July 13, 1937. B. COOPER 2,086,605

REGISTER

Filed Aug. 21, 1934 6 Sheets-Sheet 1

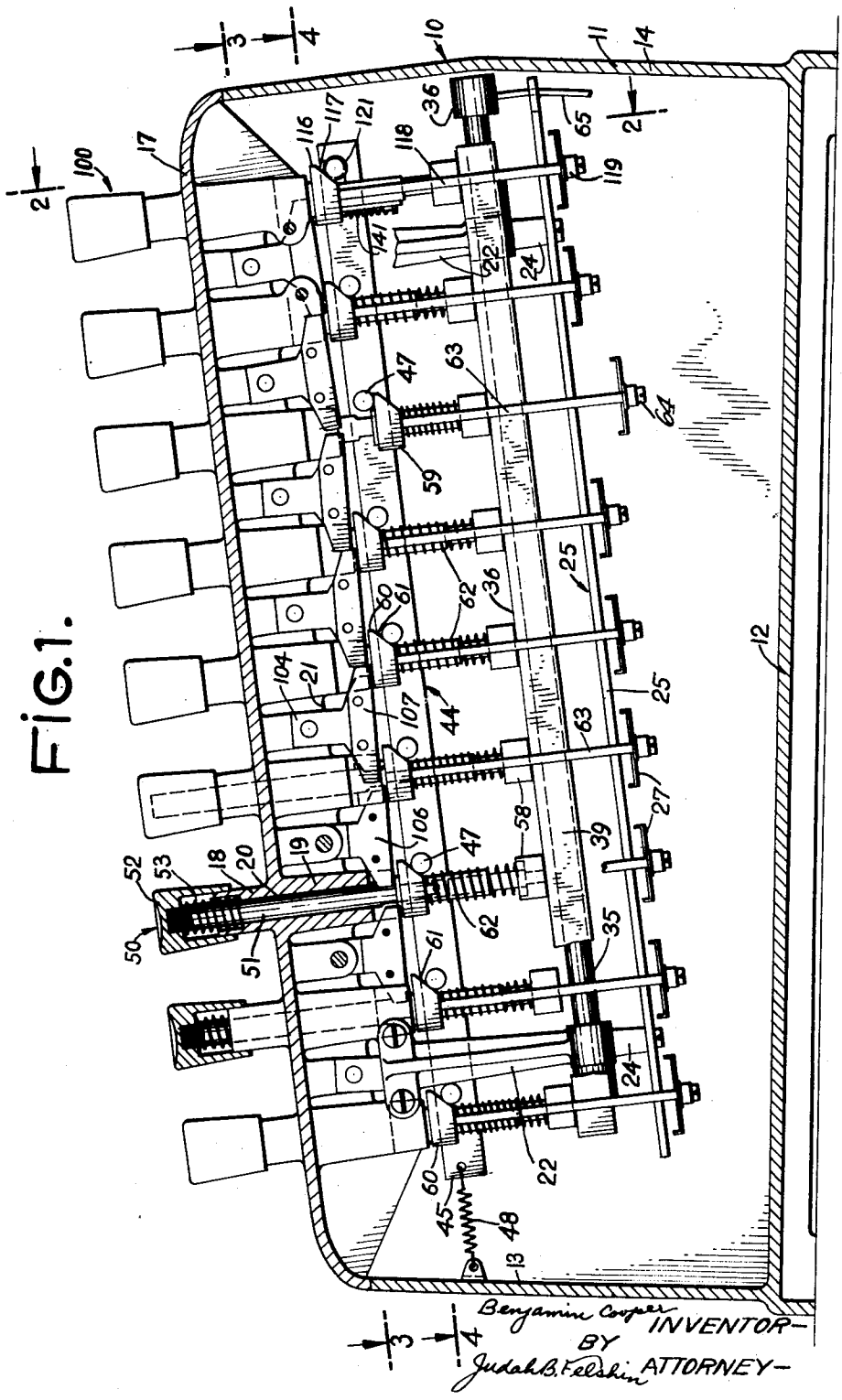


FIG. 1.

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FIG.2.

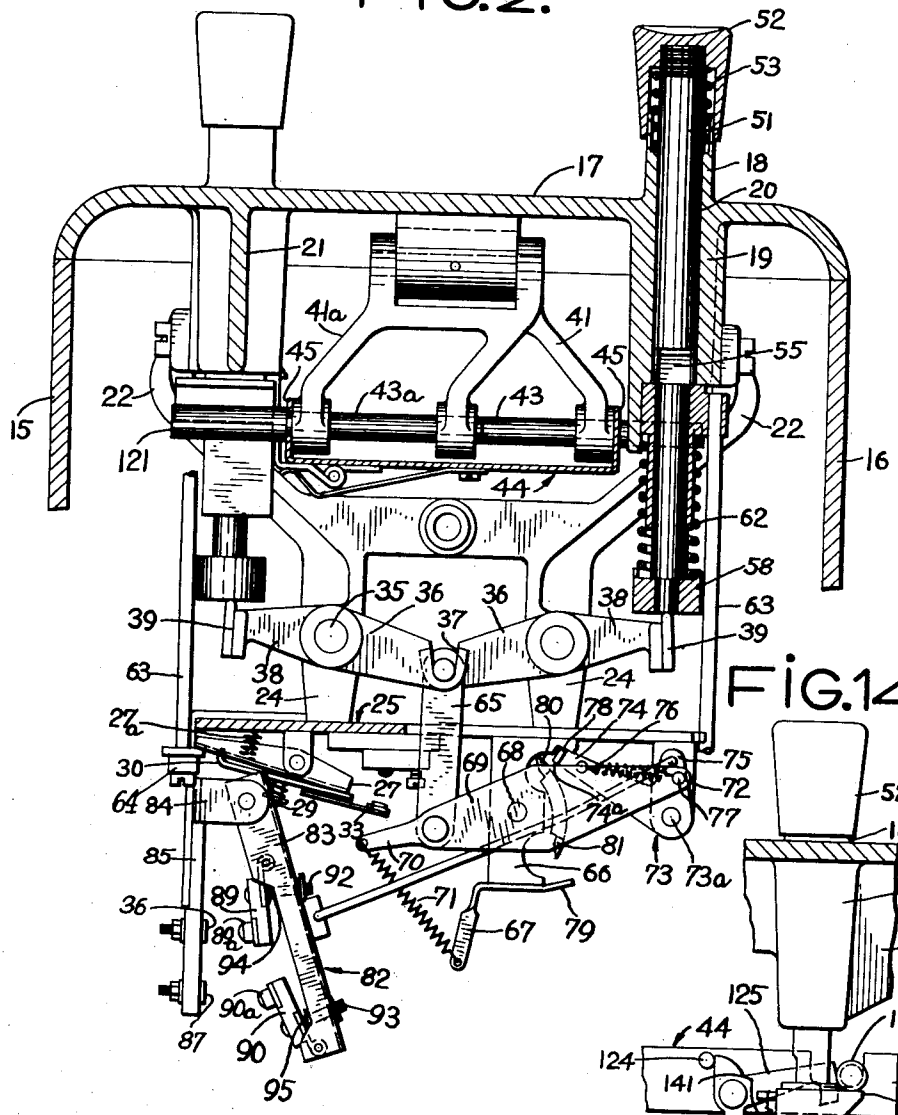
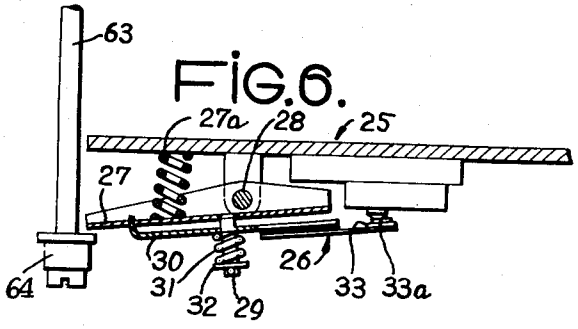


FIG.14.

