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[54] ELECTRIC SWITCHES

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[52] **U.S. Cl.** **337/44,** 337/92, 337/340

[51] **Int. Cl.** **H01h 37/72**

[58] **Field of Search** 337/41–44, 102, 337/92, 340, 81; 200/61.27; 340/81

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[57] **ABSTRACT**

A switch for controlling energization of a signal device, such as an electric light, the switch having an actuator arm which is movable to any one of three positions. In one position of the actuator, current flow to the signal device is interrupted; in a second position of the actuator, uninterrupted current flows to the signal device so that the latter is energized in a steady manner; and in a third position of the actuator, current flows intermittently to the signal device so that the latter may act as an emergency indicator.

9 Claims, 9 Drawing Figures

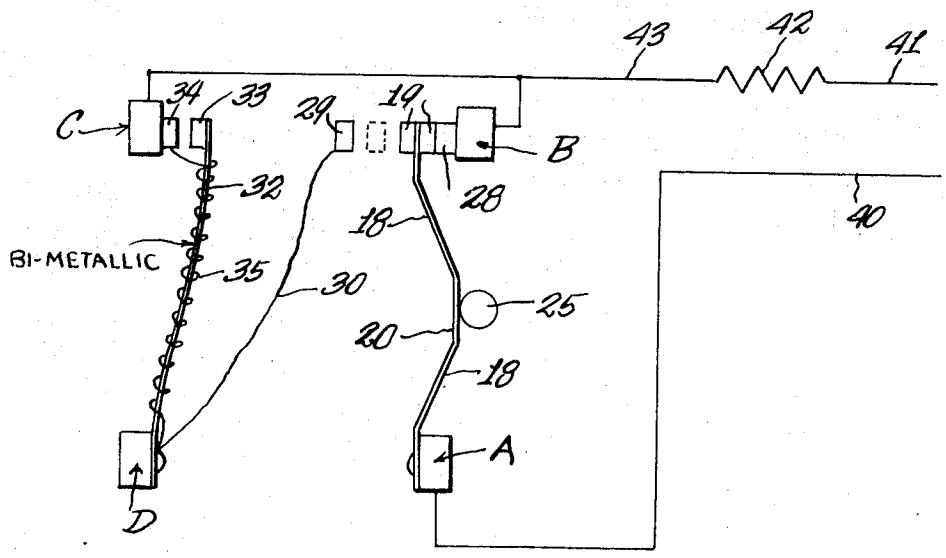


FIG. 1.

