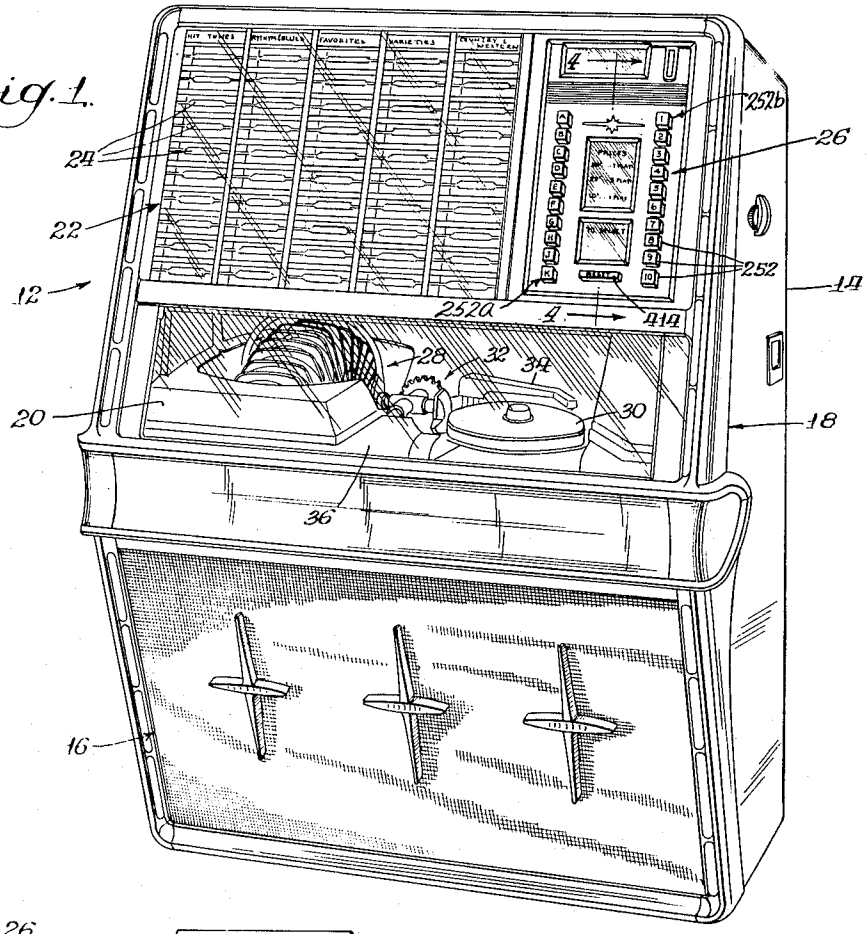
April 26, 1966 D. C. ROCKOLA 3,247,737

MANUAL SELECTION MEANS FOR AUTOMATIC PHONOGRAPH

Original Filed March 10, 1961 6 Sheets-Sheet 1

Fig. 1.



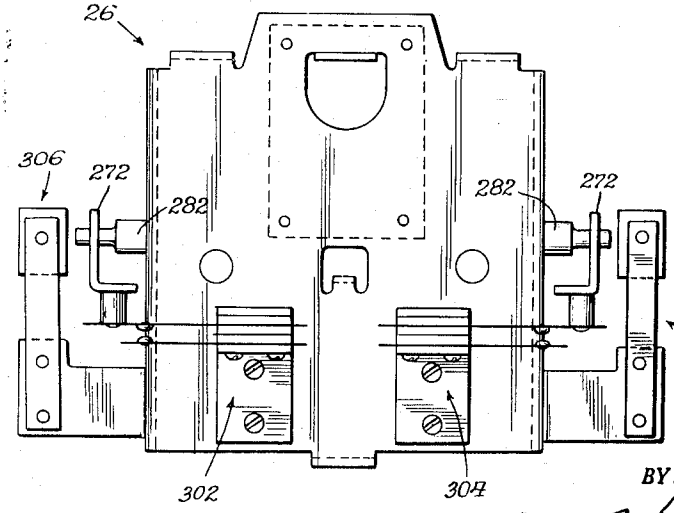


Fig. 2.

