July 14, 1936. A. D. PALMER 2,047,328

SWITCH FOR BURGLAR ALARM SYSTEMS

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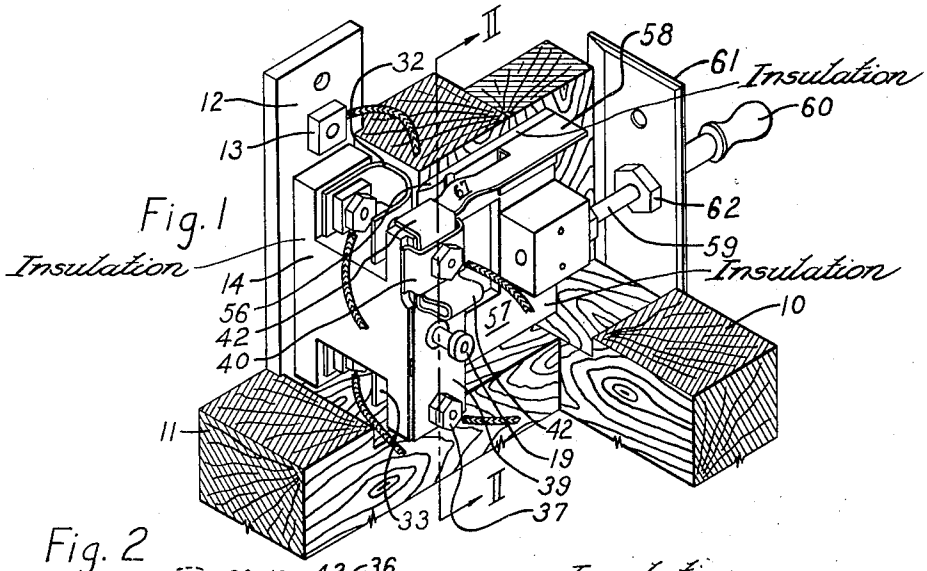