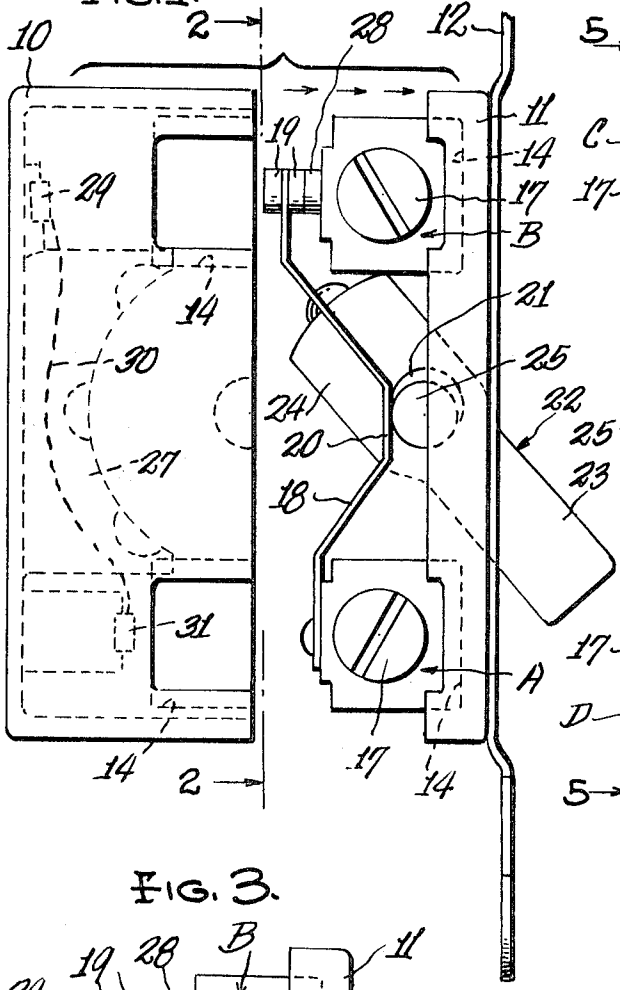


FIG. 2

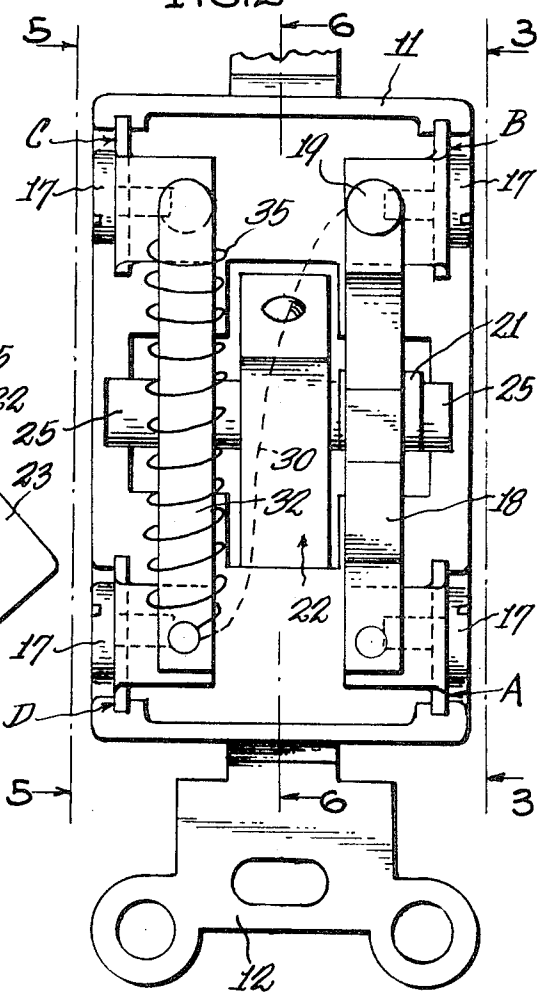


FIG. 3.

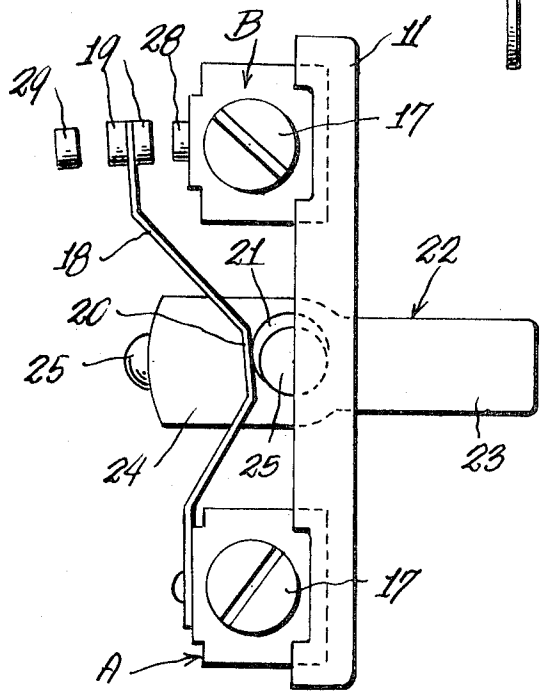
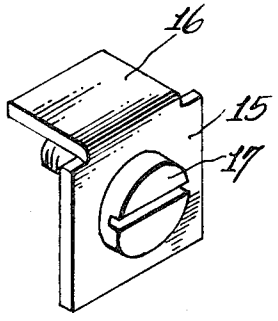


FIG. 7.



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FIG. 4.

