

[54] BURGLAR ALARM SWITCH

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[58] Field of Search 340/274 R, 409, 275;
200/61.93, 61.69, 61.62

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[57] ABSTRACT

A burglar alarm switch for protecting a closing member supported on a frame, such as a window, a door, or the like, has a first member which includes terminals adapted to be interconnected within the burglar alarm circuit, and a series combination including contact switch elements having a guarding position and an activated position in series with a first light emitting device. The series combination is connected between the terminals. The first member is to be mounted on the frame. A second member, to be mounted on the closing member, such as the window, door, or the like, includes control means for changing the contact switch elements from their guarding position to their activated position.

10 Claims, 6 Drawing Figures

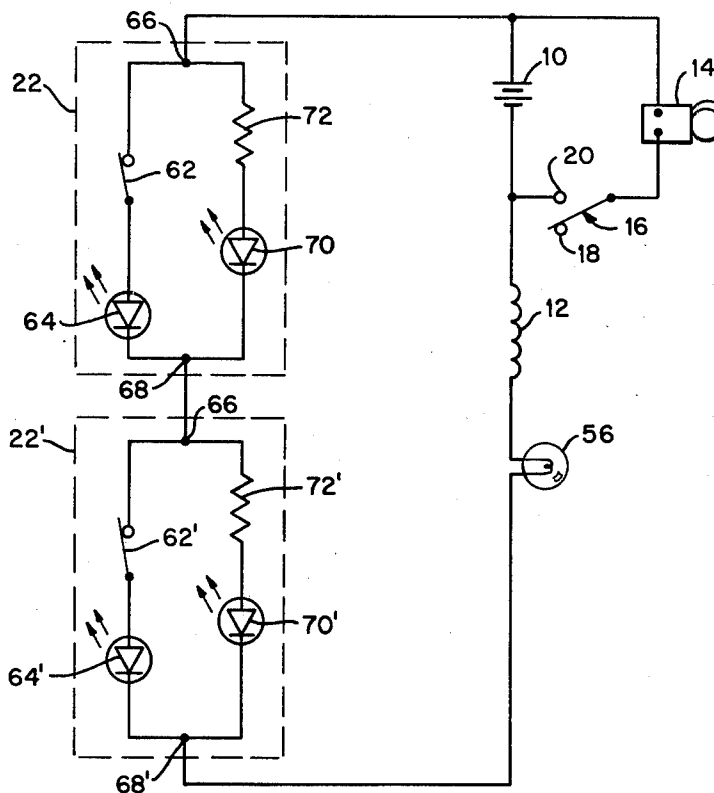


FIG. 1

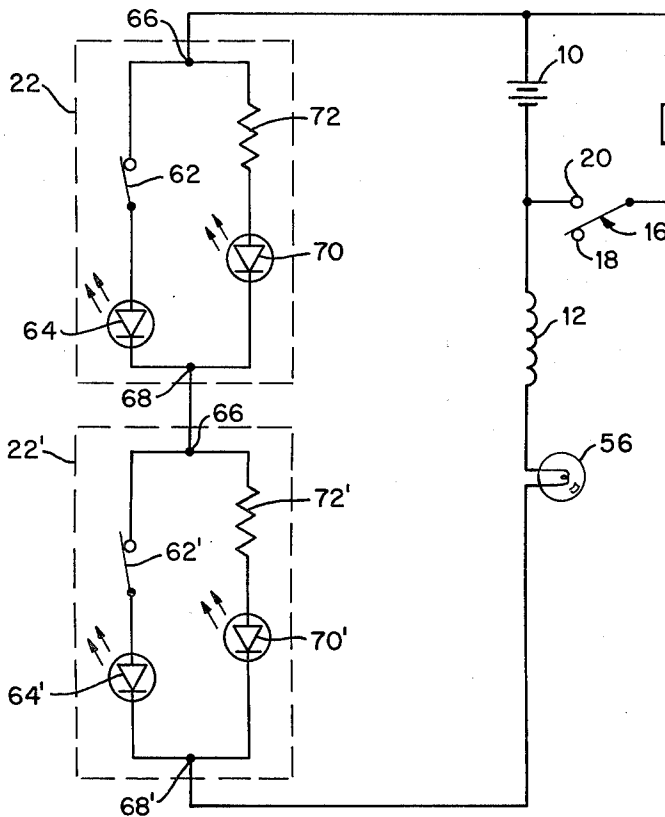
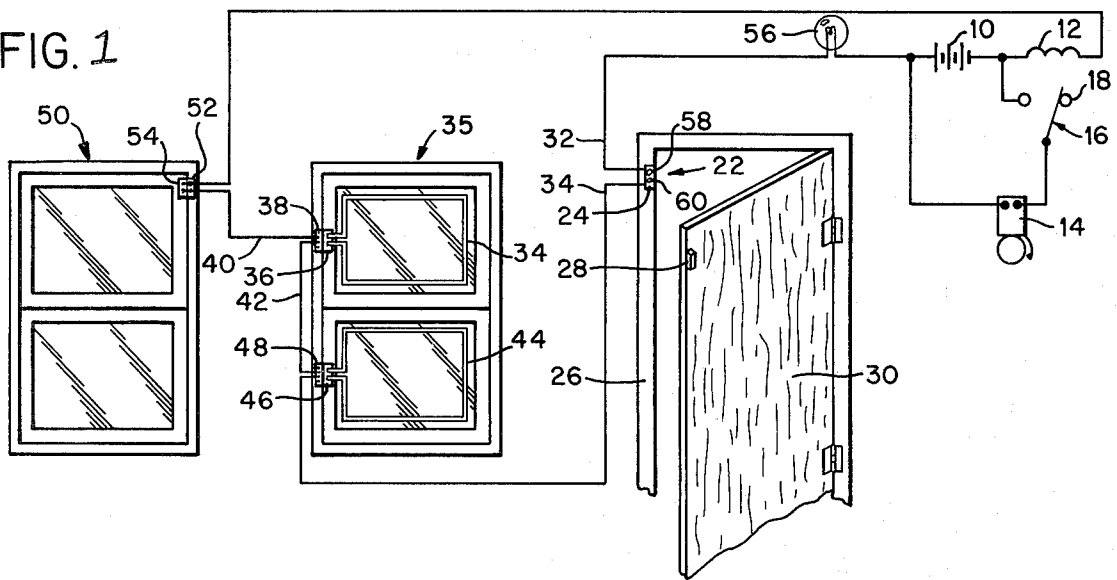