Fig. 1

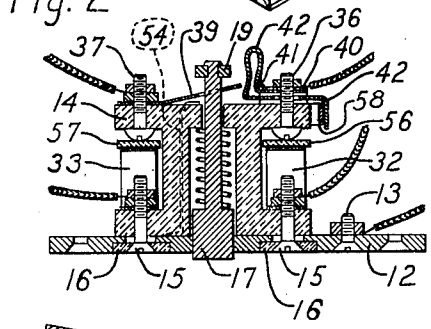


Fig. 2

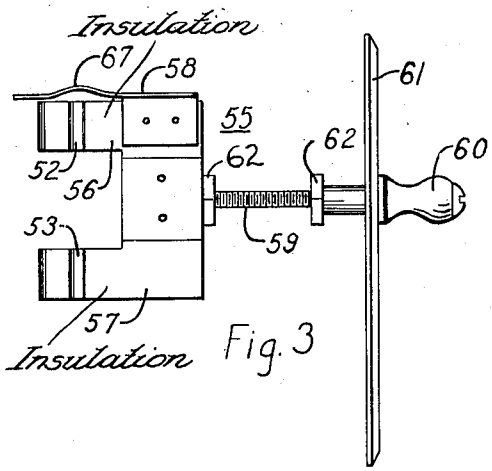


Fig. 3

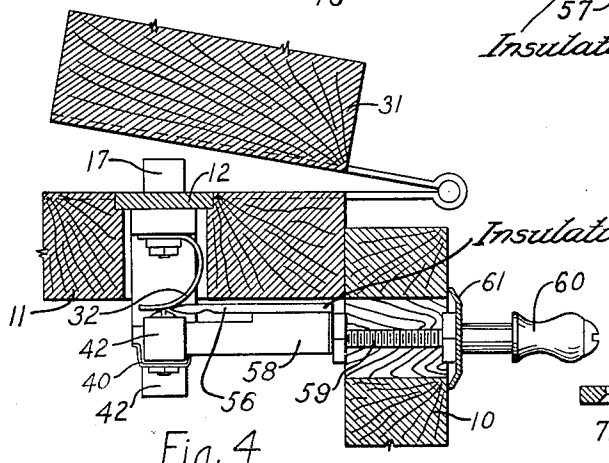


Fig. 4

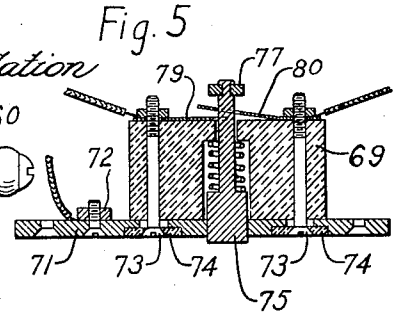


Fig. 5

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SWITCH FOR BURGLAR ALARM SYSTEMS

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10 Claims. (Cl. 200—54)

My invention relates in general to switches, and more particularly to switches that may be utilized in burglar alarm systems.

An object of my invention is the provision of a switch which establishes a circuit for sounding an alarm upon the opening of an entrance to an enclosure, and which, when the circuit is once established, continues to maintain the circuit for sounding the alarm, until the occupant or the owner releases the switch.

Another object of my invention is the provision of a master-duplex switch for burglar alarm systems, which, when the door or other entrance is opened, establishes a circuit for sounding an alarm, and which, if the door or other entrance is reclosed, continues to maintain the circuit for sounding the alarm, until the occupant or owner operates the duplex-switch and thus deenergizes the alarm.

A further object of my invention is the provision of a switch having an interlock for holding the switch closed until the operator releases the interlock.

A still further object of my invention is the provision of two switches and an interlock whereby the operation of one of the switches, together with the interlock, controls the operation of the other switch.

Another object of my invention is the provision of a burglar alarm switch, together with an interlock, whereby the switch is controlled both by the interlock and by the opening of an entrance to an enclosure.

A still further object of my invention is the provision of a special switch for burglar alarm systems that may be closed by the opening of a door or other entrance, together with an interlock for maintaining the switch closed when the door or other entrance is reclosed.

A still further object of my invention is the provision of special switches for burglar alarm systems that may be readily mortised into, or otherwise attached to, door jambs, and window frames that are used in standard building construction.

Other objects and a fuller understanding of my invention may be had by referring to the following description, taken in connection with the accompanying drawing in which like reference characters designate corresponding parts throughout the several views, and in which:

Fig. 1 is an isometric view of my master-duplex switch that is especially designed for utilization in a burglar alarm system, and shows, in addition, the fragmentary view of a door-jamb to which the switch may be mounted;

Fig. 2 is a cross-sectional view of my master-duplex switch, only, taken along the line II—II of Fig. 1;

Fig. 3 is a plan view of an insulating insert member which is a part of the master-duplex switch and which is actuated by the occupant of the premises for setting the burglar alarm system either in the operative or inoperative position.

Fig. 4 is a top view of my master-duplex switch and illustrates, in addition, the manner in which it may be connected to a door-jamb;

Fig. 5 is a cross-sectional view of a junior switch which may be utilized in circuit relation with the master-duplex switch.

With particular reference to Figures 1 to 4, inclusive, my master-duplex switch comprises, in general, a metal base **12** that may be connected to the door-jamb **11**, an H-shaped insulating block **14** connected to the base **12**, a plunger **17** actuated by the opening and closing of the door **31**, a pair of resilient contacts **32** and **33** mounted on the inside surface of one of the legs of the H-shaped insulating block **14**, two screws **36** and **37** mounted on the ends of the opposite leg of the H-shaped block **14** and having their heads disposed to contact the resilient contacts **32** and **33**, a resilient interlock **42** connected to the screw **36**, a resilient switch member **39** connected to the screw **37** and actuated by the movement of a washer **19** mounted on the end of the plunger **17**, and an insulating insert member **55** that is moved in and out by a re-set knob **60** for separating the resilient contact members **32** and **33** from the heads of the screws **36** and **37**.