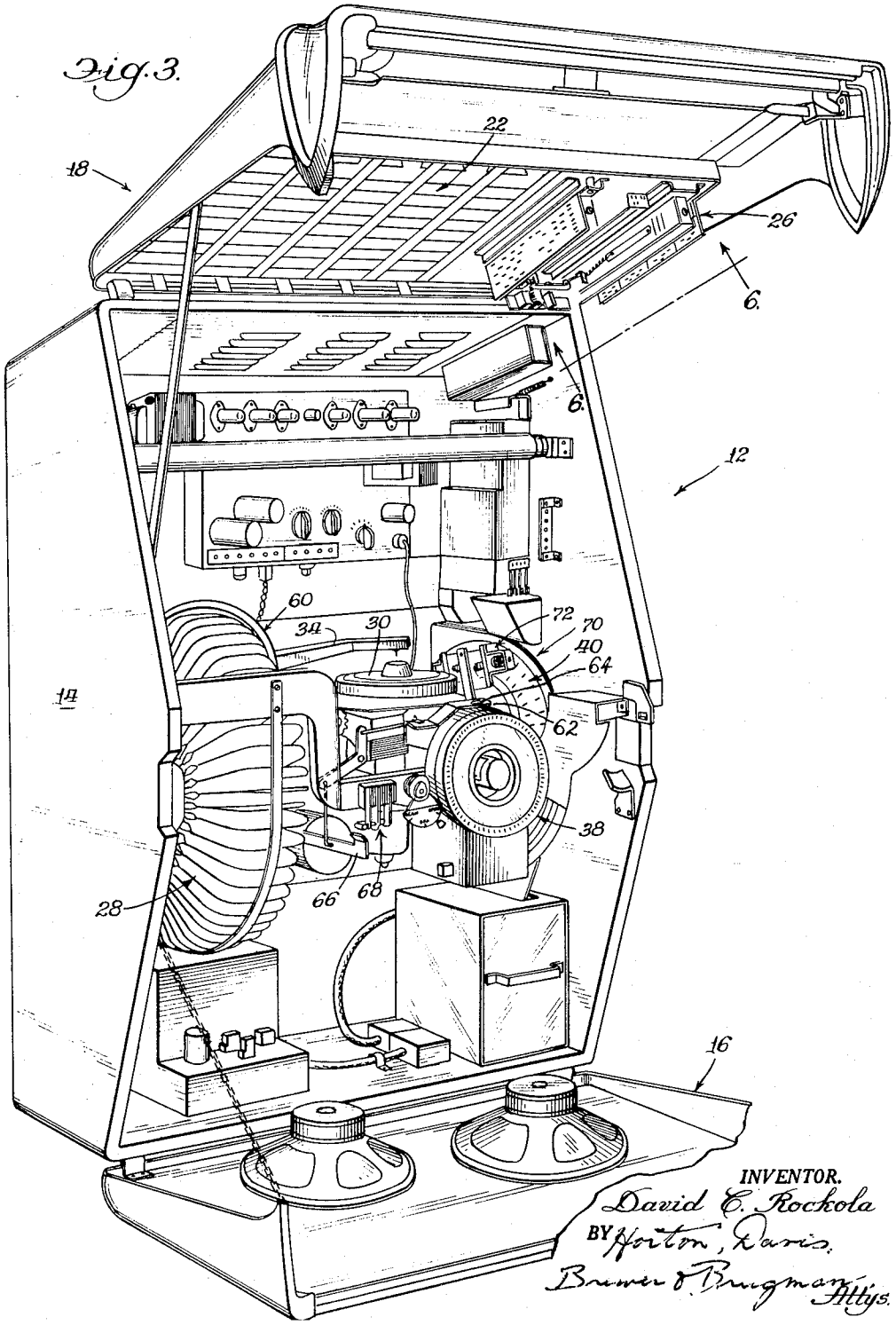
INVENTOR.
David C. Rockola
BY Horton, Davis, Brewer & Brugman
Attys.

April 26, 1966 D. C. ROCKOLA 3,247,737

MANUAL SELECTION MEANS FOR AUTOMATIC PHONOGRAPH

Original Filed March 10, 1961 6 Sheets-Sheet 2

Fig. 3.



INVENTOR.
David C. Rockola
BY Horton, Davis.
Brewer & Brugman Attys.