FIG.6.



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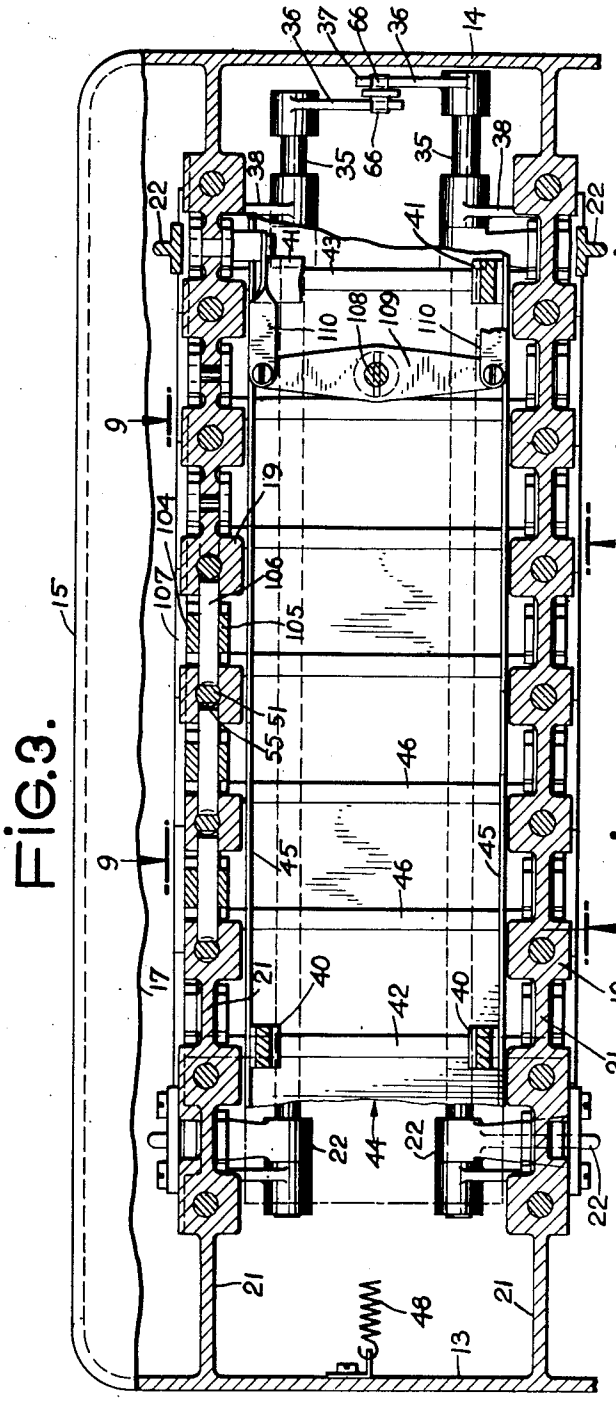


FIG. 3.

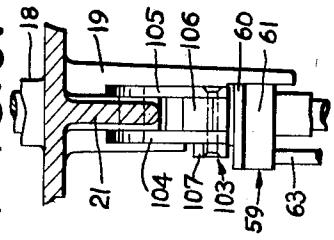


FIG. 8.

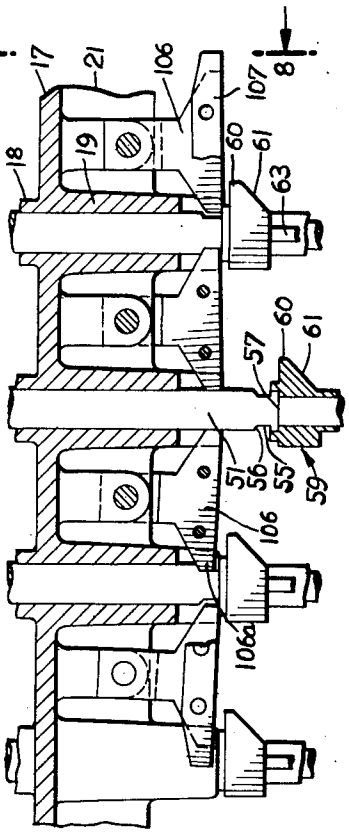


FIG. 7.

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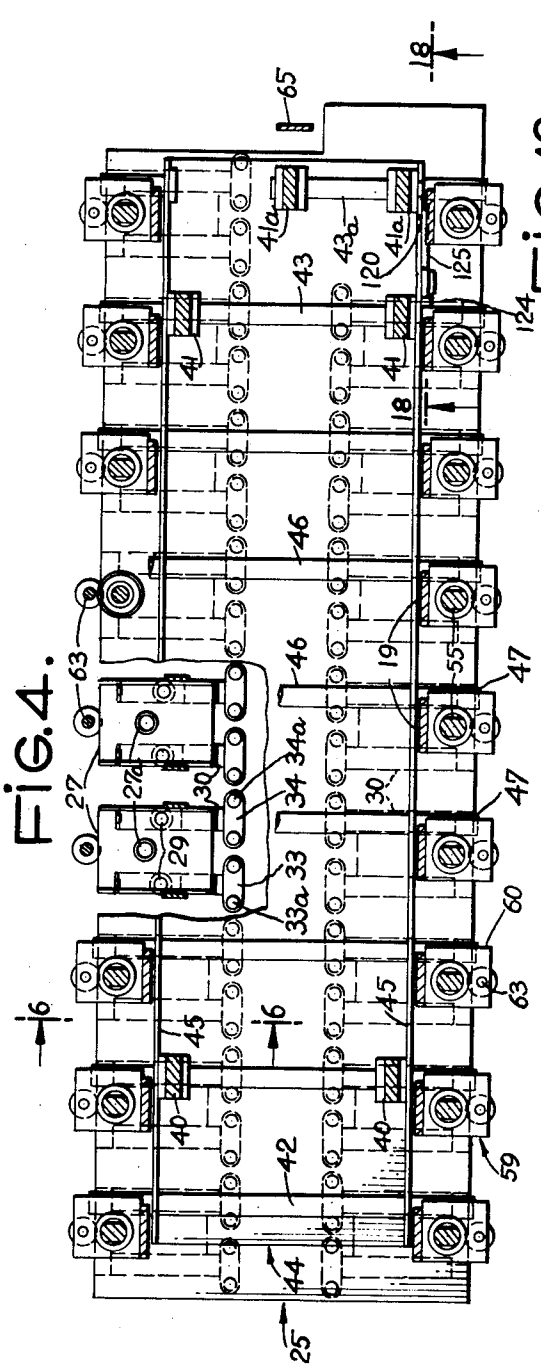


FIG. 4.

