March 1, 1966 E. R. CARLSON 3,238,343

ILLUMINATED THREE-WAY SWITCH

Filed April 17, 1964

Fig. 1.

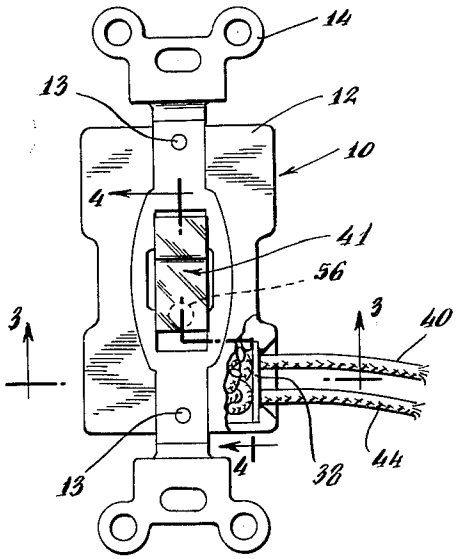


Fig. 2.

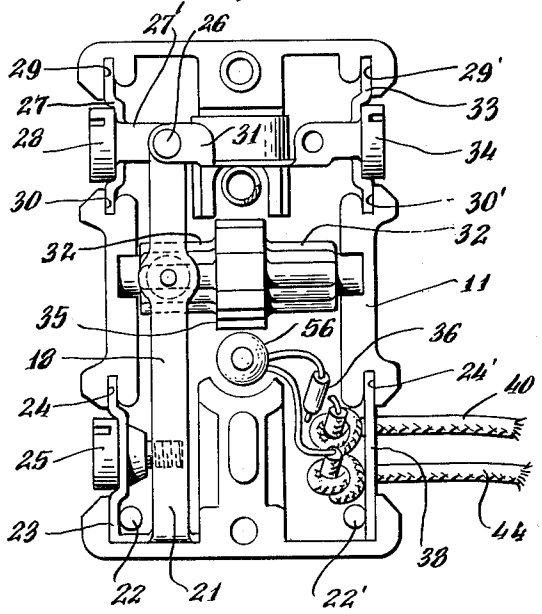


Fig. 3.

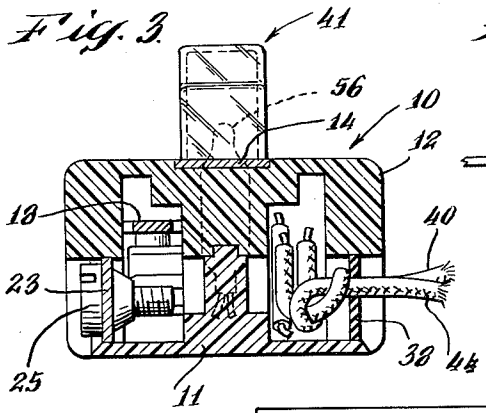


Fig. 4.

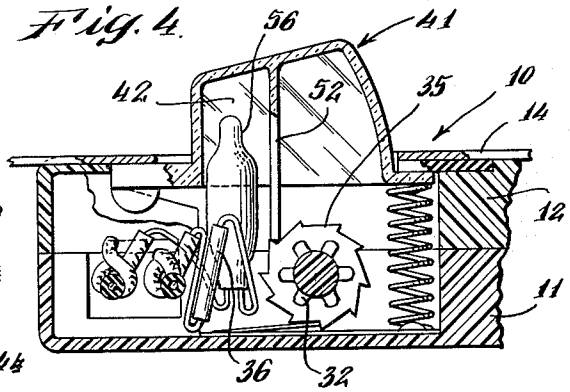
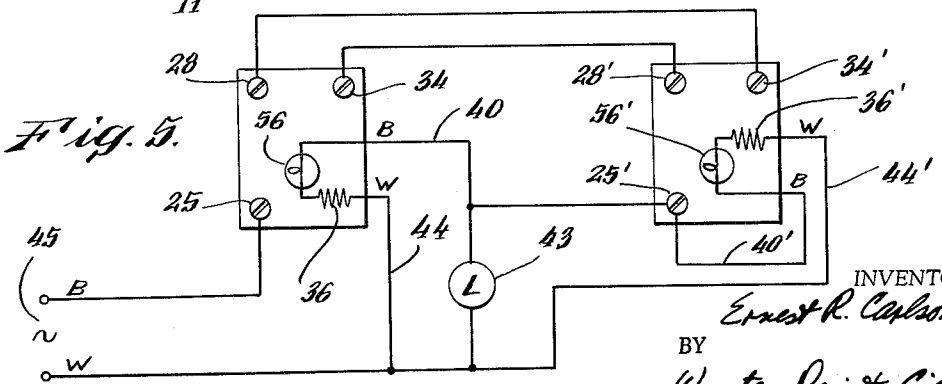


Fig. 5.



INVENTOR.
Ernest R. Carlson
BY
Wooster, Davis & Cifelli
ATTORNEYS.