FIG. 2

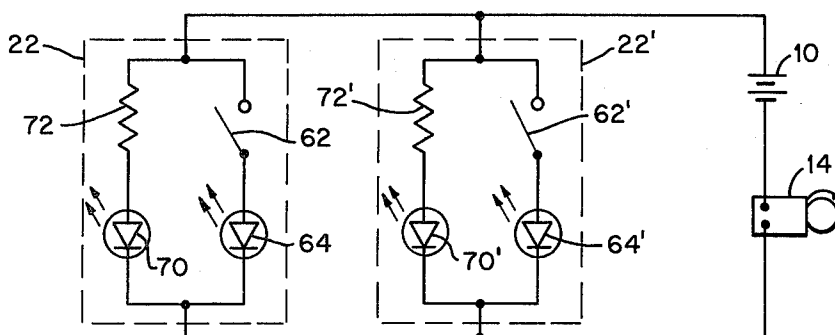
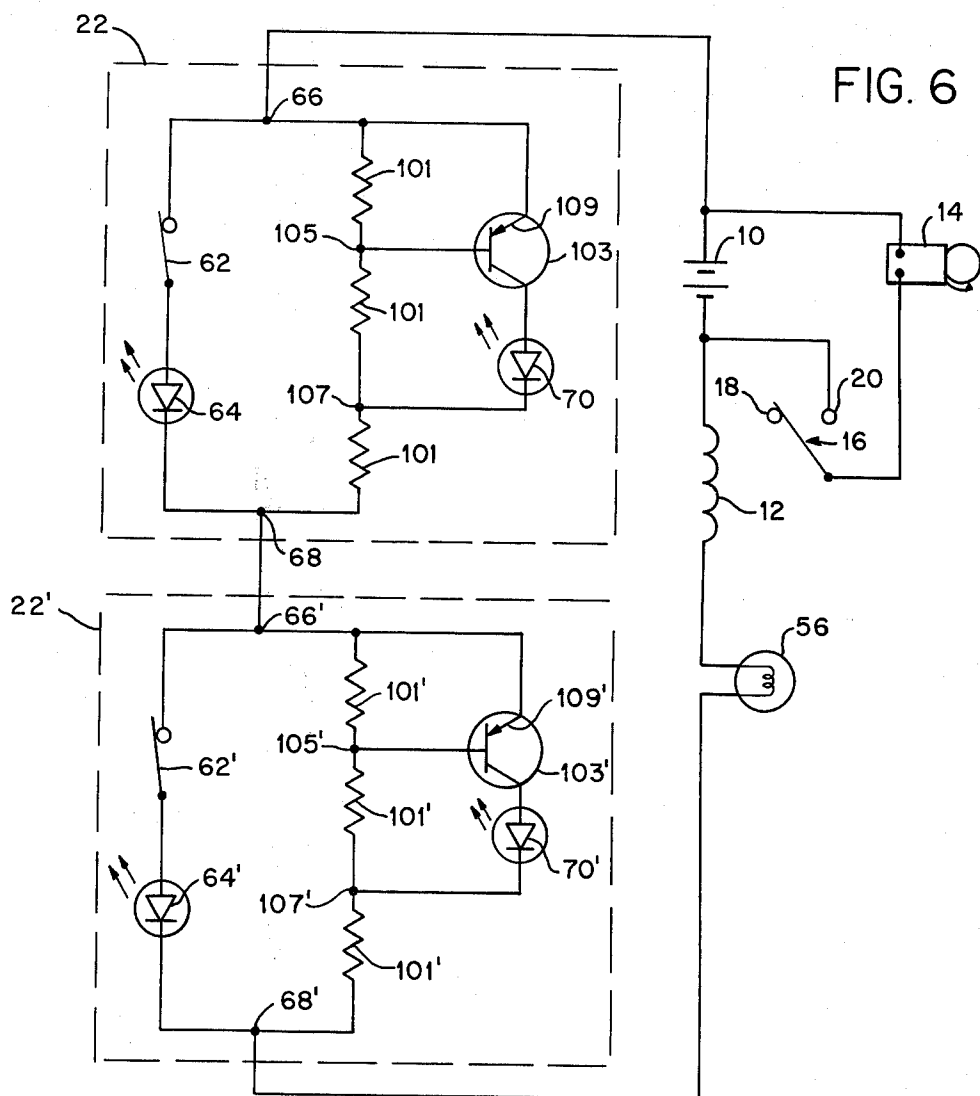
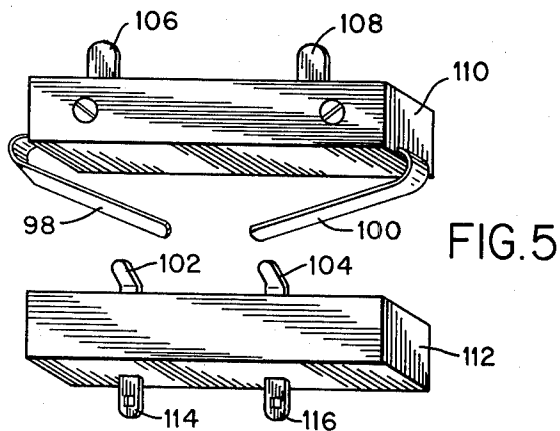
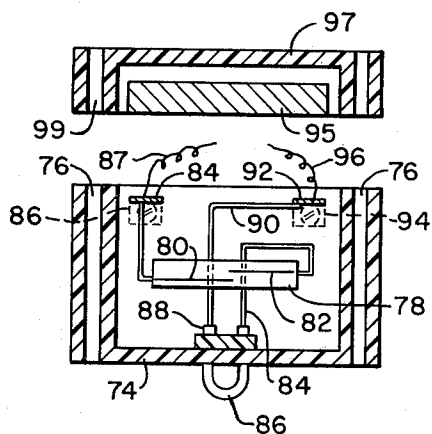


