuator plate **178** to its FIG. **8** position causing the lug **190** to bias the latchplate upwardly, disengaging latchpin **172** from the shouldered opening **180** and permitting returning movement of the latchbar and lockbar to their FIG. **8** positions. It further will be appreciated that upon the depression of any third digit pushbutton, the lockbar is biased to the left so that all other pushbuttons are prevented from downward movement since the interferring elements **168** thereof are then in a non-aligned condition with the respective slotted openings **166** of the lockbar. In this fashion then, any one pushbutton may be depressed to select the third digit at any one time, but once the same is depressed it is locked in its depressed condition until released therefrom upon deenergization of the solenoid assembly **34.**

It will be noted that the lockbar switch **144** is carried on the frame number **175** adjacent one outer end of the latchbar which is provided with an outwardly turned ear portion **193** for engaging an insulated actuator pin **194** of the lockbar switch assembly. Upon translating movement of the latchbar to the left as viewed in FIG. **8,** switch **144** is actuated as shown specifically in FIG. **10.** Similarly the holding switch assembly **147** for the solenoid assembly **34,** is carried on the frame member **175** with an actuator **195** thereof positioned adjacently beneath an outwardly turned lug portion **196** on the actuator plate **178** (see FIG. **9**). Thus when the actuator plate is biased clockwise in response to energization of the solenoid assembly, lug **196** thereof contacts switch actuator **195** to operate the holding circuit switch **147** for the solenoid means.

In a similar fashion, the left or outer end of latchplate **177** is adapted to engage an acutator means **197** for a latchswitch assembly **200** which is in circuit controlling connection with the fourth level of contact **201** associated with the several pushbutton means **156** (see FIG. **9**).

As best shown in FIG. 9 of drawings, the several pushbuttons are individually coupled to insulator plates carrying spaced movable wiper contacts **203-206** so that these wiper contacts and insulator plates **202** move responsively with the individual pushbuttons. A common insulator plate **207** is mounted in parallel adjacency to the several wiper contacts and carries thereon a plurality of fixed or stationary contacts comprising the first level switch contacts **19**, second level switch contacts **21**, third level contacts **22** and the fourth level contacts **202** which are associated with suitable control circuits for the scanning motor, record transfer mechanism and relating elements of the automatic phonograph in accordance with recognized practice as taught, for example, in the aforementioned U. S. Pat. No. 3,183,005.

From the above description those familiar with this art will readily recognize the present invention as a novel advancement over the prior art and that the same is not limited to the particulars of the described preferred embodiment thereof, except as appears in the following appended claims.

I claim:

1. For use in an automatic phonograph having a record selector assembly and a record transfer mechanism for transferring phonograph records from a multiple record storage magazine to a record playing turntable, a selector system comprising: three switch banks each comprising plural switches; a plurality of selectively operable pushbuttons each for actuating a corresponding switch in each of said banks; first, second and third electronic circuit means individually in circuit with said switches in one of said switch banks and actuated by pushbutton operation of said switches, said first electronic circuit means operable to actuate the transfer mechanism to play a selected side of a stored record, said second and third electronic circuit means being cooperable to actuate the record selector assembly to select a particular record to be played; said first circuit means being operated in response to depression of a first one of said pushbuttons, said second circuit means being operated in response to depression of a second one of any of said pushbuttons, and said third circuit means being operated in response to depression of a third one of said pushbuttons; disabling means operable to prevent, after each of said first and second circuit means has been operated, further operation thereof in response to subsequent depression of any one of said pushbuttons; and locking means operable to prevent, until completion of record selection, operation of any of said pushbuttons subsequent to the operational sequencing of three consecutive pushbutton depressions, whereby selection of a particular side of a particular record to be played is preconditioned upon a predetermined operational sequencing of three pushbutton depressions.

2. The invention of claim **1** wherein each said pushbutton carries a digital indicia, and each side of a stored record is identified by a unique three digit combination determinative of the sequence for depressing the pushbuttons to effect a play selection thereof.

3. The invention of claim **1** wherein each of said switch banks comprises one level of switch contacts.

4. A selector system as set forth in claim **1** wherein each of said first and second electronic circuit means comprises a plurality of silicon controlled rectifiers each associated with at least one of said switches in one of said banks.

