Aug. 6, 1935. R. M. HOPKINS ET AL 2,010,233

ELECTRIC CALL AND ALARM SYSTEM

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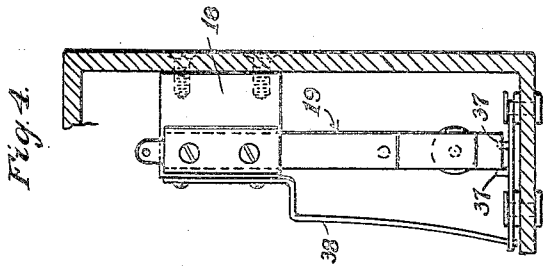


Fig. 4.

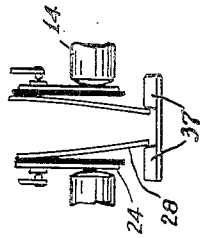


Fig. 5.

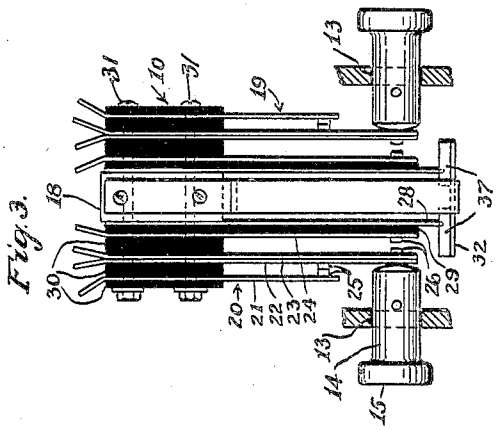


Fig. 3.

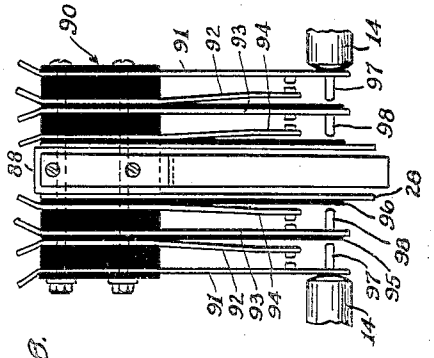


Fig. 6.

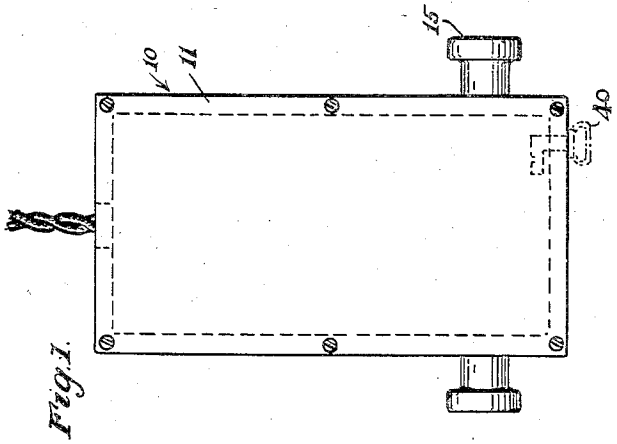


Fig. 1.

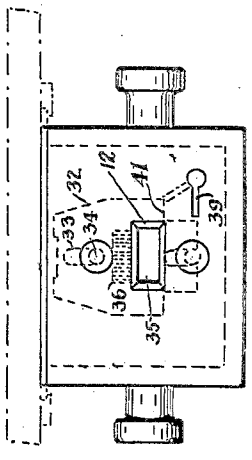


Fig. 2.

INVENTORS
Richard M. Hopkins.
Paul M. Farmer

By Harold D. Penney, ATTORNEY.

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ELECTRIC CALL AND ALARM SYSTEM

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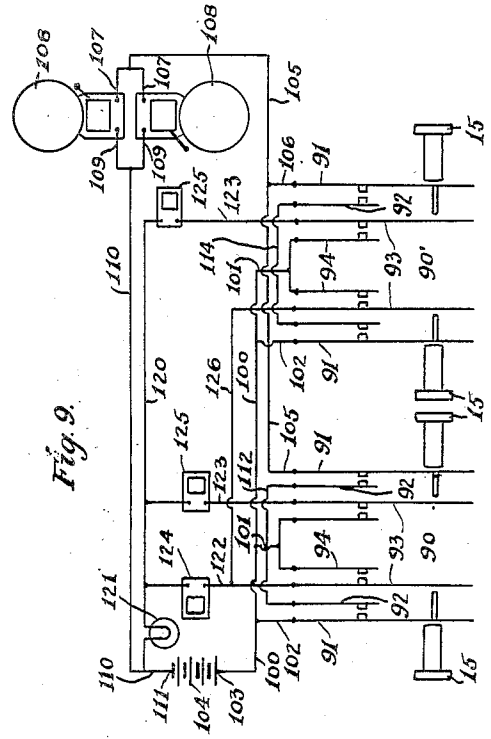


Fig. 9.