FIG. 3

FIG. 4



BURGLAR ALARM SWITCH**BACKGROUND OF THE INVENTION**

This invention relates to burglar alarm systems and more particularly to a contact switch for use within a burglar alarm system.

Burglar alarm systems generally consist of a source of energy, an alarm, and a number of contact switches each located to protect various closing members such as windows, doors, or the like. The contact switches are interconnected to each other and to the source and alarm. Generally, a closed circuit burglar alarm is utilized, since it offers maximum security protection and is constantly supervised. In the closed circuit system, current constantly flows through the contact switches which are in a normally closed position when the system is guarding the premise. When a window, door or the like is opened, the contact switch opens and the alarm is sounded. The open circuit system is another type of burglar alarm circuit and although it does not offer as much security, is nevertheless frequently utilized in certain facilities. In the open circuit system, electrical current generally does not flow through the contact switches and when the system is guarding the premise, the contact switches are in a normally open position. As the window or other member being protected is opened, the contact switch closes, thereby sounding the alarm.

In either of the systems, there is generally provided a central control box which includes the energy source, the on-off control switch, and other circuitry. In most systems, there is also included within the control box, a testing circuit which typically includes a bulb and possibly a switch. The purpose of the testing circuit is to enable the user to test the entire burglar alarm system to be sure that all of the windows, doors etc. are closed, and that the burglar alarm system is in a guarding position. In order to utilize the testing circuit, the user must check the control box to determine if the testing bulb is illuminated. In those circuits where a switch is included, the user must first activate the switch and the bulb will then illuminate if the burglar alarm is properly guarding the premise.

One difficulty in utilizing systems of the above described type is that in order to check out the system, the user must examine the control box. Since the control box is usually well hidden to avoid its being located by a burglar, it becomes difficult for the authorized user to check out the operation of the circuitry. In addition, if the testing circuit is located in a position other than in the control box, there is required additional control wiring, additional cost, and additional inconvenience. Also, the user still has to go to the single location where the testing circuit is located in order to determine if the complete burglar alarm system is properly operating.

Once the user has found that the burglar alarm is not operating properly, he then has to find the cause of the improper operation. In most cases the cause is a window or door which is not adequately closed. However, in order to find the window or door which is causing the problem, it is necessary to isolate that window. First, the burglar system is divided in half and each half is tested. Then the half causing the problem is again divided in half and so on until the single window or door causing the problem is isolated. However, this process is time consuming, awkward difficult to carry out.

It is therefore an object of the present invention to provide a burglar alarm system which avoids the aforementioned problems of the prior art devices.

Another object of the present invention is to provide a burglar alarm system having contact switches for activating the alarm, each switch providing an indication of the operation of the entire burglar alarm system.

Still another object of the present invention is to provide a burglar alarm system, having contact switches for activating the alarm, each switch providing an indication when that particular contact switch has been activated as a result of a door, window or the like being opened.

Yet a further object of the present invention is to provide a contact switch for a burglar alarm system which can be utilized on a closing member, such as a door, window or the like, and which includes an illuminating device for indicating when the entire burglar alarm system is operational.

A further object of the present invention is to provide a contact switch for a burglar alarm system which includes light emitting devices, one of which provides an indication when that particular switch has been activated.