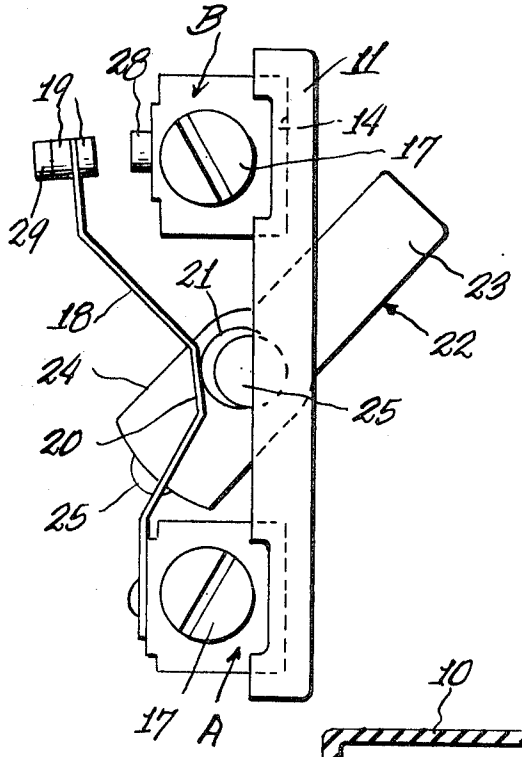


FIG. 5.

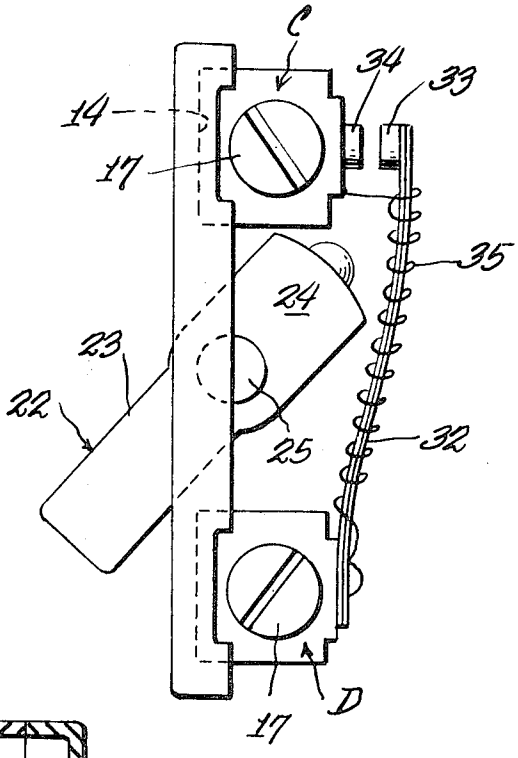
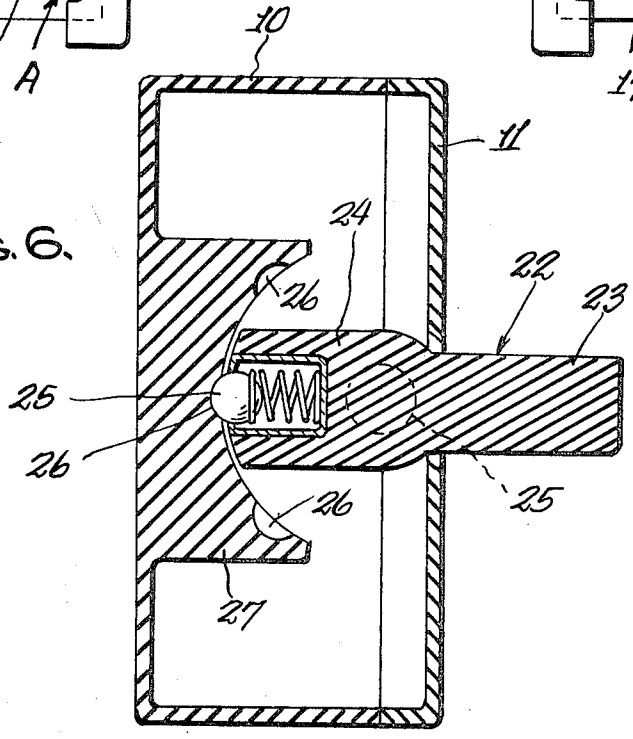
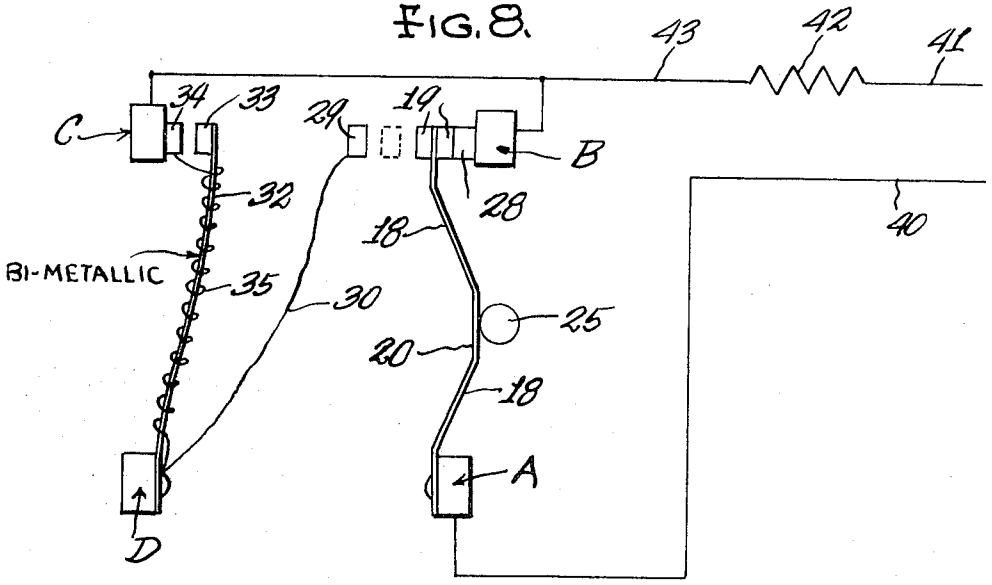