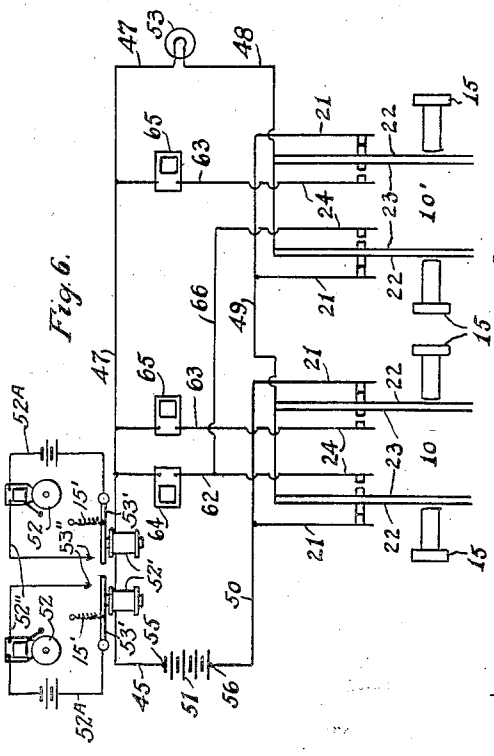


Fig. 6.

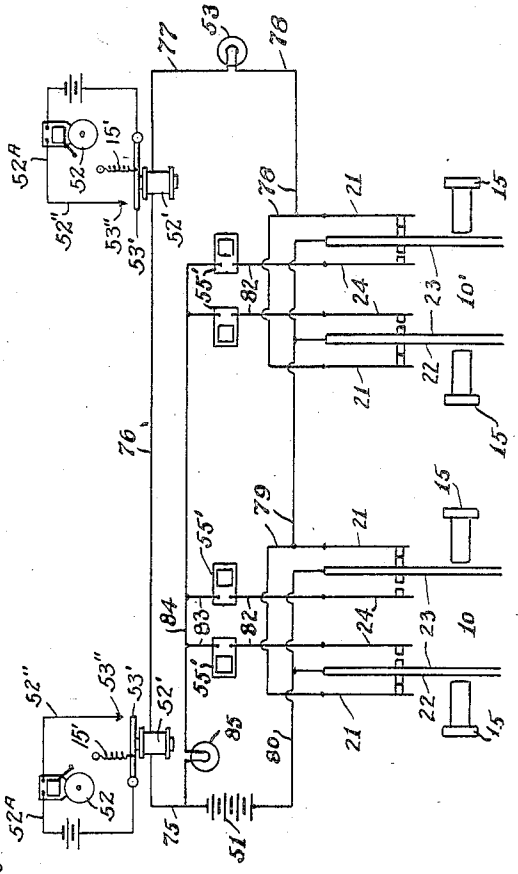


Fig. 7.

INVENTORS
Richard M. Hopkins.
Paul M. Farmer

By Harold D. Pierce. ATTORNEY.

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2,010,233

UNITED STATES PATENT OFFICE

2,010,233

ELECTRIC CALL AND ALARM SYSTEM

Richard M. Hopkins and Paul M. Farmer, New York, N. Y., assignors to American District Telegraph Company, New York, N. Y., a corporation of New Jersey

Application January 13, 1930, Serial No. 420,471

8 Claims. (Cl. 177—314)

This invention relates to call and alarm systems and to modifications of the system described in the Hopkins application Serial No. 410,718 filed Nov. 30, 1929 for Alarm switches, and more particularly to unitary means for sounding hold-up alarms and the like and for sounding electric call means, though it is noted that in some of the claims the invention is not limited to alarms, or call means.

One object of the invention is to provide an apparatus or system of this kind having push buttons, which when operated singly, selectively sound different call means, and when operated in unison, sound an alarm.

Another object of the invention is to provide an improved switch device for a system of this kind.