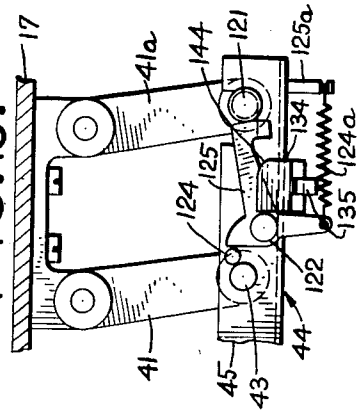


FIG. 18.

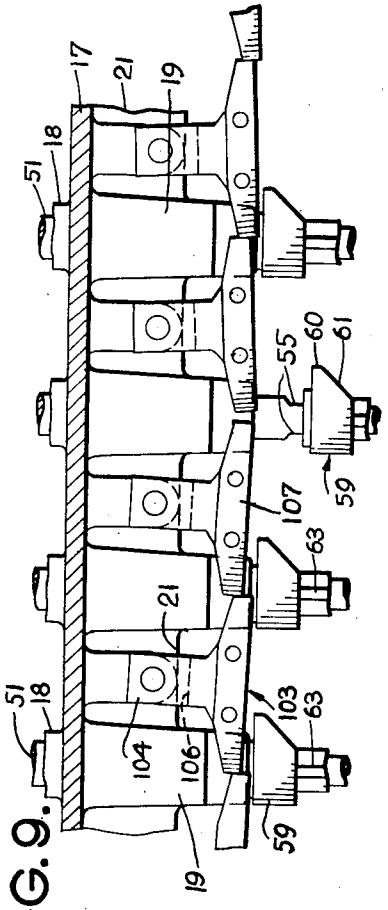


FIG. 9.

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FIG.5.

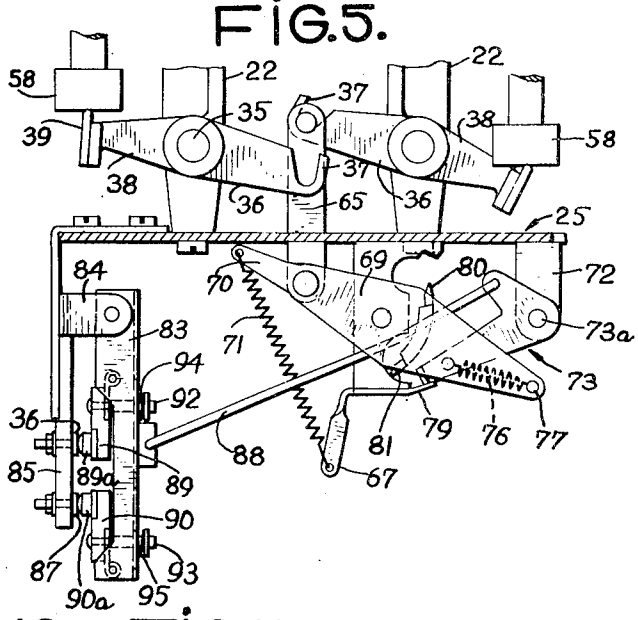


FIG.10. FIG.11.

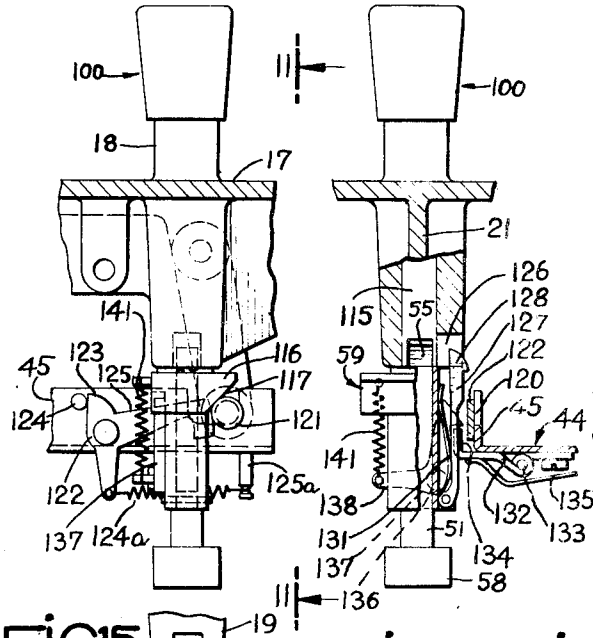


FIG.12. FIG.13.

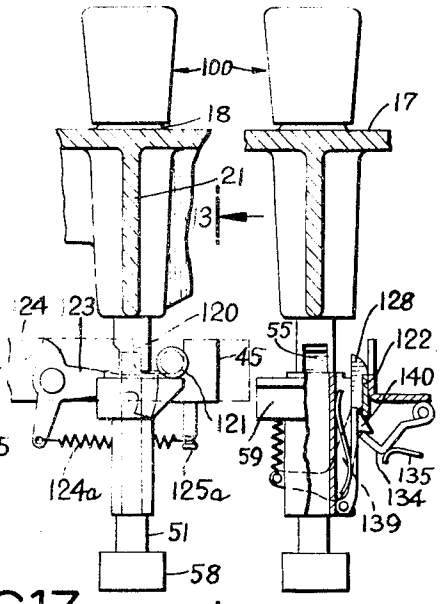


FIG.15.

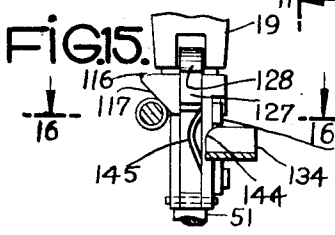
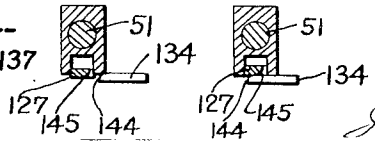


FIG.16. FIG.17.



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FIG. 19.

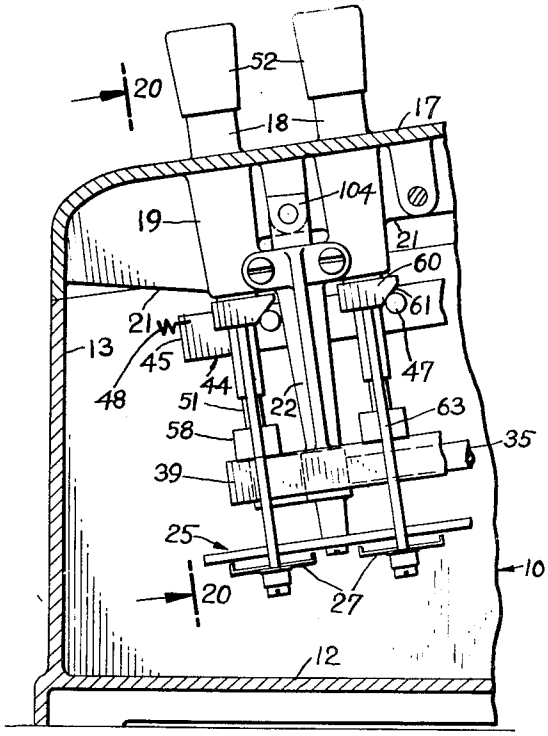


FIG. 21.

