Jan. 31, 1967 M. J. WEITZMAN 3,301,988

LIGHT SWITCH WITH INDICATING LIGHT IN A TRANSLUCENT HANDLE THEREOF

Filed Feb. 10, 1965

FIG. 1

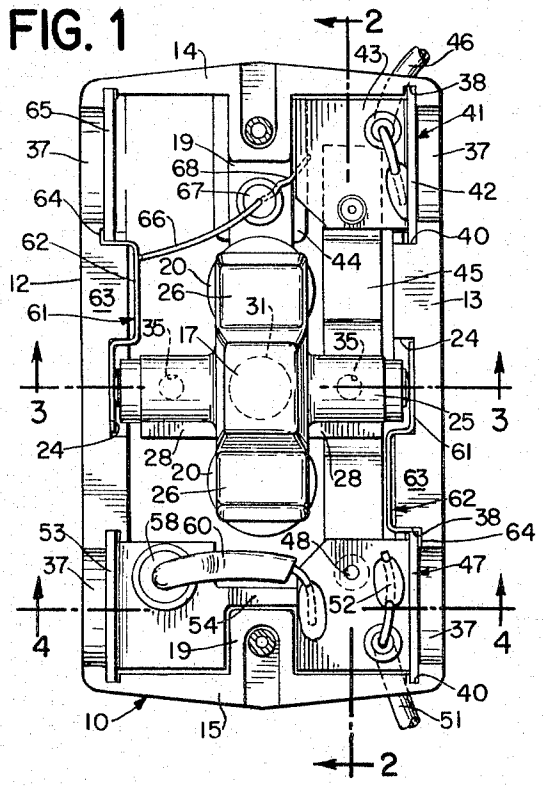


FIG. 2

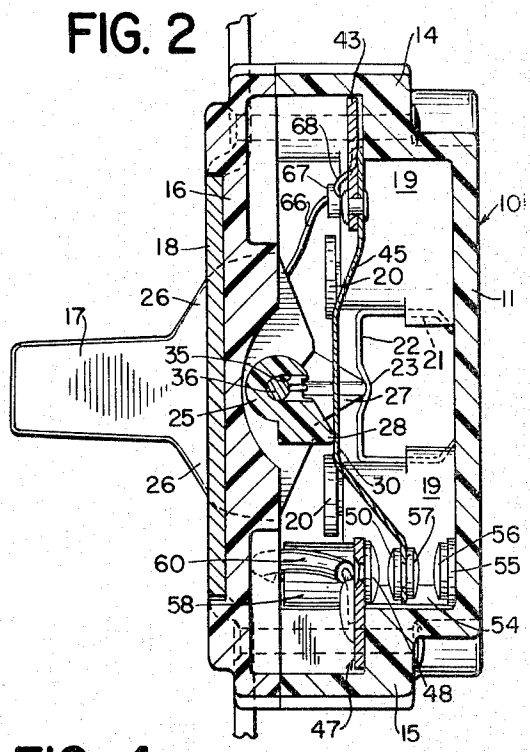


FIG. 3

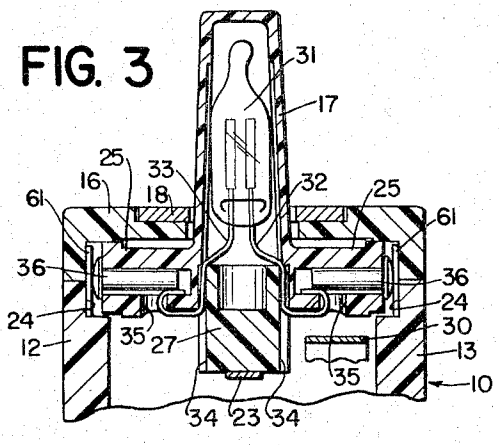


FIG. 4

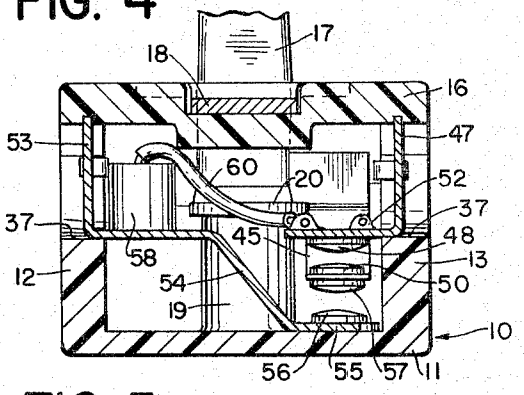


FIG. 5

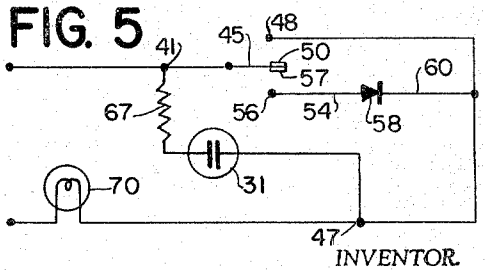
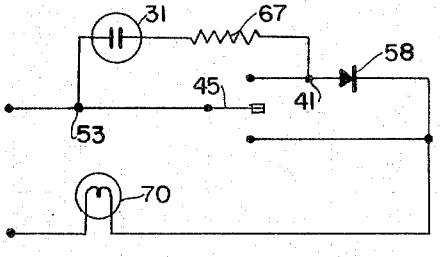


FIG. 6



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LIGHT SWITCH WITH INDICATING LIGHT IN A TRANSLUCENT HANDLE THEREOF

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4 Claims. (Cl. 200—167)

The present invention relates to a two level electrical switch of the type commonly known as a dimming switch which is provided with a light which is operative when the switch is in its off position to thereby indicate the position of the switch.

Additionally, the indicating light of the present invention is so arranged that it operates at a decreased intensity when the switch is in its dim position thus indicating that fact and is off when the light is bright.

It has been common to provide small neon lamps in the handles of electrical switches to indicate the location of the switch when the lamp controlled thereby is unenergized but in general such indicating lamps have required quite complex structures since the switch handle is oscillatable and thus some type of commutator device is necessary to carry the current to the lamp or in the alternative, flexible leads must be used which are subject to failure due to the repeated flexing thereof.

The present invention provides a structure wherein no flexible leads are required and wherein the neon lamp is readily mounted in the switch handle and current conducted to and from that lamp by means of a commutator device located on the axis of rotation of the handle and thus requiring a minimum of space while at the same time providing a reliably operating device.

It is an object of the invention to provide a two level switch having an indicator lamp mounted in the switch handle which lamp, in addition to indicating the location of the switch, serves to indicate the operative condition thereof.

It is another object of the invention to provide such a two level switch with an indicating lamp in which the current is conducted to the indicating lamp in such a manner as to assure that failure will not occur while at the same time providing a construction occupying a minimum of space and requiring no complex mechanical arrangement for switching the indicator lamp in accordance with the position of the switch handle.