April 26, 1966 D. C. ROCKOLA 3,247,737

MANUAL SELECTION MEANS FOR AUTOMATIC PHONOGRAPH

Original Filed March 10, 1961 6 Sheets-Sheet 3

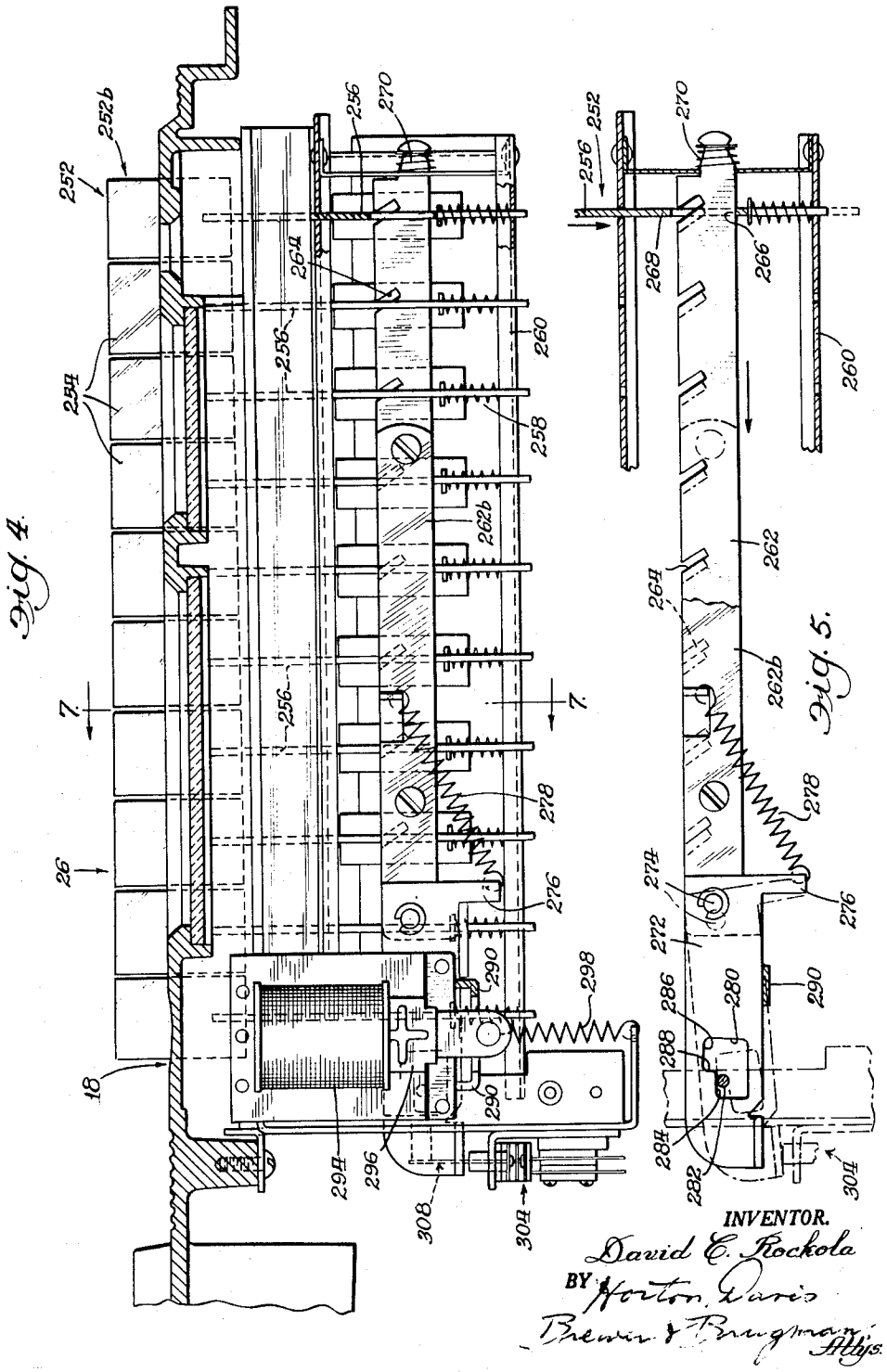


Fig. 4.

Fig. 5.

INVENTOR.
David C. Rockola
BY Morton, Davis
Brewer & Brugman
Attys.