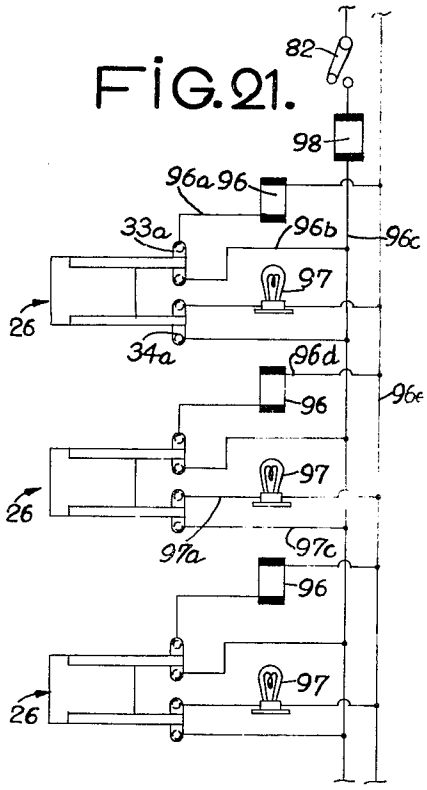
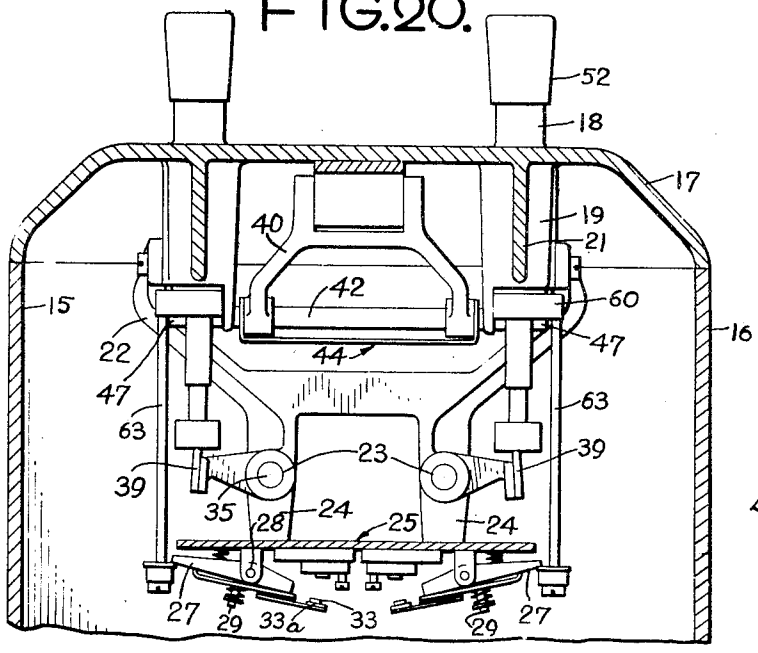


FIG. 20.



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Patented July 13, 1937

2,086,605

UNITED STATES PATENT OFFICE

2,086,605

REGISTER

Benjamin Cooper, New York, N. Y.

Application August 21, 1934, Serial No. 740,743

15 Claims. (Cl. 235—92)

This invention relates to registers. It is particularly directed to a device for operating counters.

An object of this invention is to provide a device of the character described, comprising a plurality of keys or buttons, each adapted to actuate a counter, and having means to prevent simultaneous actuation of two or more of the keys or buttons.

Another object of this invention is to provide a device of the character described having a plurality of depressible keys, each adapted to close a switch, upon being depressed, and means for retaining the switches closed and returning the keys to normal position upon releasing pressure therefrom, the construction being such furthermore, that when a second key is depressed, the switch actuated by the first key opens, and a second switch is actuated by the second key and is retained in closed position when said second key returns to normal position upon releasing pressure therefrom.

Another object of this invention is to provide a device of the character described, comprising a plurality of depressible keys, each adapted to actuate a switch, and an additional key which may be depressed for closing a switch, and said latter switch being adapted to remain closed when a second key is depressed for closing the switch associated therewith, the construction being such, furthermore, that when a third key is depressed the switches associated with the first two keys are opened and only the switch associated with the third key closes, or if the second key is again depressed the switch associated with the first key opens and the switch associated with the second key remains closed.

Still another object of this invention is to provide in a device of the character described, a casing and an insulating board or panel, fixed within said casing, all of the switches actuated by the depressible buttons, and wiring therefor being mounted on said panel and said panel being removable as a whole from the casing.

Another object of this invention is to provide a device of the character described comprising a plurality of keys, each adapted to close an individual switch associated therewith, and a master switch adapted to be actuated each time any of the keys are depressed.

Still another object of this invention is to provide a strong, compact, rugged device of the character described, comprising comparatively few and simple parts, which shall be relatively inexpensive to manufacture, smooth and positive in operation, easy to assemble and disassemble, and which shall nevertheless be practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of this application will be indicated in the following claims.

In the accompanying drawings, in which is shown one of the various possible illustrative embodiments of this invention,

Fig. 1 is a side elevational view of a device embodying the invention with parts of the casing in cross-section;

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 1;

Fig. 5 is a side elevational view of the master switch operating mechanism shown in Fig. 2, but illustrating another position thereof;

Fig. 6 is an enlarged, cross-sectional view taken on line 6—6 of Fig. 4;

Fig. 7 is an enlarged, cross-sectional view taken on line 7—7 of Fig. 2;

Fig. 8 is a cross-sectional view taken on line 8—8 of Fig. 7;

Fig. 9 is a cross-sectional view taken on line 9—9 of Fig. 3;

Fig. 10 is a side elevational view of the ticket key before being depressed;

Fig. 11 is a cross-sectional view taken on line 11—11 of Fig. 10;

Fig. 12 is a view similar to Fig. 10 but showing the ticket key depressed;

Fig. 13 is a cross-sectional view taken on line 13—13 of Fig. 12;

Fig. 14 is a view similar to Fig. 12 but disclosing the position of the depressed ticket key when a classification key is thereafter depressed;

Fig. 15 is a cross-sectional view taken on line 15—15 of Fig. 11;

Fig. 16 is a cross-sectional view taken on line 16—16 of Fig. 15;

Fig. 17 is a view similar to Fig. 16 but disclosing the spring pressed pawl in depressed position;

Fig. 18 is a partial, detailed view of the shifting plate and suspension therefor;

Fig. 19 is a partial, side elevational, cross-sec-

tional view of one end of the device embodying the invention;

Fig. 20 is a cross-sectional view taken on line 20—20 of Fig. 19; and

Fig. 21 is a wiring diagram of the electrical system forming part of my invention.

Referring now in detail to the drawings, 10 designates a device embodying the invention, here shown for the purpose of illustration only in the form of a remote control keyboard, adapted to actuate electro-magnetic counters.

The device comprises a casing 11 having a bottom wall 12, front and rear end walls 13 and 14 and side walls 15 and 16. The rear end wall 14 is preferably higher than the front wall 13. The top of the casing is covered by a cover plate 17 which is thus inclined upwardly from the front to the rear. Said cover plate 17 is formed with a plurality of rows of spaced, upwardly extending tubular portions 18 and downwardly or inwardly extending coaxial tubular portions 19, forming tubular passages 20. The tubular portions 19 are interconnected by integral web portions 21.

Fixed to the cover in any suitable manner adjacent the front and rear ends thereof, are a plurality of spaced frame members 22, each formed with a pair of bearing openings 23. The bearing openings 23 of one frame member are aligned with the bearing openings of the other member.