As illustrated best in Fig. 2, the insulating H-shaped block **14** is secured to the metal base **12** by means of two screws **15** that extend through suitable openings provided in the ends of the legs of the H-shaped insulating block **14**. The screws **15** are insulated from the metal base **12** by means of insulating washers **16**. Also, the openings in the metal base **12**, through which the screws **15** are inserted, are considerably larger in diameter than the diameter of the screws, thus providing a suitable insulating space around the screws **15**. Hence, by means of this construction, the resilient contacts **32** and **33** are insulated from the metal base **12**.

As best shown in Fig. 2, the resilient contacts **32** and **33** are disposed to be separated from the heads of the screws **36** and **37** when the insulating insert member **55** is pushed in. The insulating insert member **55** (see Fig. 3) comprises, in general, two relatively flat insulating prongs **56** and **57** which are disposed, when the re-set knob

60 is pushed in, to interrupt the electrical connection between the resilient contacts 32 and 33 and the heads of the screws 36 and 37. The insulating prongs 56 and 57 are provided with transverse grooves 52 and 53, respectively, which, when the re-set knob 60 is pushed clear in, tend to secure the insulating member 55 in its inserted position. As shown best in Figures 1 and 4, the actuating re-set knob 60 is guided by a metal plate 61 that is suitably connected to the casing of the door or other entrance. To facilitate the mounting of the insulating insert member 55, the re-set knob 60 threadably engages a threaded shaft 59 that is suitably connected to the insert member 55. Also, the threaded shaft 59 threadably engages the insulating insert member 55. Therefore, by turning the nuts 62 the re-set knob 60 and the inserting member 55 may be suitably adjusted relatively to the metal base 61.

Mounted upon the outside of the right-hand end of the rearward leg of the H-shaped block 14, and electrically connected to the screw 36, is a resilient interlock 42. One end of the resilient interlock 42 is connected to a saddle 40 which threadably engages the screw 36, and from the saddle 40 the resilient interlock 42 is looped outwardly from the saddle 40, and thence is bent under the saddle 40 and along the surface of the leg of the H-shaped block 14 to the end thereof, at which point the end of the resilient interlock is bent downwardly along the end of the leg of the H-shaped block 14. The point at which the resilient interlock 42 is looped outwardly from the saddle 40 is soldered or otherwise rigidly connected to the saddle 40, as indicated at 41. This soldered connection firmly secures the looped portion of the resilient interlock 42 in a fixed position. That portion of the resilient interlock 42 which is slidably mounted under the saddle 40 is provided with an enlarged or elongated opening through which the screw 36 passes. Mounted between the free end of the resilient interlock 42 and the end of the right-hand leg of the H-shaped block 14, is inserted a metal clip 58 having a bent portion 67, which, when the insert member 55 is pushed inwardly, the bent portion 67 actuates the free end of the resilient interlock 42 away from the right-hand end of the rearward leg of the insulating block 14, thus contracting the looped portion of the resilient interlock 42. Extending from the screw 37 and positioned along the upper surface of the rearward leg of the H-shaped block 14, is a resilient switch member 39 that is disposed to be actuated downwardly by the washer 19 mounted upon the end of the spring bias plunger 17. When the resilient switch member 39 is fully actuated against the upper surface of the insulating block 14, it is disposed to latch under the heel of the looped portion of the resilient interlock 42; provided, however, that the bent portion 67 of the resilient clip 58 is retracted from between the free end of the resilient interlock 42 and the right-hand end of the rearward leg of the insulating block 14. Therefore, if the insert member 55 is pulled out, the resilient switch member 39, when once actuated against the insulating block 14 by the opening of a door or other entrance, is engaged by the heel of the looped portion of the resilient interlock 42, with the result that, if the door of other entrance is again re-closed, the resilient switch member 39 is restrained from returning to the open circuit position, as shown in Fig. 2. As shown best in Figs. 1 and 2, the opening in the resilient finger 39 through which the plunger 17 extends is considerably larger than the diameter of the plunger 17. This means that when the door is closed, there is no electrical connection between the plunger 17 and the resilient finger 39. As shown in Fig. 2, there is a metal interconnecting strip 54 that extends through the insulating block 14. The lower end of the metal strip 54 is bent laterally and positioned between the metal base 12 and the insulating block 14, and the other end of the metal strip 54 is bent laterally along the upper surface of the insulating block 14. Therefore, when the resilient switch member 39 is actuated against the insulating block 14, an electrical circuit is established between the metal base 12 and the resilient switch member 39. When the master-duplex switch is connected in a burglar alarm system, there are five wires connected thereto; one to the binding post 13, two to the resilient contacts 32 and 33, and two to the screws 36 and 37 (see Figs. 1 and 2).