MANUAL SELECTION MEANS FOR AUTOMATIC PHONOGRAPH

Original Filed March 10, 1961 6 Sheets-Sheet 4

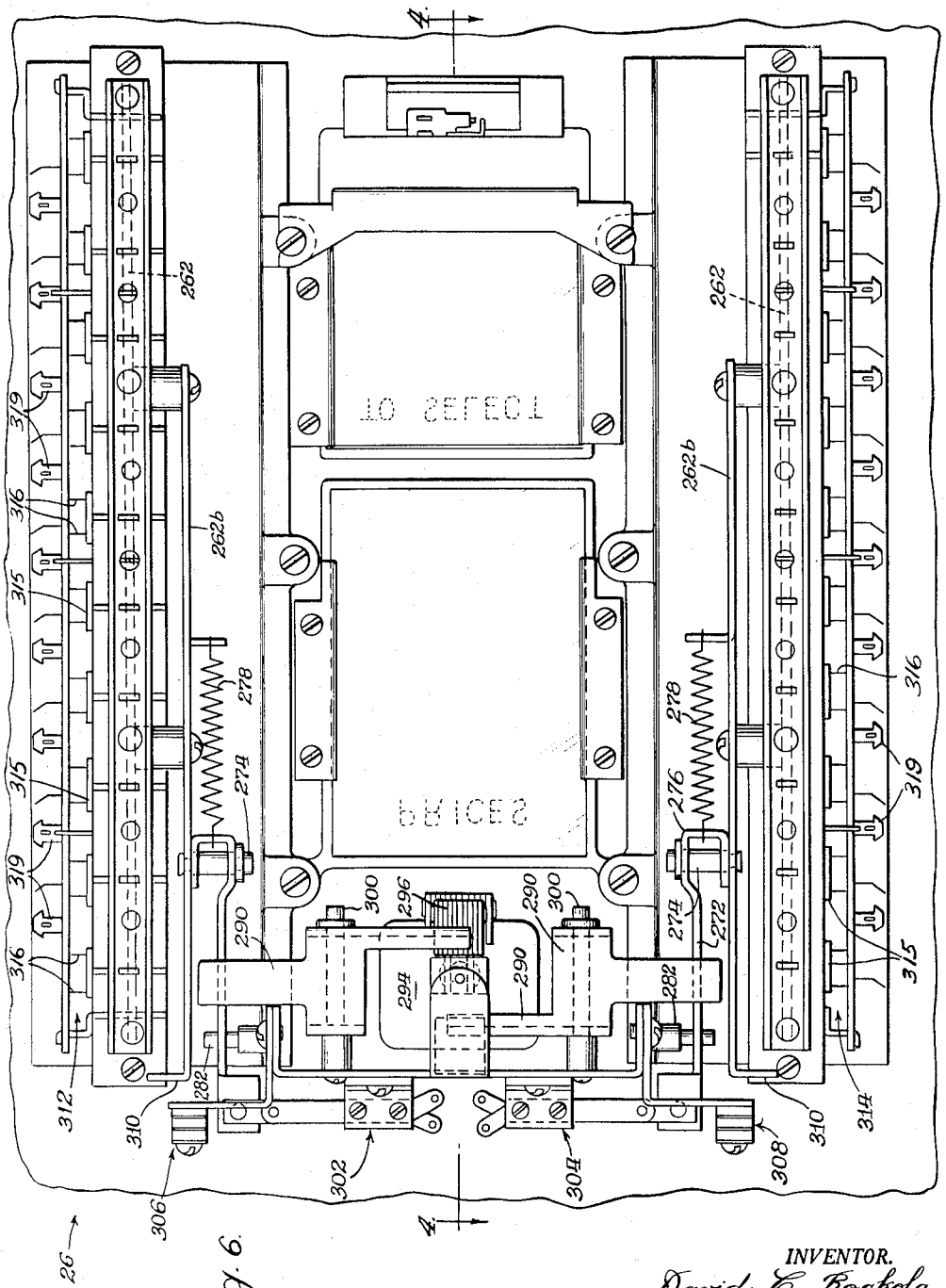


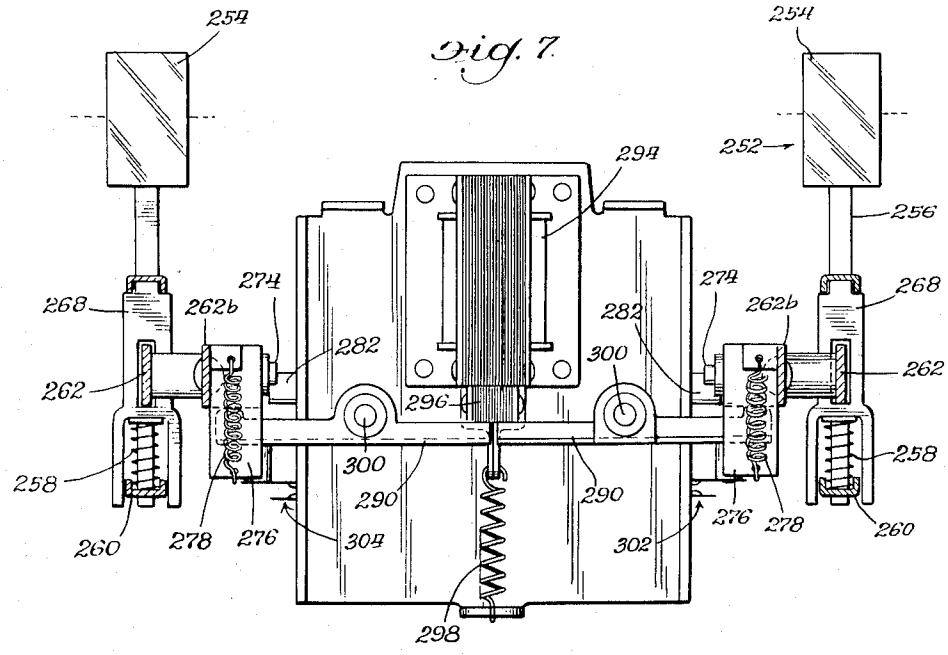
Fig. 6.

INVENTOR.
David C. Rockola
BY Horton, Davis, Brewer & Brugman Attys.

MANUAL SELECTION MEANS FOR AUTOMATIC PHONOGRAPH

Original Filed March 10, 1961 6 Sheets-Sheet 5

Fig. 7.



INVENTOR.
David C. Rockola
BY Fortin, Cairns
Brown & Brugman Attys.

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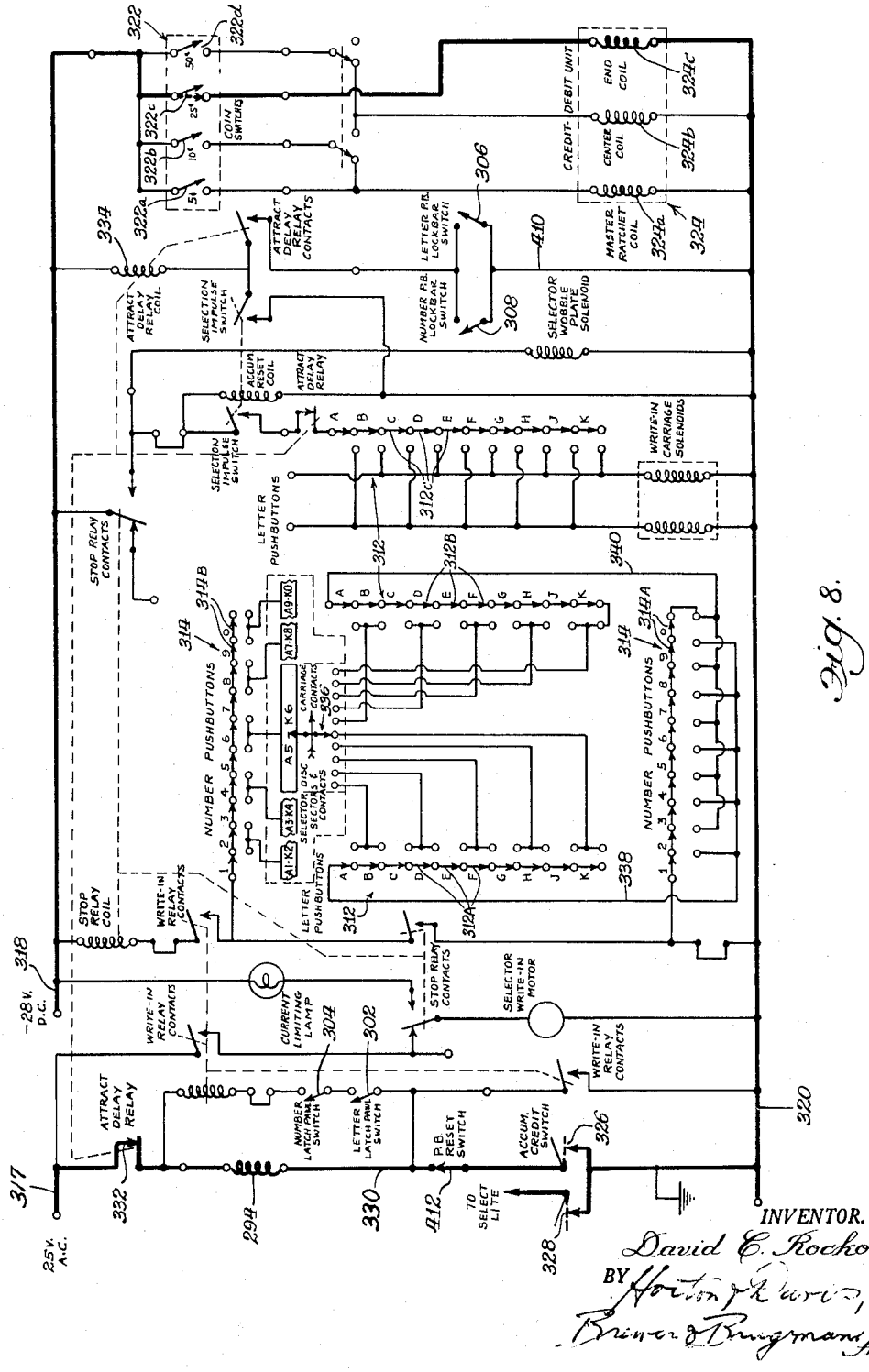


Fig. 8.