The frame members 22 are formed with downwardly projecting extensions 24 and screwed to the bottom ends of said extensions by screws or in any other suitable manner, is an insulating board or panel 25. Attached to the underside of said panel 25 are two rows of similar switches 26, one row being disposed symmetrically to the other row and each switch being located substantially in alignment with one of the tubular openings 20. The switches 26 each comprise a plate 27 pivoted as at 28 to the underside of the board and having a fixed downwardly projecting pin 29. A coil compression spring 27*a* interposed between the plate 27 and the underside of the panel 25 normally tends to rotate said plate in a counterclockwise direction, looking at Fig. 6 of the drawings.

Received on said pin 29 is a second plate 30, having an opening loosely receiving said pin, and pressed against said first plate by means of a coil compression spring 31 interposed between a head 32 on said pin, and plate. Attached to said plate 30 and insulated therefrom are a pair of projections 33 and 34 provided with pairs of contacts 33*a* and 34*a* respectively. Fixed to the underside of said panel are pairs of spaced contacts adapted to be slidably contacted by the pairs of contacts 33*a*, 34*a*.

Rotatably mounted within the bearing openings 23 are elongated shafts 35. Fixed to said shafts at one end of the casing, are inwardly extending arms 36, the inner ends whereof overlap and are provided with hooked portions 37. There is further attached to said shafts 35 adjacent the ends thereof, outwardly extending arms 38, to the outer ends of which there are fixed elongated bars 39.

Hinged to the underside of said cover 17 adjacent the front and rear ends thereof, are links 40 and 41, each formed with bearing openings at the bottom end thereof. Received through the bearing openings in the link 40 is a shaft 42 and received within the bearing openings of the link 41 is a shaft 43. Fixed to said shafts 42, 43 is a shifter plate 44 having upstanding vertical flanges 45 receiving said shafts therethrough. The shifter plate is disposed below and parallel to the cover and is likewise parallel to the panel 25. The same is provided with a plurality of parallel, horizontal, transverse shafts 46 parallel to the shafts 42 and 43 and extending beyond the flanges 45 on opposite sides as at 47, for the purpose hereinafter appearing. A coil tension spring 48 attached at one end thereof to the front wall 13 of the casing and at the other end thereof to the front end of the shifter plate 44 serves to normally move the shifter plate to the left looking at Fig. 1 of the drawings. Cooperating with said shifter plate 44, bars 39 and switches 26, are keys, plungers, or push buttons 50. Each plunger comprises a rod or stem 51 slidably mounted in one of the tubular openings 20. Screwed to the upper end of each stem is a cap 52, socketed to slidably receive the upper end of a tubular portion 18. A coil compression spring 53 received on said stem and interposed between the tubular portion 18 and the cap 52 serves to normally retain the stem in lifted position.

For the purpose hereinafter appearing, each stem 51 (as shown in Fig. 7) with two opposite parallel flat surfaces 55 forming grooves, and from each flat surface there extends an upwardly and outwardly beveled or inclined surface 56. Below said flat surface the stem 51 is provided with a flange or collar 57, and fixed to the lower end of each stem is an annular cup 58. Slidably mounted on each stem between the flange 57 and the cup 58, is a member 59 having a tubular portion receiving said stem and a head 60 formed with an inclined surface 61 normally contacting one of the extending shaft portions 47. A coil compression spring 62 surrounding the lower portion of each stem and the tubular portion of the member 59 is interposed between the cup 58 and the underside of the head of the member 59, and thus normally presses said member against the flange 57 on the stem.

Fixed to the head 60 of said member 59 is a rod 63 parallel to the stem 51 and extending below the cup 58 and normally below the panel 25. Attached to the lower end of each pin 63 is a head 64 engaging an edge of the plate portion 27 of a switch 26. Thus in normal position, the spring 53 retains the stem 51 in raised position and the spring 62 retains the member 59 in raised position, whereby the head 64 at the lower end of the pin 63 engages the plate 27 of the switch and retains the same in tilted position against the pressure of the spring 27*a* for opening the switches 33*a*, 34*a*, as illustrated in Fig. 20 of the drawings. Should one of the buttons or keys be depressed by pressing on the cap 52, the pin 51 will be moved downwardly for depressing a bar 39 and releasing a switch 26 to permit the same to close under the pressure of the spring 27*a*. During this movement, the head 60 of the member 59 will cause the shifter plate to be moved to the right and tension the spring 48, by reason of the engagement of the beveled surface 61 with a shaft portion 47. When the shaft portion 47 clears the upper surface of said head 60, the spring 48 will again move the shifter plate to the left, said shaft portion 47 thus engaging the top surface of said head so that release of pressure from the cap 52 will retain the member 59 in depressed condition and the switch 26 associated therewith closed.

It will be further noted that when the switch 26 is released and moves to closing position, the contacts 33*a* and 34*a* will have a wiping or slid-

ing contact with the complementary fixed contacts on the panel **25**, such wiping action being permitted due to the floating connection between the plate **30** and the plate **27**. Such wiping action insures a good electrical contact even after long periods of use.

Upon releasing pressure from the cap **52**, the spring **53** will raise the stem **51** and the cap **52** to normal position, the pin **63** nevertheless, remaining in its downward position. This position is illustrated in Fig. 1 of the drawings, wherein one member **59** and its pin or rod **63** are disclosed in depressed condition and held in such position by engagement of a shaft portion **47** with the head **60** of said member.

It will be further noted that one of the bars **39** is depressed each time one of the plungers is depressed. If a key or plunger in the right row is depressed, then the bar **39** on the right is depressed. If a key on the left row is depressed, then the left bar **39** is depressed.

Means is provided for actuating a master switch each time any one of the plungers is depressed and a bar **39** is swung about one of the shafts **23**. To this end there is received between the hook portions at the inner ends of the arms **36** and engaging said hooked ends, the upper end of a link **65**, said link being in the form of a plate having at the upper end thereof oppositely extending pins **66** engaging within said hooked portions. Fixed to the underside of said panel **25** is a bracket **66** to which there is attached an arm **67**. Pivoted to said bracket **66** as at **68** is a lever **69**. The lower end of the link **65** is pivoted to said lever on one side of its fulcrum. The lever is provided with an extension **70** extending beyond the pivotal point between the link and said lever, and interconnecting the outer end of said extension **70** with the bracket arm **67** is a coil tension spring **71**. The spring thus tends to rotate the lever **69** in a counterclockwise direction, looking at Fig. 2 of the drawings, for pulling the link **65** downwardly and normally maintaining the bars **39** in lifted position against the undersurfaces of the cups **58**.

Fixed to the underside of the panel board **25** is a second bracket **72** to which there is pivoted a bell crank **73** having arms **74** and **75**. A coil tension spring **76** interconnects one arm **74** with an end portion **77** of the lever **69**. Thus, in the position shown in Fig. 2, the spring **76** tends to rotate the bell crank **73** in a clockwise direction. However, should a bar **39** be depressed, the link **65** will be lifted for rotating the lever **69** in a clockwise direction. When the end **77** thereof passes the pivotal point **73***a* of the bell crank **73**, the spring will cause rotation of said bell crank in a counterclockwise direction, to the position shown in Fig. 5 of the drawings. The bracket **66** is provided with a stop **78** engaging the outer end of the bell crank arm **74** in its normal position shown in Fig. 2, and the arm **67** is provided with an extension **79** adapted to engage said arm **74** in the position shown in Fig. 5 of the drawings, when a bar **39** is depressed. When the plunger which has been depressed is released, the spring **71** will cause counterclockwise turning movement of the lever **69**. When the end **77** thereof passes the pivotal point **73***a*, the spring **76** will cause quick clockwise turning movement of said bell crank for snapping the same back to normal position.