In describing the operation of the master-duplex switch, let it be assumed that the door or window of the building to which the switch is connected is closed and that the reset knob 60 is pulled out, thus allowing the resilient contacts 32 and 33 to engage the heads of the screws 36 and 37. This is the position of the master-duplex switch shown in Fig. 4. Under this condition of the switch, let it be assumed now that the door of the premises to which the master-duplex switch is attached, is open. As the door swings open, the spring biased plunger 17 moves upwardly and thus causes the washer 19 to first contact and then depress the resilient switch member 39. As the resilient switch member 39 is depressed, the free end thereof swings into electrical engagement with the looped portion of the resilient interlock 42 and pushes the heel of the looped portion of the resilient interlock 42 to the left until the free end of the resilient switch member is depressed below the heel of the looped portion and then the looped portion swings back and latches the resilient switch member 39 in its depressed position.

When the washer 19 first contacts the resilient switch member 39, resulting from the opening of the door, a circuit is established for ringing an alarm. This circuit may be traced from the conductor that is connected to the binding post 13, through the metal base 12, the plunger 17 that slidably engages the metal base 12, the washer 19, the resilient switch member 39, the screw 37, and the resilient contact 33 to the outgoing conductor connected thereto.

As the door is opened wider, and as the washer 19 actuates the resilient switch member 39 to engage the loop portion of the resilient interlock 42, a second circuit is established for ringing a second alarm. This circuit may be traced from the positively energizing plunger 17, through the washer 19, the resilient switch member 39, the resilient interlock 42, the screw 36, and the resilient contact 32 to the outgoing conductor connected thereto. When the resilient switch member 39 is once hooked under the heel of the loop portion of the resilient interlock 42, the circuits for both the alarms are continuously energized even though the door is reclosed, and the washer 19 is biased away from the resilient switch member 39. When the door is reclosed, the current, instead of flowing through the plunger 17 and the washer 19, flows from the metal base 12 through the interconnecting strap 54 to the depressed switch member 39. Therefore, when the door or other entrance to the premises is once

opened, it is necessary for the owner of the premises, in order to shut off the alarm, to push the re-set knob 60 inwardly and thus insert the insulating prongs 56 and 57 between the resilient contacts 32 and 33 and the screws 36 and 37. The insertion of the insulating prongs 56 and 57 de-energizes both of the alarms. At the same time, the insertion of the bent portion 67 of the metal clip 58 between the free end of the resilient interlock 42 and the end of the right-hand leg of the insulating block 14 contracts the looped portion of the resilient interlock 42, and thus allows the resilient switch member 39 to swing away from the insulating block 14 to its normal opened position. To reset again the master-duplex switch in the protective position, it is only necessary to pull out the re-set knob 60. The two conductors connected to the screws 36 and 37 are adapted to connect other switches, such as the junior switch of Fig. 5, in parallel circuit relation with the master-duplex switch.