FIG. 6.



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FIG. 8.



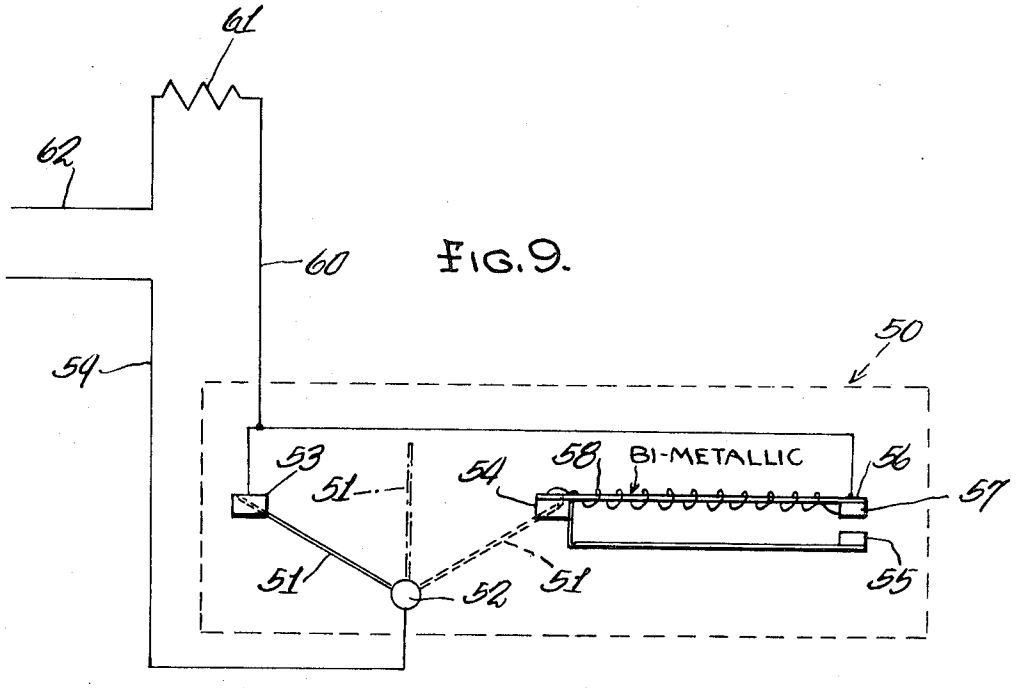


FIG. 9.

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ELECTRIC SWITCHES

BACKGROUND AND SUMMARY

The switch of our invention is designed to fit in the conventional wall receptacle of a house and therefore may be easily connected to control energization of an outside light, such as a porch light. Thus, the light may be used in conventional manner or may be made to blink to identify the house for emergency purposes or the like.

Thus, in case of an emergency at home, for example, a person would telephone the proper agency to give the location of the house, and then turn the wall switch to cause the porch light to blink, so that firemen or policemen responding to the call will quickly locate the house. This emergency signal is especially valuable at night when house numbers are difficult to read.