To produce a quick snapping action of the bell crank in both directions, there is fixed to the lever **69** a pair of spaced, parallel thin bars **80** and **81**. The bar **80** is adapted to engage an angular extension **74***a* of the bell crank arm **74** to hold said bell crank against turning movement as the lever begins to rotate in a clockwise direction. The spring **76** after passing the dead center will press the end of the bell crank arm **74** against said bar **80**. However, the bar is so designed or cammed as to hold the bell crank arm until the spring **76** has been stretched to a maximum amount. At this point the bar **80** being swung with the lever **69**, passes the end of said arm **74** and permits the spring which is now under greatest tension to snap the bell crank in a counterclockwise direction against the stop **79**. Likewise, during the return movement, the end **74***a* of the bell crank arm **74** contacts the lower bar **81** and is retained from movement in a clockwise direction until the spring has been tensioned sufficiently and the bar **81** is cleared, permitting a quick return snap action. The bell crank is adapted to actuate a master switch **82** in the manner hereinafter described.

The master switch **82** comprises a plate **83** pivoted to a bracket **84** fixed to the panel **25**. There is further fixed to said bracket **84** an insulating plate **85** to which there is fixed a pair of spaced fixed contacts **86** and **87**. Interconnecting the plate **83** and the arm **74** of the bell crank **73** is a link **88**. Thus, in the position shown in Fig. 2 of the drawings, the plate **83** is swung away from the bracket **84**. However, upon depressing one of the plungers or keys rotation of the bell crank will cause closing movement of the plate **83**. Hinged to said plate **83** are a pair of members **89** and **90** provided with contacts **89***a* and **90***a* adapted to contact the fixed contacts **86** and **87** respectively.

Fixed to the members **89** and **90** are pins **92** and **93** respectively, extending through suitable openings in the plate **83**. Springs **94** and **95** received on said pins and interposed between said plate **83** and said members **89** and **90** normally serve to swing said members **89** and **90** away from the plate **83**. However, when the plate **83** swings toward the fixed bracket **85**, pressure on said plates when the terminals **89***a* and **90***a* contact the fixed terminals **86** and **87** will cause members **89** and **90** to be pressed against the pressure of springs **94** and **95** toward said plate **83**. This action produces a wiping or sliding contact between the contacts **89***a* and **90***a* and the fixed contacts **86** and **87** respectively, thus maintaining a good and clean electrical contact.

It will be noted that the master switch is actuated when either of the bars **39** are depressed, since both the arms **36** are hooked to the upper end of the link **65**. The device disclosed herein is adapted for use in connection with and may form part of any registering mechanism for example, an apparatus for counting vehicles, at a toll bridge or highway. The plungers or keys are adapted to actuate electromagnetic counters connected by wiring to switches **26** and **82**, and each plunger may represent a different classification. Thus, for example, one plunger may be depressed each time a passenger automobile passes the toll point. Another plunger may be depressed each time a bus passes said point and so on. Thus, the toll bridges or highways where a different fee must be paid for each different vehicle an accurate classified count of the vehicles may be kept with my improved apparatus.

Referring to the wiring diagram in Fig. 21, it will be noted that each time a plunger is depressed, the master switch **82** in feed line **96***c* is

closed as is also a switch 26 for closing contacts 33a and 34a of said switch. The contacts 33a may be connected by suitable wiring 96a to an electro-magnetic counter 96 and by wiring 96b to the feed line 96c. The counters 96 are connected by wiring 96d to the other feed line 96e. Thus, when the switch 82 closes, and one pair of contacts 33a also closes, the current passes through the electro-magnetic counter 96 connected to said contacts 33a. The electro-magnetic counters may be located remotely from the device 10. The contacts 34a are connected through suitable wiring 97a to a lighting or other electric signal device indicated at 97 in Fig. 21. Devices 97 are connected by wiring 97b to feed line 96e, and contacts 34a are connected to feed line 96c by wires 97c. The devices 97 may be located above or adjacent to the point where the vehicles are being counted, and each device 97 may be in the form of a plurality of lamps arranged to appear as a number, each number representing a vehicle of a different classification. Thus for example, the lights 97 illuminated when one plunger is depressed may be in the form of a row of lights forming a number "1", and "1" may indicate, for example, to an inspector located at some distance, that a vehicle of a particular classification is passing the toll point. A check on the operator of the keyboard 10, may thus be made by an inspector at some distance from the toll point.

Any suitable lighting device or signal 97 may be employed, there being a different signal or different number for each plunger and each indicating a different classification. An additional master counter 98 may be arranged in the main feed line 96c and is actuated each time the master switch is closed to obtain a total count.

It will now be understood that when a key is depressed the master switch 82 is made and broken. The switch 33a controlling the counter 96, however, is made or closed and remains closed even after the key is released. If the same key is again depressed the master switch is again made and broken to energize the counter 96. The switch 33a remaining closed provides a path for the circuit for the counter relay 96 which is completed every time the master switch is made. Thus, if the same key is depressed consecutively a plurality of times, the counter associated with said key will be actuated each time the key is depressed.

The master switch actuated by toggle mechanism is in series with each of the individual switches. Each time one of the keys 52 is depressed, the toggle mechanism is actuated for closing the master switch. The toggle mechanism insures a positive and quick opening and closing or making or breaking of the master switch. Since the master switch is interposed in the main line of the circuit and in series with the individual switches 33a, the same acts as a check on the individual switches. Thus, for example, should one of the keys be depressed and held in a position where its switch is just at the point of making or breaking, said switch might possibly quiver or vibrate and produce a number of pulsations to actuate its counter more than once. By the interpositioning of a switch in the circuit of each individual switch controlled by a toggle mechanism, a single actuation of each individual counter is insured, each time a key is depressed. The toggle mechanism either fully makes or does not make at all. There can be no quivering motion. Thus, the single toggle control switch insures a positive opening and closing of each individual switch.

One of the plungers illustrated in Figs. 10 to 13 and designated by numeral 100 may be called a special or "ticket" key or plunger and the operation thereof, will be described hereinafter in greater detail.

Means is provided for preventing simultaneous actuation of any two keys or plungers, other than the ticket plunger 100. To this end there is disposed between each pair of adjacent tubular members 19 of the cover and pivoted to the web portion 21 between said tubular members, a member 103. Each member 103 comprises a pair of spaced plates 104 and 105 riveted to an intermediate plate 106, said plates 104 and 105 receiving a transverse pin 107 extending through an opening in the web to form the pivotal connection. The central portion 106 of each member 103 is provided with outward extensions 106a normally engaging within the grooves formed by the flattened surfaces 55 on the stems 51. Thus when all the plungers are up, the outer ends of the members 106 project into the grooves formed by said flattened surfaces, there being sufficient clearance, however, to permit one of the plungers to be depressed. When the plunger is depressed however, as shown in Fig. 7, the pair of members 103 located on opposite sides of the depressed stem, engaging the beveled surfaces 56, swing away from each other into contact with the flat surfaces 55 of the pair of stems located on opposite sides of the depressed stem, and take up all of the clearance between said pair of members 103 and said pair of stems 51. There is no member 103 located between the ticket key and the key next adjacent thereto.