SUMMARY OF THE INVENTION

Briefly, this invention describes a burglar alarm switch for protecting a closing member supported on a frame such as a window, door or the like. The switch includes a first member which is to be mounted on the frame, the first member including terminals for interconnecting the switch within the burglar alarm circuit and a series combination including contact switch elements and a first light emitting device in series therewith. A second member which is to be mounted on the closing member such as the door, window, or the like includes control means for switching the contact element from a first position wherein it is guarding against an unauthorized entry into the closing member, to a second position wherein it is activated thereby causing the alarm to sound.

When included within a closed circuit burglar alarm system, the first light emitting device will provide an indication that the complete burglar alarm system is operating and is in a position guarding against unauthorized entry through any of the closing members being protected by the burglar alarm system.

In another embodiment, a second light emitting device is included in parallel circuit arrangement with the series combination, such that in the closed circuit system, the second light emitting device will provide an indication when the particular switch has been activated.

When the contact switch of this invention is included within an open circuit burglar alarm system, the first light emitting device will provide an indication when the particular contact switch has been activated, and the second light emitting device will provide the indication that the entire burglar alarm system is operating.

The aforementioned objects, features and advantages of the invention will, in part, be pointed out with particularity and will, in part, become obvious in the following more detailed description of the invention taken in conjunction with the accompanying drawings, which form an integral part thereof.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a schematic drawing of a complete burglar alarm system protecting various closing members.

FIG. 2 is an electric circuit diagram of the contact switch of the present invention included within a closed circuit type burglar alarm system.

FIG. 3 is an electric circuit diagram of the contact switch of the present invention and included within an open circuit type burglar alarm system.

FIG. 4 is a sectional plan view of one embodiment of the contact switch in accordance with this invention;

FIG. 5 is an isometric drawing of another embodiment of the contact switch in accordance with this invention; and

FIG. 6 is another circuit diagram of the contact switch within a closed circuit burglar alarm system.

In the various figures of the drawing, like reference characters designate like parts.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1 there is shown a complete burglar alarm system protecting various parts such as windows, doors, and the like. The burglar alarm system includes a source of energy, shown as battery 10, in series with a relay coil 12. Placed in parallel across the battery is an alarm 14 and a relay switch 16 controlled by the relay coil 12. When energized, the relay coil 12 holds the switch 16 in position 18 whereby the alarm 14 is not sounded. When the coil 12 is disconnected from the battery 10, the switch 16 moves to position 20 thereby sounding the alarm.

Connected in series with the battery 10 is a first contact switch, shown generally at 22 and comprising a first member 24 mounted on the door frame 26, and a second member 28 mounted on the door 30. The member 24 is electrically interconnected to the burglar alarm system by means of the wires 32, 34 and contains contact elements therein. When the door is closed, the member 28 causes the contact elements within member 24 to close thereby completing the circuit between wires 32 and 34. When the door opens, the wires 32, 34 are disconnected by the contact switch opening, thereby deenergizing the relay coil 12 and causing the alarm to sound.

FIG. 1 also shows additionally windows being protected. Window 35 is protected by means of a metallic foil 34 which is taped onto the inside of the window, and its ends connected to a terminal block 36, which is electrically coupled to switch member 38 mounted on the window frame. Switch member 38 is interconnected to the burglar alarm system by means of wires 40 and 42. The lower half of the window 35 is similarly protected by means of the foil 44 which is connected to the terminal block 46 which electrically contacts the switch member 48 interconnected within the burglar alarm system. A further window 50 is also shown protected by means of switch members 52 and 54, in a similar manner.

The circuitry shown in FIG. 1 is a closed circuit burglar alarm system whereby each of the switches are normally closed when the windows, doors, and the like are closed. When the contacts are closed, a continuous circuit is provided and the relay coil 12 will be energized thereby preventing the alarm 14 from sounding. As soon as one of the windows, or doors is opened, a

contact switch will open thereby deenergizing the relay coil 12 and causing the alarm 12 to sound.