INVENTOR.
David C. Rockola
BY Morton J. Morris,
Brisebois & Bruggeman Attys

United States Patent Office 3,247,737 Patented Apr. 26, 1966

3,247,737

MANUAL SELECTION MEANS FOR AUTOMATIC PHONOGRAPH

David C. Rockola, Chicago, Ill., assignor to Rock-Ola Manufacturing Corporation, Chicago, Ill., a corporation of Delaware

Original application Mar. 10, 1961, Ser. No. 94,739, now Patent No. 3,183,005, dated May 11, 1965. Divided and this application Aug. 13, 1964, Ser. No. 395,636

4 Claims. (Cl. 74—483)

The present invention relates to automatic phonographs. The present application is a division of my application Serial No. 94,739 filed March 10, 1961, now Patent No. 3,183,005 issued May 11, 1965.

It is an object of this invention to provide a novel pushbutton assembly for use in making manual selections of records in automatic phonographs and the like.

A further object of this invention is to provide a selection pushbutton assembly having novel interlocking means for preventing undesired additional selecting operations before previous selections are completed.

Other objects and advantages of the invention will appear from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of an automatic phonograph embodying the features of the present invention;

FIG. 2 is an end view of the pushbutton assembly, taken from the left end of FIG. 4;

FIG. 3 is a perspective view of the phonograph with the front of the cabinet open, and an internal cover panel removed;

FIG. 4 is a longitudinal sectional view of the pushbutton assembly and taken approximately at line 4—4 of FIG. 1;

FIG. 5 is a view of only certain of the members included in FIG. 4, isolated from the remaining structure, and oriented in the same direction as FIG. 4;

FIG. 6 is a bottom view of the pushbutton assembly shown in FIG. 4, as viewed from vantage 6—6 of FIG. 3;

FIG. 7 is a cross-sectional view of the pushbutton assembly and taken approximately at line 7—7 of FIG. 4; and

FIG. 8 is a diagram of a portion of the electrical circuit utilized in the automatic phonograph, as related to the novel selection mechanism of the phonograph, and including in heavy lines that portion thereof that is energized in an initial or early step in the sequence of operations of the phonograph.

Referring now in detail to the drawings, attention is directed first to FIGS. 1 and 3 showing the general organization of the automatic phonograph embodying the features of the invention. Referring to FIGS. 1 and 3, the automatic phonograph indicated as a whole at **12** includes a cabinet **14** having a front side facing the observer in FIGS. 1 and 3. The cabinet includes two front closure members **16** and **18** covering the lower and upper portions respectively of the otherwise open front thereof, these cover portions being hinged at the bottom and top respectively and assuming a closed position shown in FIG. 1 in which they can be locked against the entrance to the interior by an unauthorized person but swingable to an open position shown in FIG. 3 exposing the interior of the cabinet and the mechanical operating parts and electrical components therein.

The upper closure member **18** is provided with a transparent panel **20** for observation by the patron of certain operating parts within the cabinet. It also includes a program area indicated in its entirety at **22** having a plurality of tabs **24**, one for each of the records contained in the phonograph and each tab having titles thereon for

both sides of the records. Also incorporated in the upper closure panel **18** is a pushbutton assembly of this invention indicated in its entirety at **26** which will be described in detail hereinbelow.

The principal operating parts of which only portions are exposed to the patron through the transparent panel **20** (FIG. 1) include a record magazine **28**, a turntable **30**, a record transfer mechanism **32** and a tone arm **34**. Provided in the interior of the cabinet is a transverse generally horizontal panel **36** concealing many of the operating parts and other components in the cabinet, but having openings for exposing portions thereof, mainly the magazine turntable, transfer mechanism and tone arm. This horizontal panel **36** is removed from FIG. 3 for exposing in that figure, more of the operating parts of the phonograph.

Attention is now directed more specifically to FIG. 3 wherein the internal components referred to above are illustrated with additional components. Reference is made to my copending application, Serial No. 79,344, filed December 29, 1960, now Patent No. 3,129,005, issued April 14, 1964, disclosing and claiming certain features disclosed in the present application. Further details not described herein may be found fully described in that copending application. In addition to the components referred to above a popularity meter **38** is provided which also incorporates a record indicator therein. Also a selector drum **40** is provided.

The record transfer mechanism **32** includes a gripper arm **60** for gripping the records and transferring them between the magazine and the turntable. The operating mechanism includes a reversing mechanism described in the above entitled application Serial No. 79,344, now U.S. Patent 3,129,005, and this reversing mechanism in addition to controlling the placement of the records on the turntable also controls an indicator arm **62** for cooperation with indicia on the popularity meter **38**. The indicia **38** includes two rows of inscriptions, corresponding to respective sides of the records, for example. The arrangement is such that in one revolution of the magazine the obverse sides of the records are played, while in succeeding rotation the reverse sides are played. The reversing mechanism operates to swing the indicator arm **62** to each of opposite positions wherein the aperture **64** in that arm exposes the inscriptions in the corresponding row. When the selected record reaches the indexing position (adjacent the top) the indicium of meter **38** corresponding to that record is at a viewing position, namely in register with the aperture **64**, and the position of the arm **62** determines which indicium is in line with the aperture, and the position of the arm **62** in turn is determined by the reversing mechanism referred to which determines which side of the selected record is played.