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ILLUMINATED THREE-WAY SWITCH

Ernest R. Carlson, Fairfield, Conn., assignor to Harvey Hubbell, Incorporated, Bridgeport, Conn., a corporation of Connecticut

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6 Claims. (Cl. 200—167)

This invention relates to an illuminated 3-way switch, and, more particularly, to such a switch which is of the push button type wherein the illumination means is positioned within the switch button.

In United States Patent 2,933,578, which issued April 19, 1960 jointly to Harvey Hubbell and the present inventor, there is disclosed a push button operated switch which may be switched into either of two positions by means of a single push button. As will be noted by reference to that patent, a push button **41** is designed with an internally depending spring finger **52** which projects downwardly against a toothed ratchet **35**. A ribbed wheel **32** is formed integral with the ratchet. A movable switch member **18** is actuated into either of two positions by means of the camming action of the ribbed wheel **32**. In the referenced patent, the mechanism is enclosed within a housing and forms a 3-way switch for making an electrical connection from the binding screw **25** to either of binding screws **29** and **31**. It will be noted that in the therein disclosed embodiment, the three binding screws and their associated terminals are positioned along one side of the body member **10**.

In United States Patent 3,084,239, which issued April 2, 1963 jointly to the present inventor and John C. Horvath, there is disclosed an improvement to the invention of the earlier patent. The mechanism of this switch is similar to that previously described. However, there are two distinctions. One distinction is that the switch is designed as a single pole, single throw switch so that only two terminal openings are provided on one side. The body is designed for mounting a second switch member on the opposite side of the body but, in any event, the illustrated switch would be a single throw switch rather than a 3-way switch. The second distinction is that illuminating means **56** (a neon lamp) is positioned within the cavity **42** of the push button **41**. The neon lamp and a suitable resistor are connected across the switching member so that the lamp will glow and iluminate the push button **41** whenever the switch is open and the controlled device deenergized.

It would be desirable to incorporate an illuminated push button into a 3-way switch. 3-way switches are customarily employed in circuits wherein it is desired to control an electrical load from two different locations. Under these circumstances, two 3-way switches are employed. However, it is not a simple matter to merely insert an illuminating means into the push button of a 3-way switch. This is because the illuminating means within the switch must be responsive to the energization of the external electrical load. Since the electrical load is controlled by the combination of two different switches, it is not possible to wire the illuminating means completely internally of the switch body. For this reason, it becomes necessary to provide some means for wiring the illuminating means of the switch button into an external circuit. This would not be a particularly difficult problem if cost were no object. However, cost is a very important object to switch manufacturers. For this reason, it would be desirable to incorporate an illuminated 3-way switch into a standard switch body with as little modification as possible. A standard switch body will normally have provision for four electrical terminals and binding screws. A body of this type may be used for either a single pole, single throw switch, in which event two terminals ar employed; or for a double pole, single throw switch, in which event four terminals are employed;

or for a single pole, double throw switch (3-way), in which event three terminals are employed. When used as a 3-way switch, one terminal location remains. The neon lamp employed to illuminate the push button, however, requires two leads that must extend beyond the switch body.

A solution which was attempted by the prior art was the use of a separate pilot light contained in the same wiring box as the switch and covered by a special combination switch plate. It will be readily perceived, however, that this is an expensive approach to providing a pilot light, and that it requires considerable separate wiring.

Accordingly, it is the primary object of this invention to provide an improved 3- way switch. Other objects are to provide such a switch which has an illuminated push button; to provide such a switch which may be housed in a standard switch housing; to provide such a switch wherein the switch illuminating means is responsive to the state of energization of the controlled load, and to provide such a switch which is designed to fit a standard switch plate.

The manner in which the foregoing objects are achieved will be more apparent from the following description, the appended claims and the figures of the attached drawing, wherein:

FIG. 1 is a front view of a 3-way switch constructed in accordance with the invention, a portion of the cover being broken away to show its internal construction;

FIG. 2 is an enlarged front view of the switch of FIG. 1 with the cover removed to show the internal details;

FIG. 3 is an enlarged cross section taken along the line 3—3 of FIG. 1;

FIG. 4 is an enlarged cross section taken along the line 4—4 of FIG. 1; and

FIG. 5 is a circuit diagram showing one arrangement for utilizing two 3-way switches constructed in accordance with the present invention.

The drawings illustrate a switch which comprises a body **10** composed of a base **11** and a cover **12**, which are molded from a suitable dielectric material. The base and cover are secured to one another by means of screws **13** which pass through the base and cover and are threadedly received in openings formed in metal mounting yoke **14**. The switch includes movable switch member **18** in the form of an elongated electrically conducting spring strip which carries suitable electrical contacts at its free end and is mounted at its other end **21** in the base **11**. The mounting of member **18** is effected by bending it at end **21** and seating it in a recess formed between base **11** and an upright stud **22** molded in base **11**. A laterally extending portion of bent end **21** forms a terminal plate **23** which is seated in a recess **24** in a side of base **11** and is formed to receive the usual binding screw **25**. The movable end of switch member **18** is designed to contact either a lower fixed contact (not shown) or an upper fixed contact **26**. The lower fixed contact is carried by a laterally extending portion **27'** of a terminal plate **27** which receives a binding screw **28**. Terminal plate **27** is retained in the wall of base **11** by means of recesses **29** and **30**. The upper fixed contact **26** is mounted on a cross over extension arm **31** which terminates in a terminal plate **33** which receives binding screw **34**. Terminal plate **33** is retained within recesses **29'** and **30'** which are similar to those on the opposite side of the base **11**.