Included within the circuit of FIG. 1 is a testing bulb 56. When the circuit is operating and is guarding the windows and doors, the bulb 56 will be illuminated. As soon as one of the doors or windows are opened, the bulb 56 will be extinguished. The bulb therefore provides a visual indication to the user that the system is operating properly and all of the doors and windows are guarded. The bulb 56 can either be located in a central control box along with the source 10 and relay 12, or can be placed independently at a convenient location. However, in order to determine if the circuit is properly operating it is necessary to examine the testing bulb.

In accordance with the present invention, there is provided on each of the contact switches, at least one light emitting device 58. The light emitting device is connected within the switch and will be illuminated as long as the entire burglar alarm system is properly operating. There is also shown a second light emitting device 60, located in the switch which indicates when the particular switch has been activated by means of the opening of the door.

Referring now to FIG. 2 there is shown an electrical circuit diagram of the closed circuit burglar alarm system including the switch of the present invention. As heretofore described in connection with FIG. 1, in the closed circuit system all of the contact switches are in series with each other. A typical switch is shown within the dotted lines 22 and includes the contact switch element 62, and a light emitting device such as a light emitting diode 64 in series therewith. The series combination is placed across terminals 66, 68 which interconnect the switch 22 into the burglar alarm system. A second switch 22' is shown in series with the first switch 22, wherein all parts are identical to the first switch and are indicated by the same numerals adding a prime to each numeral.

In operation, the light emitting diode 64, will be illuminated so long as the entire closed circuit system is in operation. If any of the contact switches 22, 22' are opened, all of the light emitting diodes 64, 64' will be extinguished. It is therefore easy for the authorized user to note whether the system is operating properly by merely checking any of the plurality of contact switches. Thus, by looking at a door, window, or other closing member protected by one of the contact switches in accordance with the present invention, and noting if the diode is illuminated, it can easily be detected whether the complete circuit is operative or not.

In addition, it is possible to connect a second diode 70 in a parallel arrangement with the series combination of the switch 62 and the diode 64. Because the diode usually has a small impedance, it may be beneficial to add a high impedance together with the diode 70 as for example adding impedance 72 or using a reverse bias zener diode. Utilizing the second diode 70, it is possible to detect which of the contact switches has been activated by having its door, window, or the like open. Thus, should, by way of example, switch 62 be opened because a window was opened, the diode 64 will be extinguished. However, current will now flow through the light emitting diode 70 causing it to emit light. In this manner it is easy to determine which contact switch has been opened merely by seeing which of the second light emitting diodes is illuminated.

To further facilitate distinguishing between the first and second light diodes, it is possible to utilize two different colors for the two diodes. For example, the first light emitting diode 64 could be a green light, so that when the green light is illuminated, it indicates that the entire burglar alarm is properly operating. The second light emitting diode 70 could be a red light, so that when the red light is illuminated, it provides an indication that a particular contact switch has been activated.

Referring now to FIG. 3 there is shown the contact switch of the present invention placed within an open circuit burglar alarm system. In the open circuit system, the alarm 14 is directly in series with the source 10 and each of the switches 22, 22' is placed in parallel across the source 10. Normally, each of the contact elements 62 are open when the door, window, or the like which they are protecting is secured. As a result, the first diode 64 in series therewith will be normally extinguished. On the other hand, the second diode 70 with its high impedance 72 will be illuminated when the circuit is properly operating in a guarding position. When one of the doors, windows, or the like are opened, the switch 62 protecting it will close, thereby illuminating diode 64 and at the same time shorting-out diode 70. As a result, diode 64 will be illuminated and diode 70 will be extinguished. In this manner, diode 70 could be a green color light and would indicate that the alarm is operating properly, and diode 64 could be a red color light such that when illuminated it indicates that the switch has been activated. It is understood that the alarm 14 would necessarily be arranged to only sound when sufficient current passes therethrough which could only occur when a switch 62 is closed. The small current that passes through the high impedance 72 during the guarding position, would not be sufficient to sound the alarm. On the other hand, when contact 62 closes thereby shorting-out the high impedance 72, sufficient current will pass through the alarm 14 to make it sound.