While the reversing mechanism as such is disclosed and claimed in other patents, such, for example, as my Patent No. 2,804,307, dated August 27, 1957, reference to certain phases thereof are made herein for purposes of facilitating description of the novel features of the present invention. Among the features directly affecting the operation of the parts making up the present invention is an arm **66** (FIG. 3) which is swung alternately vertically to upper and lower positions in synchronism with the reversing mechanism, and this arm controls a switch **68** as by closing it and by permitting it to open, or vice versa, in response to the vertical movements of the arm. The switch means **70** performs certain control functions either directly or related to certain phases of the selector drum **40** and associated instrumentalities.

The selector drum **40** is in the form of a unitized construction and is incorporated in a selector assembly indicated in its entirety at **70**, which includes a write-in car-

riage 72 and a read-out carriage (not shown), both arranged for sweeping over the drum 40 about the axis of a central shaft to operate selector levers thereon for each recording, in the selecting and playing operations.

Attention is next directed to the pushbutton assembly 26 (FIG. 1) and the detailed construction thereof shown in FIGS. 2, and 4–7, inclusive. Included in the pushbutton assembly are a plurality of pushbuttons 252 arranged in two rows 252*a* and 252*b* respectively. Those in the first row bearing letters of the alphabet and those in the second row numerals. There are 10 pushbuttons in each row affording 100 combinations for selections of the 100 sides on 50 records, the capacity assumed in the present disclosure. Each pushbutton 252 includes an outer finger-engaging block or body portion 254 and an inner stem or plunger 256 arranged for sliding movement in inward direction, in response to manual depression by the finger, and biased to an outward position by a compression spring 258 compressed between a collar on the stem and a fixed element 260 of the frame of the pushbutton assembly.

Associated with the rows 252*a* and 252*b* of pushbuttons are lockbars 262 mounted for longitudinal sliding movement in directions transverse to the depressing movement of the pushbuttons, in response to depression of those pushbuttons. These lockbars 262 are identical except opposite in arrangement and each includes ten inclined slots 264 associated with the pushbuttons of the corresponding row. Each stem 256 of the pushbuttons includes a slot 266 (FIG. 5) receiving the bar 262 and having a transverse element 268 above the corresponding slot 264 and adapted for entry into the corresponding slot upon depression of the pushbutton. Upon such depression of any pushbutton, and entry of the element 268, into the corresponding slot 264, the lockbar 262 is cammed in the appropriate direction which is to the left as viewed in FIGS. 4, 5 and 6. The lockbars 262 may be mounted in any suitable fixed elements of the frame of the pushbutton assembly and are biased to a retracted position (to the right—FIGS. 4, 5 and 6) by compression springs 270 interposed between shoulders on the lockbars and fixed elements in the frame.

Each lockbar is provided with a laterally spaced supplementary bar element 262*b* rigidly secured thereto and positioned laterally beyond the stems 256 of the pushbuttons for facilitating mounting of a latch pawl 272. The latch pawl is pivoted on a pin 274 fixed on the bar element 262*b*, and includes an extension 276 connected to which is one end of a tension spring 278, the other end of the spring being connected to the bar element 262*b*, for biasing the latch pawl in corresponding direction, or counterclockwise and downwardly as viewed in FIGS. 4 and 5. Each latch pawl adjacent its swinging end is provided with an aperture 280 receiving a pin 282 mounted in a fixed element of the frame of the pushbutton assembly. The upper edge of the aperture 280 includes a lower element 284 and an upper element 286 between which is a vertical shoulder 288.

When the lockbar 262 is moved in advancing direction (to the left—FIG. 5), and the tension spring 270 swings the latch pawl 272 downwardly (when otherwise free to do so), the vertical shoulder 288 engages in front of the pin 282 and locks the lockbar in advanced position. However, in the control movements of the lockbars 262, blocking lever arms 290 are moved in upward direction, and they hold the latch pawls 272 in upper position, and prevent the shoulders 288 from engaging in front of the pins 282. The arms 290 are controlled through certain electrical instrumentalities as explained hereinbelow. Upon a selection being made by depression of the corresponding pushbuttons 254, and the lockbars 262 being advanced, if conditions are otherwise appropriate for the selection to be made, the arms 290 are lowered and the latch pawls 272 are permitted to be lowered under the action of the springs 278 for the locking operation as explained.

The blocking arms 290 which control the position of the latch pawls 272 are themselves controlled by solenoid 294 which will be referred to again in the description of the electrical circuit. This solenoid remains energized so long as there is credit set up on the machine by the deposit of coins by a patron for the purpose of playing the records. The solenoid 294 is mounted in suitable frame elements of the assembly and has an armature 296 attracted inwardly upon energization of the solenoid and outwardly by the tension spring 298 upon deenergization of the solenoid. The blocking arms 290, as best shown in FIGS. 6 and 7, are pivotally mounted on suitable pins 300. Upon energization of the solenoid, and raising of the armature 296 thereof, the inner ends of the arms 290 are raised, resulting in lowering of the outer end of the arms and permitting the latch pawls 272 (FIG. 5) to be lowered under the action of the springs 278 so that the locking effect can be accomplished, namely, the pins 282 engaged by the vertical shoulders 288. Conversely, when the solenoid 294 is deenergized, the spring 298 positively lowers the armature and the inner ends of the arms 290, this spring being stronger than the springs 278 and operative for forcibly raising the outer ends of the arms 290 and raising the latch pawls 272 to their upper position shown in full lines in FIG. 5 thereby preventing the locking action referred to. Thus, so long as credit is set up in the machine, and the solenoid consequently remains energized, the lockbars 262 are locked in advanced position upon a selection being made by depression of the pushbuttons 254. While on the other hand, if there is no credit set up in the machine, the solenoid remains deenergized, and depression of the pushbuttons advances the lockbars 262 but then are held in advanced position only while the pushbuttons are held in depressed position, and upon release thereof they are returned to their normal outer position and the lockbars 262 are returned to their home or retracted positions.