Other objects and features of the invention will be apparent when the following description is considered in connection with the annexed drawings, in which,

FIGURE 1 is a top plan view of the two level switch and indicating light of my invention with the cover removed;

FIGURE 2 is a vertical cross-sectional view of the switch of FIGURE 1 taken on the plane of the line 2—2 of FIGURE 1. In this view, however, the cover is shown in place;

FIGURE 3 is a fragmentary transverse cross-sectional view taken along the plane of the line 3—3 of FIGURE 1;

FIGURE 4 is a transverse cross-sectional view taken on the plane of the line 4—4 of FIGURE 1; and

FIGURES 5 and 6 are circuit diagrams of alternative circuits, the diagram of FIGURE 5 showing the mode in which the circuit is arranged in the switch depicted in FIGURES 1 through 4.

Referring now to the drawings, the switch comprises the usual housing **10** having the base **11**, side walls **12** and **13** and end walls **14** and **15**. In the usual manner there is mounted on the housing **10** a cover **16** which, as will appear, has an opening therein through which the handle **17** extends, the handle being held in position by the cover which is in turn held in position by the mounting strap **18** which is secured to the housing by any suitable means such as rivets.

Extending upwardly from the base **11** adjacent each end wall is a boss **19**, these bosses supporting rubber bumpers **20** which act as end stops for the handle as it is oscillated from one position to another.

Mounted in slots **21** (FIG. 2) in the opposing faces of the bosses **19** is a U-shaped resilient member **22** having a depressed area therein as indicated at **23** which serves, as will appear, to hold the switch handle in its center position.

Formed in the inner surface of the side walls **12** and **13** and extending from the upper surface of the side walls toward the base **11** are notches **24** which serve as journals for the shaft portion **25** of the handle **17**. As is clearly indicated in FIGURES 1 and 3, the handle **17**, in addition to having the shaft portion **25**, is provided with the right angled extensions **26** which extensions cooperate with the bumpers **20** previously mentioned to cushion and limit the oscillation of the handle.