Referring now to FIG. 4 there is shown one embodiment of the contact switch in accordance with the present invention. There is shown a first insulating housing 74 having mounting holes 76 passing therethrough permitting this housing to be mounted on a door or window frame. Contained within the housing 74 is a dry reed switch 78 retaining the contact elements 80, 82 therein. Contact 80 is connected to terminal lug 84 having a conductor screw 86 connected therewith and to which is attached the wire 87 connected to one part of the burglar alarm system. The end of the contact 82 is connected to one terminal 84 of the light emitting diode 86. The other terminal 88 of the light emitting diode 86 is connected by means of wire 90 to the terminal lug 92 to which is connected conductor screw 94 which connects to the wire 96 leading to the other part of the burglar alarm system. A second insulating housing 97 includes mounting holes 99 for connecting the second housing to the door or window and including a magnet 95. When the window or door is closed, the magnet keeps the contact elements 80, 82 of the reed switch 78 in physical contact thereby keeping the circuit closed. When the door or window is opened, and the magnet 95 is moved away from the housing 74, the elements 80, 82 separate thereby opening the circuit and causing the alarm to sound. When the contact elements 80, 82 are closed, the diode 86 is illuminated providing an indication that the entire burglar alarm

system is operating. When the contact elements are opened, the diode 86 is extinguished providing immediate indication to the user that the alarm system has been activated.

While only one light emitting diode has been shown in FIG. 4, it is understood that a second light emitting diode could be included in parallel circuit arrangement with the contact element by interconnecting the second light emitting diode with a high impedance therewith, across lugs 84, 92. Furthermore, while FIG. 4 has been described in connection with a closed circuit system, it is understood that it could also be utilized with an open circuit system whereby under normal circumstances, the magnet would retain the elements 80, 82 in an open position and when the magnet is removed the elements would close causing contact.

Referring now to FIG. 5 there is shown an alternate embodiment whereby in place of the reed switch and magnet, it is possible to use mechanical type contacts 98, 100 on one housing 110, which are short-circuited by means of the elements 102, 104 when the door is closed. The circuit in FIG. 6 shows the two diodes 64, 70 connected to the one housing 110 which would be mounted on the frame. The housing 112 would be mounted on the window. The lugs 114, 116 can be utilized to interconnect to window foil which may be placed along the window to protect the window from being broken into.

In the embodiments shown in FIGS. 4 or 5 once the wiring and electronic circuitry has been included the entire unit could be potted thereby protecting and preserving the circuitry within the housing.

Referring now to FIG. 6 there is shown an alternate embodiment of a closed circuit burglar alarm system. Like parts as in FIG. 2 are identified by like reference numerals. It is noted, that in FIG. 6, the parallel branch of the contact switch includes a high impedance element 101 having a transistor 103 connected with its base at a first point 105 along the resistor and its collector connected through the second light emitting diode 70 to a second point 107 along the resistor 101. The emitter 108 is connected to the terminal 66.

Utilizing the embodiment in FIG. 6, when the burglar alarm system is in a guarding position, the switch 62 will be closed thereby shorting-out the current from the high impedance element 101. The light emitting diode 64 will be illuminated while the light emitting diode 70 will be extinguished. When the switch 62 is caused to open by the opening of the window, door or the like, light emitting diode 64 will be extinguished. Now however, current will flow through the high impedance element 100. The current flowing through this element will be insufficient to illuminate the first of the light emitting diodes or the other switches 64' so that all of the first light emitting diodes will be extinguished thereby providing an indication that the system is not operating and that at least one of the doors, windows or the like is open. However, the transistor 103 will then be turned on, thereby causing the diode 70 in the switch 22 to be illuminated. In this manner, the only switch which will have its second illuminating diode in a lighted condition, will be the switch which has been activated by its window, door, or the like being opened. A small current flowing through the entire burglar alarm system will be insufficient to sustain the holding power of the relay coil 12 so that the alarm will sound.