Another object of the invention is to provide a system of this kind which has also supervisory means for supervising the alarm circuit.

Other objects of the invention are to improve generally the simplicity and efficiency of such switches and systems and to provide a switch device of this kind which is reliable in operation, and economical to manufacture.

Still other objects of the invention will appear as the description proceeds; and while herein details of the invention are described and claimed, the invention is not limited to these, since many and various changes may be made without departing from the scope of the invention as claimed in the broader claims.

The inventive features for the accomplishment of these and other objects are shown herein in connection with improved alarm systems, each of which, briefly stated, includes a plurality of switch devices or stations each comprising a pair of sets of insulated switch members, each set comprising an outer switch and an inner switch, and push buttons for separately or simultaneously operating the sets.

Conductors connect a source of current and an alarm in a circuit with the outer switches of both switch devices in a manner to render the alarm operative if both sets, and therefore, both outer switches of the same device are operated. Conductors are also provided whereby a pair of call means are connected with the inner switches respectively in a manner to selectively operate the call means respectively when the inner switches are operated.

A suitable signal means with detent therefor, similar to that in said application, is shown for indicating when both alarm switches have been operated.

While in this specification and claims we speak of the right, left, and front of the switch devices and mention inner and outer members and switches, call means and alarms, it is understood that we use these words for designation, and that they are to be construed broadly enough to cover other relative arrangements or positions than as shown, and other translating means and operating devices, and in general the terms are to be given broad interpretation for the purposes of protection.

In the accompanying drawings showing, by way of example, three of many possible embodiments of the invention,

Fig. 1 is a plan of one form of the switch device;

Fig. 2 is a front elevation thereof;

Fig. 3 is a plan, partly in section, showing the switch assembly;

Fig. 4 is a fragmental longitudinal sectional view, partly in elevation, showing the switch assembly and signal means therefor;

Fig. 5 is a fragmental plan showing a position of the signal and detent means;

Fig. 6 is a diagram showing one form of circuit, a closed circuit;

Fig. 7 is a diagram showing another form of closed circuit;

Fig. 8 is a fragmental plan showing a switch assembly for open circuit; and

Fig. 9 is a diagram showing the circuit for use with the assembly of Fig. 8.

As shown in Figs. 1 to 6 one form of our combined alarm and call system comprises one or more stations or switch devices or assemblies **10**, **10'** each comprising a casing **11** (Fig. 1) having a front window **12** (Fig. 2), and a pair of openings **13** (Fig. 3) on opposite sides of the casing from each other slidably receiving stems **14** of push buttons **15**.

A block **18** (Fig. 4) mounted in the casing carries a pair of sets **19**, **20** of relatively insulated parallel spring plate members, said sets being mounted on respectively opposite sides of said block.

Each of said sets comprises an outer normally closed switch **21**, **22** between the members of which are opposed contacts **25** and an inner normally open switch **23**, **24** between the members of which are opposed contact lugs **26**.

The inner member **22** of the outer switch and the outer member **23** of the inner switch are extended frontwardly beyond the lugs and other members, with the button stems engaging the extended outer-switch members **22**.

A detent spring plate member 28 engages against the inner face of an inner long insulating strip 29 which is disposed along the entire inner face of the inner member 24 in the case of each inner switch, projects frontwardly beyond all of the other members and said member 28.

Short insulating strips 30 separate the respective members 21, 22 and 23, 24; said long strips 29 are disposed between the contact members 24 and 28, as indicated; and bolts 31 passing through all of strips, plates and the block secure them together.

An indicator plate 32 (Fig. 2) similar to that shown in said application, having slots 33 slidably received on rivets 34 on an inner face of the casing is provided with a normal panel 35 and a second panel 36 of white and red or other different colors, either of which is adapted to register with windows 12 on sliding movement of the plate.

A pair of separated alined ledges 37 (Fig. 3) on the inner face of said signal plate are engaged beneath by said detent members 28 to hold the signal plate with the normal panel 35 exposed at the window.

Said ledges 37 are positioned to be both released by the detent members to disengage the plate only when both detent members are pressed inward somewhat more than is shown in Fig. 5. A spring 38 mounted on said block and pressing against the plate causes it to move to show the second panel when the ledges 37 are thus disengaged, whereupon the said ledges move to position of the dotted lines of Fig. 4, to hold the detent members 28 inward as in Fig. 5, after the buttons and members 24 have been released.