It will be noted that the total clearance, normally, between the outer ends of a member 106 and the flat surfaces 55 of the stems located on opposite sides of said member, is equal to the depth of the recess or groove formed by said flat surface. Thus to depress any stem, the clearance of the members 103 located on opposite sides of said stem is necessary to permit depression of said stem. Riveted to each plate 104 of members 103 is a flat horizontal strip 107. The strips 107 on each row of members 103 are aligned with one another and disposed in substantially end to end relation. There is some looseness however, between the members 107 to permit slight pivotal movement of the members 103 when a plunger is depressed. The total clearance between the members 107 in both rows of members 103 is equal to twice the depth of a groove formed by a flat surface 55 on one of the stems 51. Projecting downwardly from the cover 17 is a fixed pin 108 located on the longitudinal axis of said cover. Pivoted to the lower end of said pin 108 is a lever 109 having arms of equal length. Interconnecting the outer ends of said lever with the members 107 located at adjacent ends of the two rows of said members 107 are links 110. When one plunger is depressed, the total amount of movement of the members 103 located on opposite sides of said depressed stem is equal to twice the depth of one of the grooves, formed by the flat surface 55.

During such movement, the plates or strips 107 of said pair of members 103 will separate a distance equal to twice the depth of said groove and since this clearance is all of the clearance that can be taken up between all of the strips or plates 107, the strips located on one side of the depressed stem contact one another and the

strips located on the opposite side of said depressed stem also contact one another. When a plunger is depressed in one row, the plates 107 of the other row move into end to end contact by reason of the connection through the lever 109. Thus, when one plunger is depressed, each strip or plate 107 is fixed against movement and brings the ends 106a of plates 106 into the grooves in the stems of the other plungers; and a second plunger therefore, cannot be depressed while the first plunger is in depressed condition. Simultaneous depression of two plungers is therefore prevented.

The ticket key 100 may be depressed when the operator receives a ticket instead of a cash fare. The ticket may represent, furthermore, a variety of types of vehicles, and therefore it would be necessary when receiving the ticket, to depress both the ticket key 100 and one of the classification keys 50. For this reason, after the ticket key is depressed to actuate a counter 96 which counts the number of tickets received and which also closes a light or other signal circuit to show a signal 97 indicating that a ticket has been received, it is further necessary to depress a classification key to actuate the counter which counts the number of vehicles of that classification and also to close the light circuit to indicate by a signal the kind of a vehicle being registered.

Means is therefore provided to permit depression of a classification key after the ticket key has been depressed, without opening the switch closed by the ticket key; and for opening the switches closed by both the ticket key and said classification key when a second classification key is thereafter depressed. To this end, the classification key 100 may comprise a stem 115 having the usual spring pressed cap at the upper end thereof and usual cup 58 at the bottom end thereof.

Fixed to said stem is a member 116 similar to the member 59 and provided with a beveled undersurface 117 and with the usual pin portion 118 having a head 119 at the bottom end thereof for actuating a switch 26 similar to the other switches 26 and similarly connected by wiring to an electro-magnet and a light or other electrical signal device.

The flange 45 of the shifter plate 44 adjacent the ticket key is formed with a notch 120 having a length equal to the length of movement of the shifter plate when a classification key is depressed. Suspended from a link 41a hinged to the cover of the casing and somewhat similar to the link 41, is a horizontal shaft 43a extending through said notch 120 and somewhat beyond the member 116, as at 121. The portion 121 may be somewhat enlarged, as shown in Fig. 2 of the drawings.

Pivoted to the outer surface of said flange 45 and lying substantially flat against said flange is a bell crank lever 122 having an arm 123 adapted to contact a pin 124 fixed to said flange 45 for retaining the bell crank against movement in a counter-clockwise direction. (See Fig. 10.)

A coil tension spring 124a attached at one end to a pin 125a fixed to the shifter plate at the other end thereof to another arm of the bell crank, serves to move the bell crank in a counter-clockwise direction for maintaining the arm 123 against the stop 124. The bell crank is further provided with an arm 125 normally adapted to contact the shaft portion 121, as shown in Fig. 10 of the drawings for maintaining said shaft at the right end of the slot 120 and thus in effect clamping the shaft 121 to the shifter plate. In this normal position, depression of any classification key will move the shifter plate together with the shaft 121.

For the purpose hereinafter appearing, the member 116 is formed on the face thereof adjacent the flange 45, with a vertical slot 126 and received within said slot and pivoted to said member 116, adjacent the bottom end thereof, is a lever 127 having a hook portion 128 at the upper end thereof. A small strip spring 131 received within said groove 126 and behind the lever, serves to press the same normally toward the flange 145. The lever 127, however, is pressed into the groove 126 by means of a member 132 pivoted to the underside of the shifter 44, as at 133 and having an arm 134 engaging the lever 127, said pivoted member 132 being pressed upwardly to the position shown in Fig. 11 by means of a spring 135 fixed to the underside of the shifter, in any suitable manner.

Pivoted to a side of the member 116, as at 136, and disposed in a plane perpendicular to the plane of the flange 45, is another bell crank lever 137 having an arm 138 extending away from the flange 45, and an upwardly extending arm 139 having a hook 140 at the upper end thereof. A spring 141 connected at the lower end thereof to the arm 138 and at the upper end thereof to a pin 141 fixed to the upper end of the member 116, serves to rotate the bell crank in a clockwise direction, looking at Fig. 11 of the drawings. The hook 140 is adapted to engage the portion 134 of the pivoted member 132.

Beginning with the parts in the position shown in Figs. 10 and 11, depression of the ticket key will move the parts to the position shown in Figs. 12 and 13 for actuating a bar 39 in the usual manner to operate the master switch 82, and for closing a switch 26 to close the circuit for an electro-magnet and a signal device.

Upon depressing the ticket key 100 the hook 140 engages the portion 134 of the pivoted member 132 and rotates the same downwardly to the position shown in Fig. 13. The hook 128 of the lever 127 also engages the arm 125 of the bell crank 122 and rotates the same in a clockwise direction, looking at Fig. 12 of the drawings, to bring the outer end of said arm 125 beneath the shaft portion 121. During the movement, furthermore, the beveled surface 117 engaging the shaft 121 will cause the shifter plate to be moved to the right until said member 116 moves beneath the shaft to permit the spring 48 to move the shifter to the left and bring the shaft portion 121 above the member 116. The member 116 is thus held in depressed position to retain the switch 26 closed. When the member 132 is swung downwardly by the hook 140 of the bell crank 137, the lever 128 will be pressed outwardly to bring the hook 128 into engagement with the arm 125 of the bell crank 122 to swing the same downwardly against the tension of the spring 124.