With reference to Fig. 5, I illustrate a junior switch that is adapted to be utilized in connection with my master-duplex switch. This switch comprises, in general, a metal base 71 that is adapted to be connected to window jambs and the like, an insulating block 69 connected to the metal base 71, a spring biased plunger 75 that is actuated by the opening of the window, a resilient switch member 80 actuated by the washer 77 mounted upon the end of the plunger 75, and a stationary contact member 79. The screws 73 that secure the insulating block 69 to the metal base 71 are insulated from the metal base 71 by means of insulating washers 74. Also, the openings in the metal base 71, through which the screws 73 extend, are considerably larger in diameter than the diameter of the screws. By means of this construction, the resilient switch member 80 and the stationary contact member 79 are electrically insulated from the metal base 71, when the plunger 75 is in the position shown in Fig. 5. When the junior switch is connected in a burglar alarm system, there are three wires connected thereto; one to the binding post 72, one to the stationary contact 79, and one to the resilient switch member 80.

The junior switch is especially designed to be mounted upon door or window frames and the like. In one position, it may be mortised in the sill or the side and top jambs of the window frame, so that when the window is fully closed the plunger 75 is pushed inwardly, being the position shown in Fig. 5. Therefore, when the window is opened, the plunger is biased outwardly and thus actuates the resilient switch member 80 down against the stationary contact 79. This establishes a circuit for sounding the alarm. Also, the junior switch may be mortised in the side jamb of a window frame so that when the window is raised above a pre-determined position, the plunger is allowed to move outwardly and actuate the resilient switch member 80 against the stationary contact finger 79. The junior switch may be mounted as high as 8 to 10 inches above the sill of the window. This allows the occupant to raise the window for ventilating purposes, but still does not allow enough room for a person to crawl through.

The junior switch may be connected to another entrance of the premises and may be electrically connected in parallel circuit relation with the master-duplex switch. Therefore, when the master-duplex switch is set in its protective position, and when the junior switch is operated by the opening of the entrance, both of the alarms are energized.

Although I have described my invention with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

I claim as my invention:

1. A duplex switch comprising, in combination, a switch, means for actuating the switch, an interlock for holding the switch in its closed position, a second switch including two engaging contacts and an insulating member for electrically separating the contacts, means for actuating the insulating member in between and out of the two engaging contacts, and means governed by the movements of the insulating member for operating the interlock.

2. A duplex switch comprising, in combination, a switch, means for actuating the switch, an interlock for holding the switch in its closed position, a second switch including two engaging contacts and an insulating member for electrically separating the contacts, means for actuating the insulating member in between and out of the two engaging contacts, and means governed by the inward movement of the insulating member for releasing the interlock and thus freeing the first switch and by the outward movement of the insulating member for re-setting the interlock in its holding position.

3. A duplex switch comprising, in combination, a switch, means for actuating the switch, an interlock for holding the switch in its closed position, a second switch including a stationary contact, a resilient contact and an insulating member for electrically separating the contacts, means for connecting the two switches in series circuit relation, means for actuating the insulating member in between and out of the stationary and resilient contacts, and means governed by the inward movement of the insulating member for releasing the interlock and thus freeing the first switch and by the outward movement of the insulating member for re-setting the interlock in its holding position.

4. An electrical switch comprising, in combination, a metal base, an H-shaped insulating member having one side connected to the base, the said base and insulating member having a hole extending therethrough, a plunger slidably mounted in the hole, a spring for biasing the plunger in one direction, a resilient interlock mounted upon the other side of the H-shaped insulating member, a resilient switch member mounted upon the same side of the H-shaped insulating member as the resilient interlock is mounted, the free end of the said switch member being adapted to engage and lock under the resilient interlock, means carried by the plunger for actuating the resilient switch member under the resilient interlock, a stationary contact member connected to the interlock, a second stationary contact member connected to the resilient switch member, a pair of resilient contact fingers adapted to engage the two stationary contact members, an insulating insert member adapted to separate the resilient contact fingers and the two stationary contact members, means carried by the insulating insert member for actuating the resilient interlock and thus releasing the free end of the resilient switch member, and a con-

necting member for electrically connecting the metal base and the resilient switch member when the said switch member is depressed.