DESCRIPTION OF THE DRAWINGS

In the drawings accompanying this description and forming a part of this specification, there are shown, for purpose of illustration, embodiments which our invention may assume, and in these drawings:

FIG. 1 is a side view of a switch illustrating an embodiment of our invention, the front and back parts of the switch being slightly separated,

FIG. 2 is a view looking into the rear of the cover of the switch, as suggested by the line 2—2 of FIG. 1,

FIGS. 3 and 4 are side views of the switch, corresponding to the line 3—3 of FIG. 2, with the back omitted, these views showing switch parts in various positions,

FIG. 5 is a side view of the switch corresponding to the line 5—5 of FIG. 2, with the back omitted,

FIG. 6 is a sectional view through the switch, corresponding to the line 6—6 of FIG. 2,

FIG. 7 is a perspective view of a switch terminal,

FIG. 8 is an electrical diagram showing the switch of FIGS. 1 through 7 in an electrical circuit with a signal device, and

FIG. 9 is an electrical diagram showing another embodiment of our invention.

DESCRIPTION OF PREFERRED EMBODIMENT

The switch shown in FIGS. 1 through 7 is of an overall size to correspond closely to the size of a conventional wall switch, and the disclosed embodiment utilizes parts of a switch presently made and sold.

The switch comprises a back 10 and cover 11, both molded to desired shape from a suitable plastic material, and connected in well known manner by screws or rivets (not shown). A metal plate 12 is provided to secure the switch in a wall receptacle in conventional manner.

The back and cover have matching recesses 14—14 for receiving the flat sides 15 of terminals. As seen in FIG. 2, a first set of terminals A and B is disposed at one side of the switch, and a second set of terminals C and D is disposed at the other side of the switch. Each terminal has a side 16 (see FIG. 7) at right angles to the flat side 15, and a contact or switch arm is adapted to be carried by the side 16. A screw 17 is threaded through the terminal side 15 to provide for connection of a conductor wire in usual manner.

In the embodiment disclosed in FIGS. 1 through 7, a first switch arm 18 has one end fixed to terminal A and has a contact 19 extending from opposite sides at the free end of the arm. The arm is formed of spring metal and shaped to the form shown in FIGS. 1, 3 and 4, so that its center part 20 is engageable with a cam 21 on an actuator 22.

The actuator is molded of plastic material and provides a finger piece 23 exteriorly of the switch and a detent-carrying piece 24 interiorly of the switch. Trunnions 25 extend from opposite sides of the actuator and fit within matching recesses in the back and cover 10, 11 to provide a pivot. As best seen in FIG. 6, the actuator piece 24 carries a spring-pressed ball detent 25 which releasably fits within any one of three recesses 26 in a part 27 extending inwardly of the back 10.

The contact 19 on switch arm 18 is adapted to electrically engage either one of two contacts 28,29. The contact 28 is fixed to terminal B while the contact 29 is fixed to the back 10. A conductor 30 electrically connects contact 29 to a contact 31 which is adapted to electrically engage terminal D.

Fixed to terminal D is one end of a bi-metallic arm 32 (see especially FIG. 5) and the free end of the arm carries a contact 33 which is normally spaced from a contact 34 carried by the terminal C. A resistance wire 35 is wound around the bi-metallic arm 32 and has its opposite ends respectively connected to terminals C and D.

In the centered position of the actuator 22, as seen in FIGS. 3 and 6, the cam 21 has moved the switch arm 18 so that its contact 19 is out of engagement with either contact 28 or 29. In the lower position of the actuator 22, the contact 19 on switch arm 18 is in engagement with the contact 28, as seen in FIG. 1. In the upper position of the actuator 22, the cam 21 has moved the switch arm 18 so that its contact 19 is spaced from the contact 28 and in engagement with the contact 29, as seen in FIG. 4.

The switch is shown in an electrical circuit in FIG. 8 which comprises conductors 40, 41 which may be connected to the household power supply. Conductor 40 is connected to terminal A and conductor 41 is connected to one side of a signal device 42 which may be an electric bulb, or a device which gives an audible signal when energized. The other side of the signal device 42 is connected to terminals B and C through a conductor 43.

When the actuator 22 is on the middle position shown in FIGS. 3 and 6, there will be no current flow to the signal device. In the lower position of the actuator 22, as seen in FIG. 1, the circuit is completed from line conductor 40, terminal A, switch arm 18, closed contacts 19 and 28, terminal B, conductor 43, signal device 42 to line conductor 41, and the signal device will be energized in steady manner.