The casing 11 is provided with a key-hole 39 (Fig. 2) positioned to receive a key 40 (Fig. 1) in position to engage the edge 41 (Fig. 2) of the plate and restore it to normal position, to permit the detent members to return to the normal position of Fig. 3.

As shown in Fig. 6, conductors 45, 46, 47, 48, 49, 50 connect a source of current 51, solenoids 52', a supervising resistance lamp 53 and said switch devices 10, 10' in a normally closed series circuit, translating means such as solenoids being between said lamp 53 and one pole 55 of the source and the switch devices being between the lamp and the other pole 56 of said source. The solenoid 52' constitutes part of translating means 52A including a normally open local circuit 52'' in which is a signal or alarm means 52. When the solenoid is deenergized, the armature 53' closes by the action of spring 15' upon contact 53'', causing the alarm means to operate.

One member 21 of each normally closed switch of the device 10 or 10' being connected to the adjacent part 50 or 49 respectively of the circuit toward the terminal 56 of the source, the other members 22 of such switches of the respective devices 10 or 10' being connected to the adjacent part of the circuit 49 or 48 toward the lamp, whereby the circuit is not opened unless both normally closed switches of the same device are opened.

One member 23 of each normally open switch is connected to the adjacent part 49 or 48 of the circuit toward the lamp, whereby such member is cut off from the terminal 56 of the source, only when both of the normally closed switches of a station are opened.

Shunt conductors 62, 63 connect the other member 24 of each normally open switch to the part 47 of the circuit between the alarms and the lamp; and translating means such as call buzzers 64, 65 are interposed in said shunt conductors, whereby if one set of switch members 19 or 20 is actuated a buzzer will be actuated by current caused by the difference of potential around the lamp. However, if both sets 19 and 20 are actuated, no buzzer will be actuated, because the buzzers and the part of the circuit away from the terminal 56 have been cut off by the opening of both of the normally closed switches.

If desired a conductor 66 may be employed to connect members 24 of different stations to a single buzzer 64, as in Fig. 6, rather than having the buzzers all separately connected, as the buzzers 65.

The lamp 53 serves, not only as a resistance as stated, but also as a supervisory means for the closed circuit. If this lamp goes out it indicates that the circuit is broken or that the current has failed.

The operation of the switches and circuit of Figs. 1 to 6 will be obvious from the foregoing. The one or more alarms 52, which may be widely separated, operate through the instrumentality of a spring 15' to send an alarm only when no current passes through the wiring 45—47; and these alarms are held against operation by solenoids 52' when current passes, the passage of the normal current through the lamp 53 lighting this latter lamp and showing that the circuit is in order.

The stations or devices 10, 10' are placed at different desks or in different offices, and other locations, and if the person at such location wishes to call a person at the buzzer 64, the left hand button 15 of that station is pressed, permitting current to shunt the lamp through conductors 50 or 49, unactuated members 21, 22, conductor 47 or 48, actuated members 23 and 24 and conductors 62 or 63 and 62, 47, 46 and 45, without reducing or cutting off the current through the solenoids 52', whereby the alarm is not sounded but the buzzer 64 is sounded.

If it be desired to sound one of the buzzers 65, the associated right hand button of the associated station is pressed, sending current through conductors 50 or 59 and 49, unactuated 21, 22, actuated members 23, 24 and conductors 63, 47, 46 and 45.

If it be desired to ring the alarms 52, both buttons 15 must be pressed. If both buttons of station 10 be pressed current cannot pass from conductor 50 and members 21 to members 22 and conductor 49 because both switches 21, 22 have been opened. Therefore, the circuit is broken; no current passes the solenoids 52', and the alarms will sound. However, since the pressure of both buttons opens both switches 21, 22 and disconnects conductor 49 entirely from conductor 50, no current will pass the closed switches because these, being connected to the conductor 49, are cut off from the terminal 56. Thus no buzzer rings when both buttons of the station 10 are pressed.

In like manner, the alarms may be sounded by pressing both buttons of station 10', without sounding the buzzers, since when both buttons of station 10 are not pressed, conductors 49 and 50 are connected as if one conductor.

In the circuit of Fig. 7, the switch devices 10, 10' comprise each a pair of sets of insulated switch members as in Fig. 3, each set comprising a normally closed switch 21, 22 and a nor-

mally open switch 23, 24. The button 15 serves as means for separately or simultaneously operating the sets, all as in Figs. 1 to 5. The alarms 52 are controlled by solenoids 52' as in Fig. 6.