The mechanism of this switch which actuates switch member **18** includes ribbed wheel **32** and ratchet **35** which are rotatably mounted in base **11**. Push button **41** includes a depending spring finger **52** which actuates the ratchet wheel **35** when the button is depressed. As the mechanism is substantially identical with that described in the referenced patents, it will not be discussed in further detail herein.

The illuminating means **56** extends into the cavity **42** formed in the push button **41**. The illuminating means **56** is a neon lamp which is in electrical series with a suitable resistor **36**. It is important to note that the two leads from the illumination means **56** must be brought outside the body of the switch. This is because the circuit of the neon lamp must respond to the state of the other 3-way switch in the wiring system as well as to the state of the switch in which it is located. However, it will also be noted that three of the four terminal openings in the switch body have already been employed for the switch terminals. This problem has been overcome in applicant's device by inserting a rigid panel **38** into the slot **24'** and into the space provided between the wall of base **11** and the upwardly extending stud **22'**. The panel **38** is drilled to receive lead wires **40**, **44** which are knotted on the inner side of panel **38** and connect to the resistor **36** and to the illuminating means **56**. It will thus be noted that five different connections may be made to a switch having a standard four terminal switch body.

In FIG. 5 there is illustrated a circuit utilizing two 3-way switches constructed in accordance with this invention to control a lighting load **43** energized from an alternating current power source **45**. The 3-way switches are connected in the usual manner so that the lighting load **43** may be controlled from either switch location. The lead wires **40**, **44** from the left hand switch are connected across the lighting load **43** as are the lead wires **40'**, **44'** of the right hand switch. Accordingly, it will be apparent that each of illuminating means **56** and **56'** will be illuminated when the lighting load **43** is energized. If it is desired to connect either or both of the lighted push buttons so that it will be illuminated when the lighting load is off, this may be easily accomplished by connecting the leads **40**, **44** between the binding screws **25**, **25'**. Under some circumstances, it might be desirable if the illumination of two 3-way switches in the same circuit were differently actuated. For example, a 3-way switch in a detached garage might be arranged so that the push button would glow in the dark and thus be easily found. The other 3-way switch, which might be located, for example, within the house, could be connected so that it would glow when the garage light was on.

Many other modifications and variations of the invention will be apparent to those skilled in the art. In any event, it will be quite obvious that this invention not only provides an inexpensive illuminated 3-way switch but also allows a maximum amount of freedom in the manner in which the illumination means of the switch may be interconnected with a controlled circuit. Accordingly, the foregoing description is to be construed as illustrative only, rather than limiting. This invention is limted only by the scope of the following claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An illuminated electrical switch comprising: a body made of dielectric material and including a base and a cover which are secured to each other and define an internal chamber therebetween, said body defining first and second terminal plate openings in a first side wall and third and fourth terminal plate openings in a second side wall; electrical switching mechanism within said chamber; push button means extending through the front wall of said cover and arranged to actuate said switch, said push button means being formed of a translucent material and defining a cavity therein; first, second, and third terminal plates positioned, respectively, in each of said first, second, and third terminal plate openings and internally connected to the switching mechanism of said switch; a panel positioned in said fourth terminal plate opening; and illuminating means mounted within said chamber and extending into said cavity and including first and second leads passing through openings in said panel.

2. The switch of claim **1** wherein said first and second terminal plate openings are symmetrically positioned opposite said third and fourth terminal plate openings.

3. The switch of claim **1** wherein said switching mechanism is a three-way switch mechanism.

4. The switch of claim **1** wherein said illuminating means is a neon lamp.

5. A load controlling circuit comprising: first and second three-way switches connected to control an electrical load energized from a power source; a panel positioned in an opening in at least one of said switches; push button illuminating means in said one switch; and electrical lead means from said illuminating means passing through said panel and connected to indicate the state of energization of said electrical load.

6. The combination defined in claim **5** wherein each of said three-way switches comprises; a body made of dielectric material and including a base and a cover which are secured to each other and define an internal chamber therebetween, said body defining first and second terminal plate openings in a first side wall and third and fourth terminal plate openings in a second side wall; electrical switching mechanism within said chamber; push button means extending through the front wall of said cover and arranged to actuate said switch, said push button means being formed of a translucent material and defining a cavity therein; first, second, and third terminal plates positioned, respectively, in each of said first, second, and third terminal plate openings and internally connected to the switching mechanism of said switch; a panel positioned in said fourth terminal plate opening; and illuminating means mounted within said chamber and extending into said cavity and including first and second leads passing through openings in said panel.

No references cited.

KATHLEEN H. CLAFFY, *Primary Examiner.*