As will be seen especially in FIGURE 3 the shaft portion **25** is hollow as is the handle portion proper **17**, the lower end of the handle being provided with a cap **27** which fits into an opening provided in alignment with the portion **17**. Also, the shaft **25** is provided on its lower surface with camming members **28**, one of which is not utilized in the present example and the other of which cooperates with a contact member **30** and causes it to be moved into engagement with one or the other of a pair of contacts or to rest between those contacts. Mounted in the handle **17** is a neon lamp **31** the leads from which, designated **32** and **33**, pass through grooves **34** (FIG. 3) in the sides of the cap member **27** and extend thence outwardly along the bottom of the shaft **25** through holes **35** therein and are held in position by means of conductive pins **36** which are inserted in the central bores of the shaft portion **25** from the respective ends and serve to pinch the leads **32** and **33** between the inner surface of the bore and the inserted pin.

The side walls **12** and **13** are provided with apertures **37** adjacent the ends thereof, the apertures being enlarged toward the inner edge of the side walls to provide grooves **38** and **40** which grooves, together with the apertures, extend from the outer face of the side walls toward the base and terminate at a point spaced from the base, as clearly seen in FIGURE 4.

Mounted in the upper right hand ones of the slots **38** and **40**, as seen in FIGURE 1, is a terminal member **41** which comprises a portion **42** which is mounted in the slots and an additional portion **43** which extends at right angles thereto, the inner edge of the portion **43** resting on a shoulder portion of the corresponding boss **19**, this shoulder portion being designated **44**. Fixed to the inwardly extending portion **43** of the terminal **41** is a flexible contact member **45** which extends parallel to the side walls and lies between two contacts about to be described. A lead-in conductor **46** extends through an aperture in base **11** and the conductor is electrically connected to the terminal **41**.

Another terminal member **47** similar to the member **41** is mounted in the grooves **38** and **40** associated with the aperture **37** at the right hand bottom of the switch housing as seen in FIGURE 1. This terminal **47** carries on its lower face a contact **48** which mates with a similar contact **50** on the contact member **45**. A lead-in conductor **51** extends through an opening in the base and through an opening in the inwardly extending right angles portion of terminal **47** and is soldered as indicated at **52** to that portion of terminal **47**.

A third terminal **53** is mounted in a similar manner at the lower left hand of the switch as seen in FIGURE 1. This terminal member carries an arm **54** which extends

toward the right and downwardly as seen particularly in FIGURE 4 and carries on a portion 55, parallel to the base 11, a contact 56 which cooperates with a contact 57 mounted on contact member 45. Additionally, there is mounted on the terminal 53 a diode 58, the center electrode of which is connected by means of the conductor 60 to the terminal 47, and the outer terminal of which is connected directly to terminal 53 and thus to the contact 55.

In order to supply current to the indicator lamp 31 the pins 36 engage conductive strips 61 which are placed in the journal notches 24. These conductive strips rest upon the bottom wall of the notch 24 and extend upwardly along the side walls. The two strips are identical but they are inserted facing in opposite directions and each is provided with an offset portion 62 which fits about a portion of the side wall 12 or 13 as the case may be, these portions being designated 63, see FIGURE 1. Additionally, each strip is provided with a bent-over end 64. The bent-over end 64 of the right hand conductive strip 61 lies between the upstanding portion of terminal 47 and the corresponding groove in the side wall 13. In a similar manner the bent-over end of the left hand conductive strip 61 lies behind an insulating member 65 which is positioned in grooves in the side wall 12.

The left-hand conductive strip 61 is electrically connected by means of a conductor 66 to one terminal of a resistor 67 which resistor is mounted in a cavity in the upper boss 19, the opposite terminal of the resistor being connected by means of the conductor 68 to the terminal 41. This connection is made by placing a bared end of the conductor 68 on the ledge 44 on which the inner end of terminal 41 rests so that contact is made by pinching the bared conductor between the ledge and the horizontal portion of terminal 41.

As shown in FIGURES 5 and 6 there are two modes of connecting the lamp 31 and resistor 67 in series therewith into the circuit. The preferred mode is shown in the drawings, FIGURES 1 through 4, and a schematic diagram thereof constitutes FIGURE 5. When the switch handle 17 is in its central position as shown in the drawings, there is no connection to the external load 70, but the lamp 31 is energized due to the fact it is connected across the line from terminal 41 to terminal 47 specifically the circuit leads from the terminal 41 through conductor 68, resistor 67, conductor 66, conductive strips 61 through left hand pin 36, conductor 33 through the lamp 31, conductor 32, right hand pin 36 and right hand conductive strip 61 to terminal 47.

When the switch handle is in its upper position, as seen in FIGURES 1 and 2, terminal 41 is connected directly by means of the contact member 45 and contacts 50 and 48 to the terminal 47, thus energizing the external load 70. The load 70 being directly across the power source will be fully energized. The lamp 31 will of course be short circuited and will therefore remain deenergized.