5. The invention of claim **1** wherein each of said first and second electronic circuit means comprises a plurality of silicon controlled rectifiers, and said disabling means comprises a diode in circuit with said silicon controlled rectifiers, said diode operable to prevent, after each of said first and second circuit means has been operated, further operation of any of said plurality of silicon controlled rectifiers therein upon subsequent operation of any of said pushbuttons by limiting the input operating voltage for each of said plurality of silicon controlled rectifiers to a non-actuating level.

6. The invention of claim **1** wherein the second cicuit means energizes electrical solenoid means to precondition operation of said locking means to prevent subsequent operation of any of said pushbuttons, after completion of the third operational depression thereof.

7. The invention of claim **1** and reset means to reinitiate operation of the selector system upon erroneous operation of any of a predetermined plurality of said pushbuttons.

8. The invention of claim **1** wherein said record selector assembly comprises a series of conducting segments, each of said segments being connected to a corresponding series of electrical contacts and each of said contacts being interconnected to corresponding contacts of the other of said segments, whereby said second electronic circuit means is operable to connect an electric circuit to one of said series of contacts of each of said segments, and said third electronic circuit means is operable to connect an electric circuit to one of said series of segments to complete a single electric circuit in said record selector assembly corresponding to a particular record selection.

9. For use in an automatic phonograph having a record transfer mechanism for transferring phonograph records from a multiple record storage magazine to a record playing turntable, a selector system comprising: two switch banks each comprising plural switches; a plurality of selectively operable push-buttons each for actuating a corresponding switch in each of said banks; first and second electronic circuit means individually in circuit with said switches in one of said switch banks and actuated by pushbutton operation of said switches, said first electronic circuit means being operable to actuate the transfer mechanism to play a selected side of a stored record, said second electronic circuit means being operable to actuate the record selector assembly to select a particular record to be played; said first circuit means being controlled in response to depression of a first of said pushbuttons; and said second circuit means being controlled by depression of a second one of any of said pushbuttons; disabling means operable to prevent, after the first said circuit means has been operated, further operation thereof in response to subsequent operation of any of said pushbuttons; and locking means operable, until completion of the selection of a record, to prevent operation of any of said pushbuttons subsequent to the operational sequence of two consecutive pushbutton operations, whereby selection of a particular side of a particular record to be played is preconditioned upon a predetermined operational sequencing of two pushbutton depressions.

10. The invention of claim **9** wherein each of said pushbuttons is identified by a numerical digit, and said circuit means are operatively controlled in response to

depressing said pushbuttons according to predetermined digital combinations identifying specific record selections.

11. The invention of claim **9** wherein each of said switch banks comprises one level of switch contacts.

12. A selector system as set forth in claim **9** wherein said first electronic circuit means comprises a plurality of silicon controlled rectifiers each associated with at least one of said switches in one of said banks.

13. The invention of claim **9** wherein said first electronic circuit means comprises a plurality of silicon controlled rectifiers, and said disabling means comprises a diode in circuit with said silicon controlled rectifiers, said diode operable to prevent, after said first circuit means has been operated, further operation of any of said plurality of silicon controlled rectifiers therein upon subsequent operation of any of said pushbuttons by limiting the input operating voltage for each of said plurality of silicon controlled rectifiers to a non-actuating level.

14. The invention of claim **9** wherein the first circuit means energizes electrical solenoid means to precondition operation of said locking means to prevent subsequent operation of any of said pushbuttons, after completion of a predetermined number of operational depressions thereof.

15. The invention of claim **9** and reset means to reinitiate operation of the selector system upon erroneous operation of any of a predetermined plurality of said pushbuttons.

16. In an automatic phonograph having a turntable and record selector and transfer means for playing particular ones of plural recordings stored on opposite sides of a plurality of disc records, a system for selecting a particular recording comprising: means for actuating the transfer means to position a particular side of each record in play position on the turntable, additional means for determining a particular record to be so positioned by the transfer means, and plural manually operated control means for activating each of said first and additional means individually in predetermined sequence in response to a predetermined number of operations of said control means individually and in combination.

17. The invention of claim **16** in which each control means comprises a pushbutton having a visual identifying symbol thereon, and said predetermined operations thereof are in accordance with unique combinations of said symbols identifying each recording.

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