It will now be noted that should a classification key be depressed thereafter, the shifter plate may move to the right without moving the shaft 121 to the right, said shaft 121 thus remaining in the position shown in Fig. 14 and maintaining the member 116 downwardly for retaining the switch 26 in closed condition. A shifting movement of the shifter plate, however, will also move the member 132 to the right since said member 132 is mounted on the undersurface of the shifter plate 44. Such a movement of the member 132 to the right will bring a cammed portion 144 of

the arm 134 into engagement with a cammed surface 145 on the lever 127 and press said lever into its groove 128 to release the hook 128 from the bell crank arm 125 and permit the spring 124 to move the bell crank 122 to the position shown in Fig. 14 of the drawings and lock the shaft 121 to the shifter plate. Should another classification key be thereafter depressed, the shaft 121 will shift to the right, together with the shifter plate 44, being locked thereto, and release the member 116. The ticket key is then moved back to normal position by the spring in the cap portion thereof.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments set forth; it is to be understood that all matter herein set forth, or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A keyboard having depressible keys, a switch within said keyboard adapted to be actuated upon depressing one of said keys, means for moving said key back to normal position upon releasing said key after the same has been depressed, and for maintaining said switch in actuated condition, upon said key moving back to normal position, and means for releasing said first switch upon depressing another key of said keyboard.

2. In a keyboard, a plurality of keys, a switch for each key, means for actuating each switch upon moving its key, means for releasing an actuated switch upon depressing a key not associated therewith, a special key, means for retaining the actuated switch associated with said special key in actuated condition upon depressing any of the other keys to permit two switches to simultaneously remain in actuated position, and means for releasing said last named two actuated switches upon thereafter depressing another of said other keys.

3. A keyboard comprising a plurality of depressible keys, a switch for each key, said switches being adapted to be actuated by their respective keys, and an additional key which may be depressed for actuating a switch associated therewith, said latter switch being adapted to remain in actuated position when one of said plurality of keys is thereafter depressed for actuating the switch associated therewith, and means for releasing the switches associated with said additional key and said depressed key from actuated position when another of said plurality of keys is depressed.

4. In a keyboard, a casing, a depressible stem mounted thereon, resilient means for normally retaining the stem in lifted position, a switch within said casing, a member slidably mounted on said stem, spring means for causing upward sliding movement of said member on said stem, means on said member for engaging said switch, said member being formed with a beveled undersurface, a plate within said casing movable in a direction perpendicular to said stem, and having a portion engaging said beveled undersurface, spring means for retaining said portion in engagement with said beveled undersurface, said plate being movable upon depressing said stem due to the engagement of said beveled undersurface with said portion, and said portion being movable to the top of said member by said last mentioned spring, for retaining said member in depressed position.

5. A keyboard comprising a casing, a plurality of brackets within said casing, a pair of parallel shafts mounted on said brackets, a pair of rows of spaced plungers on said casing, a pair of bars fixed to said shafts and disposed parallel thereto, one bar being disposed below one row of plungers and the other bar below the other row of plungers, arms fixed to said shafts extending inwardly and having overlapping hooked portions, a link engaging said hooked portions and a switch connected to said link.

6. A keyboard comprising a casing having a top cover, a plate suspended from said cover by a plurality of links and disposed parallel to said cover, a spring for normally pulling said plate toward one wall of the casing, a plunger slidably mounted on said cover and disposed perpendicular thereto, a member slidably mounted on said plunger and having a portion formed with a beveled undersurface, and means on said plate and engaging said undersurface, said plate being shiftable toward an opposite wall upon depressing said plunger, and movable back to normal position by said spring for retaining said first member in depressed position and a switch controlled by said member.

7. In a keyboard, a casing, a stem slidably mounted therein, a member slidably mounted on said stem, a switch within said casing, said member being adapted to engage said switch, means for simultaneously depressing said stem and member, means for retaining said member in depressed condition and means for moving said stem back to normal position upon releasing pressure from said stem.

8. A keyboard comprising a casing having a top wall, a plurality of brackets within said casing, a panel attached to said brackets and disposed parallel to said top wall, a plurality of plungers mounted on said top wall, a plurality of switches mounted on said panel, there being one switch associated with each plunger, means on said plunger for normally holding said switches in open position, said switches being released by said holding means and movable to closed position upon depressing the plungers associated therewith.

9. A keyboard comprising a casing having a top wall, a plurality of brackets within said casing, a panel attached to said brackets and disposed parallel to said top wall, a plurality of plungers mounted on said top wall, a plurality of switches mounted on said panel, there being one switch associated with each plunger, means on said plungers for normally holding said switches in open position, said switches being released by said holding means and movable to closed position upon depressing the plungers associated therewith, means for moving said plungers back to normal position upon releasing the same after the same have been depressed, means for retaining said switch holding means in switch releasing position whereby said switches remain closed upon release of said plungers and movement thereof back to normal position; and a master switch mounted on said panel, and means for closing said master switch each time any of the plungers is depressed.

10. A keyboard comprising a casing having an opening, a stem slidably extending through said opening, a cap at the upper end of said stem, a

spring interposed between said cap and said casing, a switch mounted within said casing, a member slidably mounted on said stem and movable with said stem upon depressing the latter, said member being adapted to engage said switch, said spring being adapted to move said stem back to normal position upon releasing said stem after the same has been depressed, means for holding said member against movement when said stem is moved back to normal position, means for releasing said member and spring means for moving said member on said stem upon said member being released.

11. A keyboard comprising a casing, a plurality of depressible keys slidably mounted on said casing, switches within said casing associated with said keys, a member slidably mounted on each key and movable with said key upon depressing the latter, said members being adapted to engage said switches upon depressing said keys, means to move the keys back to normal position upon releasing the same after said keys have been depressed, means for holding each member against movement when its key is moved back to normal position, means for releasing said member upon depressing another key, and means for moving said member on said key upon said member being released.

12. A keyboard comprising a casing having a top wall, a panel attached and disposed parallel to said top wall, a plurality of plungers slidable on said top wall, a plurality of switches mounted on said panel, there being one switch associated with each plunger, means on said plungers for normally holding said switches in open position, said switches being released by said holding means and movable to closed position upon depressing the plungers associated therewith, means for moving said plungers back to normal condition upon releasing the same after the same has been depressed, and means for retaining said switch holding means in switch releasing position whereby said switches remain closed upon release of said plungers and movement thereof back to normal condition.

13. In combination, a keyboard, a plurality of keys thereon, a switch associated with each key adapted to be closed upon depressing its key, means for retaining each switch in closed condition upon depressing its key, until another key is depressed, an individual counter electrically connected to each switch and adapted to be actuated upon closing said switch, a master switch electrically connected to a master counter, means for making and breaking the master switch to actuate the master counter each time any one of said keys is depressed, said master switch and master counter being so connected to the first switches that when any of said first switches is closed by depression of its key to actuate the counter associated therewith, a path is provided through said master counter, whereby, should the same key be again depressed, the circuit is completed through its counter to again actuate the same, as well as the master counter.

14. In combination, a keyboard, a plurality of keys thereon, a switch associated with each key, means for closing each switch upon depressing its key, means for retaining each switch so closed in closed condition until another key is subsequently depressed, a counter electrically connected to each switch and adapted to be actuated upon closing said switch, a master switch in series with each of the first switches, and means including a toggle mechanism for closing the master switch each time any one of the keys is depressed and for opening said master switch when pressure is released from said key.

15. In combination, a keyboard, a plurality of keys thereon, a switch associated with each key, means for closing each switch when its key is depressed, means for preventing opening of a closed switch until a key unconnected therewith is subsequently depressed, a counter electrically connected to each switch and adapted to be actuated upon closing said switch, an electrical device in series with a master switch, said device and master switch being connected in series with each of said first switches, and means including toggle mechanism for closing the master switch each time any one of the keys is depressed, and for opening said master switch upon releasing pressure from said key.

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