The transverse elements 268 (FIGS. 4 and 5) of the stems 256 of the pushbuttons are all arranged in register with the open ends of the respective slots 264 when the lockbars 262 are in their retracted positions. Thus upon depression of any pushbutton, the corresponding transverse element 268 enters into the slot and advances the bar. When the lockbar 262 is locked in advanced position, in the manner just described, the open ends of the slots 264 corresponding to those pushbuttons which have not been depressed, are out of register with the corresponding transverse elements 268 and thus only the one pushbutton in each row 252 can be depressed at a time.

Each selection requires the depression of a pushbutton in each of the rows 252*a* and 252*b*, namely a letter pushbutton and a numeral pushbutton, and upon depression of these pushbuttons, when all other conditions are properly set up for operation of the phonograph, the operation begins.

The pushbutton assembly includes switches 302 and 304 arranged for actuation by the latch pawls 272. In the instant construction, these switches are arranged for closure in response to the latch pawls 272 being swung downwardly, and they are held in closed position so long as the latch pawls remain in lowered position. Additional switches 306 and 308 are arranged for actuation by the lockbars 262 in response to advancing movement of those bars, by means of turned over ends 310 (FIGS. 4 and 5) which engage the leaves of those switches. In the case of the switches 302 and 304, these are actuated only when the lockbars 262 are advanced and the latch pawls 272 are in lowered position, but on the other hand, the switches 306 and 308 are actuated by the lockbars each time the latter are advanced.

Also included in the pushbutton assembly are other switches actuated by the pushbuttons, these switches being a first row 312 associated with the letter pushbuttons 252*a* and a second row of switches 314 associated with the number pushbuttons 252*b*. These switches include a

plunger element **315** (FIG. 6) mechanically connected to the stems **256** of the pushbuttons and contact elements **316** on each plunger element arranged for engaging contact elements mounted on fixed frame elements of the assembly. The switches, of known type, include terminal elements **319** for connection of conductors thereto. The switches **312** in the letter pushbuttons **252***a* have three contact elements while the other switches **314** associated with the number pushbuttons **252***b* have only two contact elements.

Attention is directed next to the circuit diagram shown in FIG. 8, but different portions thereof are shown energized in different figures, the heavy lines indicating energized portions. The diagram is shown as including an A.C. line **317** and a D.C. line **318** connected with a common return **320**. Certain of the electrical instrumentalities identified above will be found herein, including the lockbar solenoid **294** (left end) the pushbutton lockbar switch for the letter pushbuttons **306**, and the corresponding switch **308** for the number pushbuttons. Additionally, the latch pawl switch **302** for the letter pushbuttons and the latch pawl switch **304** for the number pushbuttons are shown at the left end of the circuit.

The other switches, namely **312** and **314**, connected with the pushbutton stems or plungers are adjacent the center of the diagram. The three contacts of the letter pushbuttons shown at **312** and individually identified in banks or groups **312A**, **312B**, there being ten in each group, one of each group being related to the corresponding pushbutton.

The other switches **314**, associated with the letter pushbuttons, are also shown in the diagram, these switches having two contacts each, as explained above, and here identified as **314A** and **314B**, there being ten in each of these groups and one of each group associated with each of the number pushbuttons.

A coin control switch assembly **322** (right, top) of known type is incorporated in the electrical circuit, having individual switches **322***a*, **322***b*, **322***c* and **322***d*, respectively closed momentarily by insertion of coins in the usual coin insert means. The individual switches thereof, as indicated, represent different values of coins and for purposes of example herein the 25¢ switch **322***c* is shown closed, which completes a circuit portion through the circuit diagram. Associated with the switches is a coil assembly **324** (right, bottom) including a plurality of coils **324***a*, **324***b* and **324***c*. Included in the circuit also is a credit unit which also may be of known kind, such for example as disclosed in the co-pending application of myself and others, Serial No. 849,546, filed October 29, 1959, now Patent No. 3,082,853, issued March 26, 1963. The credit unit includes a toothed ratchet which is advanced in steps corresponding to the value of the coins inserted, being advanced by the three coils **324** according to the values of the coins with which they are associated. For example, upon the insertion of a 25¢ piece the switch **322***c* is closed whereupon the coil **324***a* is energized, this coil advancing the toothed ratchet in the credit unit an amount representing 25¢, such as five increments or steps. The toothed ratchet closes the accumulator credit switch **326** (left, lower) and this switch remains closed so long as any credit is set up in the credit unit, in a known manner. Conversely, when all of the credit is expended, and the toothed ratchet returns to its home or retracted position, the switch **326** is permitted to open. As an incidental operation to the energization of the coil **324***a*, an additional switch **328** is closed (left, lower) for lighting a signal light suitably placed in the phonograph to indicate to the patron that a selection may be made.