When the actuator 22 is in its upper position shown in FIG. 4, contacts 19, 28 will be disengaged and contacts 19 and 29 closed. The circuit is thus completed from line conductor 40, terminal A, switch arm 18, contacts 19 and 29, conductor 30, contact 31, terminal D, resistance wire 35, terminal C, conductor 43, signal device 42 to line conductor 41. However, resistance conductor 35 absorbs most of the current to generate heat, and an insufficient amount passes to signal device 42 so that the latter does not give a signal.

The heat of the resistance wire **35** affects the bi-metallic arm **32** and causes it to bend to close contacts **33,34**, whereupon the resistance wire is shorted out since the current will more readily flow through the bi-metallic arm **32** and thus a full amount of current will flow to the signal device **42** to activate it.

However, when the resistance wire **35** is shorted out, it will no longer heat the bi-metallic arm **32** and the latter will cool and tend to return to its shape shown in FIG. **5**, whereupon the contacts **33,34** are disengaged so that current will again flow through the resistance wire **35** to cause it to generate heat. This action will continue so that the signal device is intermittently actuated to generate the signal, such as a flashing light when an electric bulb is used.

DESCRIPTION OF OTHER EMBODIMENT

FIG. **9** schematically discloses a modified switch **50** in an electrical circuit of the type heretofore described. A switch blade **51** is pivoted to the housing of the switch at **52** so that it may swing to electrical contact with either terminal **53** (as shown in full line) or terminal **54** (as shown in dotted line). The switch blade also has a center position, shown in dot-dash line.

A fixed contact **55** is electrically connected to the terminal **54**. Also, one end of a bi-metallic arm **56** is fixed to the terminal **54**, the free end of the arm carrying a contact **57**. A resistance wire **58** is wound about the arm **56** and has its opposite ends connected respectively to the terminal **54** and contact **57**.

When the switch blade **51** is in its full line position, the circuit is completed from line conductor **59**, through blade **51**, terminal **53**, conductor **60**, signal device **61** and to line conductor **62**, and the device will be energized in steady manner.

When the switch blade **51** is in its dotted line position, the circuit is completed from line conductor **59**, through blade **51**, terminal **54**, resistance wire **56**, conductor **60**, signal device **61** to line conductor **62**. However, the resistance wire will use most of the current to generate heat, and the signal device will not be energized. The generated heat will cause the bi-metallic arm **56** to bend and close contacts **55, 57** to short out the wire **58** and energize the signal device. Thereupon, the bi-metallic arm will cool and break the contacts **55,57**, and this action will be repeated to intermittently energize the signal device.

We claim:

1. A switch for use in an electrical circuit including a signal device, comprising:

a switch housing,

an actuator movably carried by said housing for movement to any one of three positions,

a first set of electrical terminals carried by said housing in spaced relation, one terminal (A) being adapted for connection to one line of power source and the other terminal (B) being adapted to be connected to one side of said signal device and the other side of the latter adapted to be connected to the other line of the power source,

a first switch arm having one end fixed to terminal (A) and its other end movable toward and away from electrical engagement with terminal (B),

a second set of terminals carried by said housing in spaced relation, one terminal (C) being adapted for connection to said one side of said signal device and the other terminal (D) being adapted to receive current from said one line of said power source,

a bi-metallic switch arm having one end fixed to terminal (D) and its other end movable toward and away from electrical engagement with terminal (C),

a resistance wire wound about said bi-metallic switch arm and having its ends respectively connected to terminals (C) and (D),

said actuator in one position holding said first switch arm one end out of engagement with terminal (B) so that no current flows to said signal device, said actuator in another position providing for engagement of said first switch arm end with terminal (B) so that said signal device is energized in a steady manner, said actuator in the third position providing for engagement of said first switch arm end with a further terminal which is electrically connected with terminal (D) and thus providing for energization of said resistance wire to heat the same and cause said bi-metallic switch arm to bend from its unheated shape to cause its end to engage terminal (C) so that said signal device is energized, engagement of the end of said bi-metallic switch arm with terminal (C) shorting out said resistance wire so that said bi-metallic switch arm cools and tends to bend back to break electrical engagement with terminal (C), this action continuing so that said signal device is intermittently energized.