In the circuit of Fig. 7 a source of current 51, solenoids 52', and the resistance 53 are all, by conductors 75, 76, 77, 78, 79, 80, connected in a normally closed series circuit with the switch device, the resistance being between the solenoids 52' and the switch device, an inner member 22 of each outer switch and an outer member 23 of each inner switch being connected to part of the conductor 80 (in station 10) or 79 (in station 10') toward the source, and the other members 21 of the normally closed switches being connected to the part 79 or 78 of the circuit toward the resistance 53.

The buzzers 55 are connected by conductors 82 to the other members 24 of the normally open switches respectively and by conductors 83, 84 to the part 75 of the circuit between the alarm and the source.

The operation of the normally closed circuit of Fig. 7 is similar to that of Fig. 6; but in Fig. 7, if both buttons 15 of station 10 be pressed not only is the main circuit broken, thus operating the alarm; but since the switch members 23 are connected to the conductor 80, current also passes through conductor 80, members 23, 24, conductors 82, 83, 84, and the buzzer, but not through the solenoids 52'. The operation of station 10' of Fig. 7 is substantially the same as that of station 10 of Fig. 7.

If only one button be pressed, the closed circuit is not broken, but current passes through a switch 23, 24 and sounds the buzzer as above described; but the buzzer shunt 82, 83, 84 will not shunt enough of the current from the alarms to cause their operation, since the resistance lamp 85, interposed in the conductor 84, will prevent too much current from shunting the alarms. Obviously the invention is not limited to an exterior resistance 85 in the shunt, as the buzzers may be wound for high resistance.

Figs. 8 and 9 show switch assemblies 90, 90', and a circuit designed to operate on a normally open circuit. The switch assembly of Fig. 8 comprises a block 88 similar to the block 18, and a pair of sets of relatively insulated parallel spring plate members, said sets being mounted on respectively opposite sides of said block.

Each set comprises a pair of outer and inner normally open switches which include members 91, 92 and 93, 94 and these members carry contacts which are like those shown at 25 and 26 in Fig. 3. In this case the members 91 and 93 of the respective switches are extended frontwardly beyond the shorter members, and the button stems 14 engage the extended outer-switch members 91.

A long intermediate insulating strip 95 separates adjacent members 92, 93, of adjacent switches and extends to the outer end of the extended member 93; and an inner insulating strip 96 along the entire inner face of the inner member 94 of each inner switch. Each strip 96 projects frontwardly beyond its member 94 engages a detent spring plate member, as 28, and the latter is adapted to control and be controlled by the signal plate, as 32.

Inwardly pointed pins 97, 98 fast on and projecting from the inner face of the extended ends of the extended members 91, 93 are adapted to engage the insulating strips, whereby pressure of a button 15 closes both associated switches.

Fig. 9 shows a normally open circuit for use with switch assemblies 90, 90', as follows:

Conductors 100, 101, 102 connect one terminal 103 of a source of current 104 to one member 94 of each inner switch and also to the outer member 91 of one (here the left hand) outer switch of each switch assembly.

Conductors 105, 106 connect the outer member of the other (here the right hand) outer switch of the assembly to one terminal 107 of the open circuit alarms 108, the other terminal 107 of the alarms being connected by a conductor 110 to the other terminal 111 of the source 104.

Conductors 112, 114 connect the members 92 of associated outer switches, whereby pressure of both buttons of the same assembly causes current to pass through conductors 100, 102, left hand members 91, 92, conductor 112, right hand members 92, 91, conductor 105, the alarms and conductor 111 to the source, thereby to cause an alarm.

When only a single button 15 is pressed, one switch 91, 92 is left open, the above circuit is not completed and no alarm sounds.

Conductors 122, 123 connect the outer member 93 of each inner switch a common conductor 120 connected through a resistance lamp 121 to the conductor 110 adjacent to the terminal 111.

Call buzzers 124, 125 are interposed in said shunt conductors 122, 123 respectively, whereby if any set of switch members 93, 94 is actuated a buzzer connected thereto will be actuated, the lamp 121 preventing the complete short circuiting of the alarms.

Somewhat as in Fig. 6, there is provided a conductor 126 (Fig. 9) connecting the left hand switch member 93 of station 90' to the conductor 122 between the buzzer 124 and the station 90, whereby the buzzer 124 may be sounded from either station.