Although a transistor 103 has been illustrated, it will be understood that other types of devices could be utilized such as field effect transistors, thyristors, SCR's or other trigger elements which will respond to current flowing through a portion of the impedance element illuminating the second light emitting diode associated with the switch being activated. At the same time, the current will pass through the high impedance element to reduce the current making it insufficient to turn on the first light emitting diodes, of the other contact switches 22'.

There has been disclosed heretofore the best embodiments of the invention presently contemplated. Further, it is to be understood, that various changes and modifications may be made thereto without departing from the spirit of the invention.

What I claim as new and desire to secure by Letters Patent is:

1. A switch for a burglar alarm system which protects a closing member supported on a frame, said switch comprising:

- a. a first housing adapted to be mounted on the frame and including: terminal means adapted to be interconnected within the burglar alarm circuit, and a series circuit combination of electrical contact means having a guarding position and an active position in series with a first light emitting means, said series circuit combination being interconnected between said terminal means, and a circuit arrangement of impedance means and second light emitting means electrically connected to said impedance means for illuminating only when current passes through said impedance means, said series circuit combination and said circuit arrangement being connected in parallel circuit relationship;
- b. a second housing adapted to be mounted on the closing member and including control means for switching said contact means for one of its positions to the other of its positions.

2. The switch as in claim 1 and wherein said first and second light emitting means each emit light of a different color.

3. The switch as in claim 1 and wherein said burglar alarm is of the closed circuit type, said guarding position is a closed position, said active position is an open position, and wherein said first light emitting means provides an indication of the operativeness of the entire burglar alarm system, and said second light emitting means provides an indication of the activation of that switch.

4. The switch as in claim 1 and wherein said burglar alarm system is of the open circuit type, said guarding position is an open position, said active position is a closed position, and wherein said first light emitting means provides an indication of the activation of said switch, and said second light emitting means provides an indication of the operativeness of the entire burglar alarm system.

5. The switch as in claim 1 and wherein said light emitting means are light emitting diodes.

6. The switch as in claim 1 and wherein said light emitting are visible externally from said first housing means.

7. The switch as in claim 1 and further comprising trigger means interconnecting said impedance means and said second light emitting means for illuminating said second light emitting means when sufficient current passes through said impedance means.

8. The burglar alarm system as in claim 7 and wherein said first housing further includes a circuit arrangement including impedance means and second light emitting means electrically connected to said impedance means for illuminating only when current passes through said impedance means, said series circuit combination and said circuit arrangement being connected in parallel circuit relationship.

9. A burglar alarm system comprising alarm means adapted to be energized by a source of electrical energy, and a plurality of switch means protecting a respective plurality of closing members each supported on a frame, such that when one of said switch means are activated, said alarm means will sound, each of said switches including:

- A. a first housing adapted to be mounted on said frame and including: terminal means interconnected within the burglar alarm circuit, and a series circuit combination including electrical contact means having a guarding position and an active position and first light emitting means, said series circuit combination being interconnected between said terminal means, and
- B. a second housing adapted to be mounted on the closing member and including control means for switching said contact means from one of its positions to the other of its positions.

10. A switch for a burglar alarm system employing a circuit current interruption sensing means for activating an alarm for protecting a movable member in a frame comprising:

- a. a housing having a wall and adapted for mounting on the frame proximate to the movable member;
- b. an externally actuatable switch having a pair of switch terminals positioned within said housing;
- c. a light emitting diode carried by said housing having a pair of diode terminals;
- d. a pair of housing output terminals extending through the wall of said housing;
- e. circuit means connecting one said housing terminal to one said switch terminal;
- f. circuit means connecting the other said housing terminal to one diode terminal;
- g. circuit means connecting the other said diode terminal to the other said housing terminal; and
- h. circuit means for connecting said switch and said light emitting diode in series with said circuit interruption sensing means.

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