When the switch handle 17 is placed in its lower position the contact member will move so that contact 57 engages contact 56 and the circuit will then extend from terminal 41 through contact member 45, contacts 57 and 56, to terminal member 53, thence through diode 58 and conductor 60 to terminal, 47. This time, therefore, the diode will be connected in series with the load across the power line and the load will be energized only by half wave alternating current and will operate a lamp at a reduced brilliancy. At the same time a shunt will be formed across the indicator lamp 31 during those periods when the diode is conducting so that the lamp 31 will also be energized by a half wave alternating current and will operate with a reduced brilliancy thereby indicating that the load 70 is operating at less than full power.

Although the circuit arrangement above described is preferred it is obvious that the indicator lamp may be connected in circuit in other manners and FIGURE 6 illustrates one such manner. In this arrangement the diode and its series resistor, instead of being connected directly across the power line, are connected from terminal 41 to terminal 53. With this arrangement the diode operates when the switch is open only and when so operative is provided with half wave A.C. current. When the switch handle is in either its upper or lower position the lamp 31 is shorted out and therefore is, as stated, deenergized.

It will be seen from the foregoing that I have provided a very simple means for conducting current to an indicator lamp which is located in a switch handle without the necessity of utilizing flexible leads. It will be apparent also that my structure for accomplishing this purpose provides means for readily replacing the indicator lamp if this be necessary and also provides a structure which is readily assembled at low cost both for parts and for labor.

Although in the foregoing description the indicator lamp circuit arrangement has been described in connection with a two level switch, it will be understood that a substantially identical arrangement could be utilized in connection with the ordinary single-pole single-throw switch or with a single-pole double-throw switch. Thus I wish to be limited not by the foregoing description, but solely by the claims granted to me.

What is claimed is:

1. In an electrical switch of the type having a housing, a cover, terminals mounted in the housing for connecting the switch in one side of a line from an A.C. power source to a load, at least one movable and at least one fixed contact arranged to connect one of said terminals to another and a movable operating handle mounted in the housing to operate the movable contact; in combination, the operating handle comprising a hollow translucent manually operable member having hollow shaft portions extending perpendicular thereto, an indicator lamp having wire leads integral therewith mounted in said operating member to be visible from outside the switch housing, means mounting said hollow shaft portions in journals formed in the side walls in at least one of the cover and housing, each said lead from said indicator lamp extending into one of said hollow shaft portions adjacent the manually operable member, pins in said hollow shaft portions engaging said leads to hold said leads in position, heads on said pins, resilient means at each side of said housing connected to one of said terminals, said resilient means being urged into continuous contact with a corresponding pin head, said connection of said resilient means to said terminals causing said indicator lamp to be in series with the load and energized therethrough when the movable contact is out of contact with the fixed contact, said indicator lamp being shorted out and de-energized when the movable contact engages one of the fixed contacts, a cap at the inner end of said manually operable member, said cap having an outwardly extending pointed member, and a detent member mounted in the switch housing and cooperating with said pointed member to hold said handle in a central position.

2. In an electrical switch of the type having a housing, a cover, terminals mounted in the housing for connecting the switch in one side of a line from an A.C. power source to a load, at least one movable and at least one fixed contact arranged to connect one of said terminals to another and a movable operating handle mounted in the housing to operate the movable contact; in combination, the operating handle comprising a hollow translucent manually operable member having hollow shaft portions extending perpendicular thereto, an indicator lamp having wire leads integral therewith mounted in said operating member to be visible from outside the switch housing, means mounting said hollow shaft portions in journals formed in the side walls in at least one of the cover and housing, each said lead from said indicator lamp extending into one of said hollow shaft portions adjacent the manually operable member, pins in said hollow shaft portions engaging said leads to hold said

leads in position, heads on said pins, resilient means at each side of said housing connected to one of said terminals, said resilient means being urged into continuous contact with a corresponding pin head, said connection of said resilient means to said terminals causing said indicator lamp to be in series with the load and energized therethrough when the movable contact is out of contact with the fixed contact, said indicator lamp being shorted out and de-energized when the movable contact engages one of the fixed contacts, said switch including at least one fixed contact, at least one movable contact, and a diode connected between the switch terminals in one position of the movable contact, said operating handle having three positions in at least one of which the circuit to the external load is broken and said indicator is fully energized and in another of which said indicator lamp is shunted and completely de-energized.

3. A switch in accordance with claim 2 in which in the third position of said operating handle said lamp is shunted by said diode and is partially energized.

4. A switch in accordance with claim 2 wherein a resistor is connected in series with said indicator lamp.

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