When a single button 15 is pressed current passes through conductors 100, 101, members 94, 93, conductor 122 (or 123 or 126 and 122), a buzzer, conductor 120, lamp 121 to terminal 111, thus sounding the buzzer; but as only one button is pressed, the alarm is not sounded.

We claim as our invention:

1. An alarm system comprising a switch device having a pair of sets of insulated switch members, each set comprising a normally closed switch and a normally open switch; means whereby the sets may be separately or simultaneously operated; a source of current, an alarm means responsive to the opening of said closed circuit for operating said alarm, and a resistance lamp connected in a normally closed series circuit with the switch device, the resistance being between the alarm and the switch device; one member of each normally closed switch being connected to part of the circuit toward the source, the other member of the normally closed switches and one member of each normally open switch, being connected to the part of the circuit toward the resistance; and a call means connected between the other members of the normally open switches respectively and the part of the circuit between the alarm and the lamp.

2. An alarm system comprising in combination a plurality of switch devices each including a pair of sets of insulated switch members, each set comprising a normally closed switch and a normally open switch; movable means whereby the sets may be separately or simultaneously operated; a source of current, an alarm means responsive to the opening of said closed circuit for operating said alarm,

and a resistance lamp connected in a normally closed series circuit with the switch devices, the resistance lamp being between the alarm and the switch devices; one member of each normally closed switch being connected to a part of the circuit toward the source, the other member of the normally closed switches and one member of each normally open switch being connected to a part of the circuit toward the resistance lamp; and a call means connected between the other members of the normally open switches respectively and the part of the circuit between the alarm and the resistance lamp.

3. In combination, a pair of translating means; a pair of operating means for selectively operating said translating means respectively, the one to the exclusion of the other when the operating means are operated separately; additional translating means; and electrical means set in operation by the simultaneous operation of both of the operating means for causing operation of the additional translating means, and at the same time omitting operation of the first named pair of translating means.

4. In combination, an alarm; a pair of call means; and means including a pair of operating means for operating said call means respectively, the one call means to the exclusion of the other when only one operating means is operated; and electrical means set in operation by the simultaneous operation of both operating means for omitting operation of either call means and operating the alarm when by operation of the operating means both operating means are operated.

5. An alarm and call system comprising in combination a plurality of switch devices each comprising a pair of sets of switch members, each set comprising a normally closed alarm switch and a call switch; means for separately and simultaneously operating the sets; a source of current; an alarm means adapted to send an alarm only when no current passes therethrough; conductors whereby said source and alarm means are connected in a closed circuit with the alarm switches, alarm switches of the same switch device being in parallel with each other; a plurality of call means; and conductors whereby the call means are connected in series with the call switches respectively thereby to operate the call means respectively when the call switches are closed.

6. In combination, a pair of sets of switch members, each set comprising a normally closed outer switch and a normally open inner switch; means associated with each set for simultaneously opening the normally closed switch and closing the normally open switch; and yieldable indicator means held against operation by an inner switch whenever either or both normally open switches are open, and released for operation whenever both normally open switches are closed.

7. In combination, a casing having a pair of openings on opposite sides thereof; a block mounted in the casing; a pair of sets of relatively insulated spring members, the sets mounted on opposite sides of the block; each set comprising an outer normally closed switch and an inner normally open switch; each switch comprising an outer and inner contact member; the inner member of the outer switch and the outer member of the inner switch being extended frontwardly beyond the other outer switch member; push buttons slidable in said openings and engaging the extended outer switch members; an inner insulating strip disposed along the inner face of the inner member of each inner switch; a detent spring member against the inner face of each inner strip and projecting frontwardly, and indicator means controlled by the detent members.

8. In combination, a casing having a pair of openings on opposite sides thereof; a block mounted in the casing; a pair of sets of relatively insulated spring members, the sets mounted on opposite sides of the block; each set comprising an outer normally closed switch and an inner normally open switch; each switch comprising an outer and inner contact member; the inner member of the outer switch and the outer member of the inner switch being extended frontwardly beyond the other outer switch member; push buttons slidable in said openings and engaging the extended outer-switch members, whereby pressure on the push button opens the outer switch and closes the inner switch; a detent spring member against the inner face of each inner strip and projecting frontwardly, whereby push button pressure is communicated through the outer and inner members of the outer and inner switches to the detent spring; and indicator means controlled by the detent springs.

RICHARD M. HOPKINS.
PAUL M. FARMER.