5. An electrical switch adapted to be actuated by the opening and closing of an entrance to an enclosure comprising, in combination, a metal base, an insulating member connected to the base, said insulating member and said base having three openings extending therethrough, two connecting members positioned in two of the holes for securing the insulating member to the base, an insulating washer for insulating each of the connecting members from the base, a spring biased plunger positioned in the third opening, a stationary contact member connected to one of the connecting members and positioned along the insulating member, a resilient switch member connected to the other connecting member and adapted when depressed to engage the stationary contact member, and means controlled by the plunger for depressing the resilient switch member.

6. A switch comprising, in combination, a metal base having two holes, an H-shaped insulating member connected to the base, each leg of said H-shaped member having a hole extending therethrough, two of said holes registering with the two holes of the metal base, two connecting members positioned in the registered holes for securing the insulating member to the base, an insulating washer for insulating each of the connecting members from the base, a resilient contact connected to each of the connecting members and positioned between the legs of the H-shaped member, two terminal members positioned in the other two holes of the H-shaped member, said terminal members being positioned to engage the two resilient contacts, and an insulating insert member to separate the resilient contacts from the terminal members.

7. A plunger-operated switch comprising, in combination, a switch, a plunger for operating the switch, a spring associated with the plunger, said spring being disposed when released to bias the plunger in one direction and close the switch, latch means associated with the switch for holding the switch closed when the spring is depressed, a second switch connected in circuit relationship with the first switch, and means independent of the plunger for releasing the latch means and for actuating the second switch.

8. A switch adapted to be actuated by the opening and closing of a door or other entrance to an enclosure, comprising, in combination, a metal base, an insulating member having one side connected to the base, the said base and insulating member having a hole extending therethrough, a plunger slidably mounted in the hole and adapted to be actuated by the door or other entrance, a spring for biasing the plunger in one direction, a resilient and movable switch member mounted on the top surface of the insulating member, a second switch member mounted on the top surface of the insulating member and adapted to be engaged by the first switch member, means when the door or other entrance is opened for causing the plunger to operate the resilient and movable switch member against the second switch member, said second switch member being adapted, when engaged by the resilient and movable switch member, to latch and hold the resilient and movable switch member in electrical engagement therewith when the door or other entrance is reclosed, and means independent of the plunger for releasing the latched engagement between the two switch members.

9. A switch adapted to be actuated by the opening and closing of a door or other entrance to an enclosure, comprising, in combination, a metal base, an insulating member having one side connected to the base, the said base and insulating member having a hole extending therethrough, a plunger slidably mounted in the hole and adapted to be actuated by the door or other entrance, a spring for biasing the plunger in one direction, a resilient and movable switch member mounted on the top surface of the insulating member, a second switch member mounted on the top surface of the insulating member and adapted to be engaged by the first switch member, means when the door or other entrance is opened for causing the plunger to operate the resilient and movable switch member against the second switch member, means for holding the resilient and movable switch member in electrical engagement with the second switch member when the door or other entrance is reclosed, and a connecting member for electrically connecting the metal base and the resilient switch member when the resilient switch member is depressed.

10. A switch adapted to be actuated by a door or other entrance to an enclosure comprising, in combination, a switch, biasing means released by the opening of the door or other entrance to close the switch, releasable holding means independent of the biasing means for holding the switch in its closed position upon the reclosing of the door or other entrance, a second switch connected in circuit relationship with the first switch, means for operating the second switch, and means controllable by the actuation of the second switch for governing the releasable holding means and for allowing the first switch to open.

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