The accumulator credit switch **326** is included in a conductor **330** which also includes the lockbar solenoid **294** and an attract delay relay switch **332** (upper left hand corner) which is controlled by an attract delay relay coil **334** (upper right hand corner). Thus upon deposit of the coin and closure of the switch **332**, a circuit is completed from the D.C. source **318** to the common return **320**; as a result of the closure of the normally open switch **326** by the operation just referred to, a second circuit is closed from the A.C. source **317** to the common return **320**. This thus sets up the circuit for the next operation which is depression of the pushbuttons **252** which may now be done effectively, with operating steps taking place in the machine.

At this stage of the condition of the circuit the lockbar solenoid **294**, being energized, holds the armature **296** (FIG. 7) in raised position which relieves the force of the armature on the inner ends of the arms **290**. As a consequence the tension springs **278** (FIGS. 4 and 5) move the latch pawls **272** downwardly (FIG. 5) so that upon depression of the pushbuttons the lockbars **262** when advanced (to the left—FIGS. 4 and 5) will be locked in advanced position by the shoulders **288** engaging the pins **282**, as explained above.

An important feature of the invention is the arrangement of the various elements in the electrical portion of the machine that are utilized for establishing the permutations in a simple manner so as to effect the attainment of maximum permutations with a minimum number of elements. For this purpose the switches **312** and **314** are separated into different parts, these parts being adapted for selective connection for establishing maximum permutations.

As many selecting operations as desired may be made without regard to whether the selected records are played, that is, it is not necessary in making a record selection to wait for the first to be played. After each depression of the necessary pushbuttons, the write-in carriage moves to the corresponding position and sets the corresponding selector lever, and the next selection can be made, and after a single selection is made, the corresponding playing operation is performed and repeated until any additional selected records are played. For a fuller and more detailed description and understanding of the present invention, particularly as to the adaption and utilization thereof in a preferred embodiment and environment, as well as for greater particulars as to the operation of this invention in the circuitry shown in FIGURE 8 and the relationship thereof to the various elements of an automatic phonograph referred to hereinabove, reference is hereby made to the full description appearing in my co-pending application Serial No. 94,739 filed March 10, 1961, now U.S. Patent No. 3,183,005, issued May 11, 1965, of which the present application is a division. Since the present application constitutes a divisional application of its above-identified parent application Serial No. 94,739 all portions of the description and drawings appearing in said parent application and the aforesaid patent issued thereon, which do not appear herein are incorporated in full, as a part of the present description.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the forms hereinbefore described being merely preferred embodiments thereof.

I claim:

1. A selector pushbutton assembly comprising a frame, two groups of depressible pushbuttons, a bar associated with each group slidable longitudinally to an advanced position in a direction transverse to the direction of depression of the pushbuttons, the pushbuttons and bars having interengaging portions operable upon depression of the pushbuttons for advancing the bars, advancement of a bar by depression of a selected pushbutton of its associated group serving to prevent depression of any other pushbutton of that group, a latch pawl pivoted adjacent

each bar and movable to and from latching position, a pin fixed on the frame adjacent each latch pawl and positioned for engagement by the latch pawl when the latter is in latching position for consequent retention of the bar in advanced position, means normally biasing the latch pawls to latching position, blocking means movable into and out of a position blocking the latch pawls from latching position, means normally biasing the blocking means to blocking position, and solenoid means operative for moving the blocking means out of blocking position.

2. A selector pushbutton assembly comprising a frame, a plurality of groups of depressible pushbuttons, a bar associated with each of said groups and slidable longitudinally in a direction transverse to the direction of depression of the pushbuttons thereof, each pushbutton including a stem having a transverse element disposed across the associated bar, each bar having plural incline slots, one registeringly aligned with each transverse element, for receiving the latter in response to depression of the associated pushbutton whereby each bar in response to depression of any selected one pushbutton of an associated group thereof is moved longitudinally to advanced position whereat associated slots and transverse elements of the remaining pushbuttons of that group are unregisteringly aligned to prevent the depression of any other pushbutton of that said group; a latch pawl operatively related with each bar, remote of said slots therein, and controllably movable to a latching position for independently latching each bar in said advanced position; means individually biasing the latch pawls to their latching positions, means movable into and out of position positively blocking movement of all latch pawls to and removing the same from latching position, and means controllably moving the blocking means into and out of its said blocking position.

3. The invention set out in claim 2 in which yieldable means is provided for biasing the blocking means to blocking position, and solenoid means is provided for counteracting said yieldable means and moving the blocking means out of blocking position.

4. A selector pushbutton assembly comprising a frame, a grouped plurality of depressible pushbuttons mounted on said frame, a slidable bar associated with said pushbuttons and movable longitudinally in a direction transverse to the direction of depressing movement thereof, said bar and pushbuttons having normally aligned and interengageable conformations which when engaged operate to move said bar longitudinally to an advanced position, the depression of any one of said plurality of pushbuttons causing said bar to move to said advanced position whereby the conformations associated with the remaining of said pushbuttons are no longer aligned and depression of said remaining pushbuttons is thereby prevented, means normally biasing said bar out of said advanced position, latch means operatively associated with said bar and movable to latching position for positively retaining said bar in said advanced position, and means for controlling operational movement of said latch means into and out of said latching position.

UNITED STATES PATENTS

References Cited by the Examiner

2,259,156	10/1941	Ebert et al.	340—162
2,319,945	5/1943	Osborne et al.	340—162 X
2,378,557	6/1945	Jensen et al.	340—162 X
2,411,612	11/1945	Boyajian	340—162
2,551,522	5/1951	Andres	340—162
2,621,241	12/1952	Jensen	340—162
2,909,761	10/1959	Rockola	340—162

NEIL C. READ, *Primary Examiner.*

PETER XIARHOS, *Assistant Examiner.*