2. The construction according to claim **1** wherein said first switch arm electrically connects terminal D with terminal A when said actuator is in its third position.

3. The construction according to claim **2** wherein said first switch arm one end has a pair of electrical contacts extending from opposite faces, one contact being engageable with terminal B and the opposite contact being engageable with a third contact which is electrically connected to terminal D.

4. The construction according to claim **3** wherein in said one position of said actuator, the switch arm contacts are out of engagement with terminal B and said third contact, and in said another position of said actuator a switch arm contact is in engagement with terminal B but the opposed contact is out of engagement with said third contact, and in said third position of said actuator a switch arm contact is in engagement with said third contact but the opposed contact is out of engagement with terminal B.

5. The construction according to claim **1** wherein said actuator is pivotally carried by said housing and has a cam surface engageable with said first switch arm to move the latter.

6. The construction according to claim **1** wherein said actuator has a spring-pressed dent releasably engageable within any one of three recesses in said housing for yieldably holding said actuator in a selected position.

7. The construction according to claim **1** wherein said housing comprises a box-like back portion and a cover therefore, said sets of terminals being supported in matching recesses formed in said back and cover, and said back having spaced electrically connected contacts, one engaging terminal D and the other being engageable with said first switch arm free end.

8. A switch for use in an electrical circuit including a signal device, comprising:

a housing,

a pair of terminals carried by said housing in spaced relation, one adapted to be connected to one side of said signal device and the other side of the latter being adapted to be connected to one line of a power source,

a switch blade carried by said housing for movement to any one of three positions, said switch blade being adapted to be connected to the other line of said power source,

in one position said switch blade being out of engagement with either one of said terminals so that there is no current flow to said signal device, in a second position said switch blade being in electrical engagement with said one terminal to establish an uninterrupted flow of current to said signal device, and in the third position said switch blade being in electrical engagement with the other terminal,

a pair of normally separated electrical contacts, one being fixed and electrically connected to said other terminal,

a bi-metallic arm having one end fixed and electrically connected to said other terminal and its free end supporting the other contact,

a resistance wire in close relationship with said bi-metallic arm and having its opposite ends respectively connected to said other terminal and said other contact,

said other contact being adapted to be electrically connected to said one side of said signal device,

whereby when said switch blade is in electrical engagement with said other terminal current flows through said resistance wire to generate heat which affects said bi-metallic arm to cause it to bend in a direction whereby its free end moves toward said fixed contact to close said normally spaced contacts and thereby provide for conduction of current to said signal device,

closing of said contacts shorting out said resistance wire whereby the latter cools and absence of heat affects said bi-metallic arm to unbend and open said contacts to interrupt flow of current to said signal device, this action continuing so that said signal device is intermittently energized.

9. A switch for use in an electrical circuit including a signal device, comprising:

a switch blade having one end pivotally mounted so that its free end may be swung to electrical engagement with one or the other of two terminals, or to a position between and out of engagement with either terminal, said switch blade one end being adapted for connection to one side of an electrical power source,

a conductor electrically connecting said one terminal to one side of said signal device, the other side of the latter being adapted for connection to the other side of said power source, whereby when said switch blade one end is in engagement with said one terminal, current is adapted to flow in uninterrupted manner through said signal device and actuate the same,

said other terminal being electrically connected to a fixed first contact,

a bimetallic switch arm having one end anchored to said other terminal and its free end carrying a second contact movable to and away from electrical engagement with said first contact,

a resistance wire coiled about said bimetallic switch arm and having one end electrically connected to said other terminal and its other end electrically connected to the free end of said bimetallic switch arm, the latter being so biased that in cool condition it maintains said first and second contacts out of electrical engagement,

a conductor electrically connecting the free end of said bimetallic switch arm to said one side of said signal device,

whereby when said switch blade free end is moved to electrical engagement with said other terminal, current will flow through said resistance wire to heat the same and consequently heat said bimetallic switch arm and cause the latter to deform to a position wherein said first and second contacts are engaged, thereby establishing current flow through said signal device,

engagement of said first and second contacts shorting out said resistor wire to cause it and said bimetallic switch arm to cool, whereby the latter assumes its cool condition and breaks engagement of said first and second contacts and interrupts current flow through said signal device.

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