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[54] **INTEGRATED ROCKER-SWITCH AND  
INDICATOR-LIGHT UNIT**  
**6 Claims, 7 Drawing Figs.**

[52]	U.S. Cl.	200/167 A, 200/168 C
[51]	Int. Cl.	H01h 9/18
[50]	Field of Search	200/167 A, 168 C, 16 R

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**ABSTRACT:** An integrated electrical rocker-switch and indicator-light unit including an actuator pivotally mounted in an insulating box, the actuator being hollow and being formed of translucent plastic material within which is disposed an indicator lamp in series with a resistor. The arrangement is such that when the actuator is manually shifted to the "on" state, the switch contacts associated therewith are closed and the lamp is illuminated, and when shifted to the "off" state, the switch contacts are opened and the lamp is deenergized.

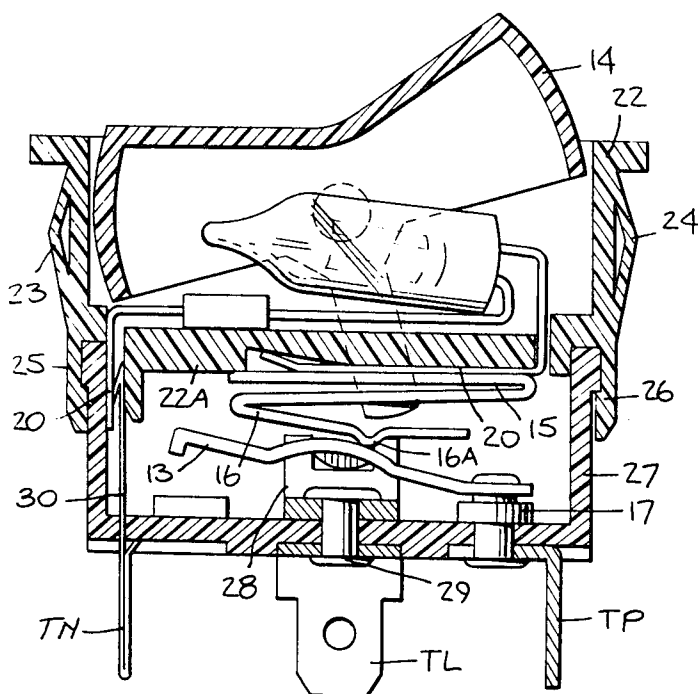


Fig. 1.

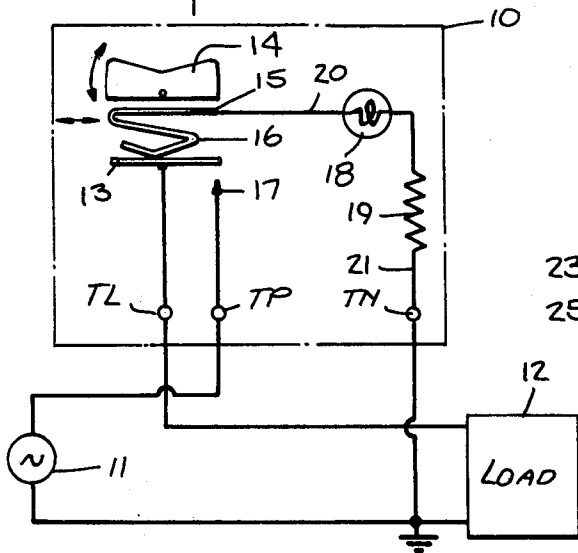


Fig. 2.

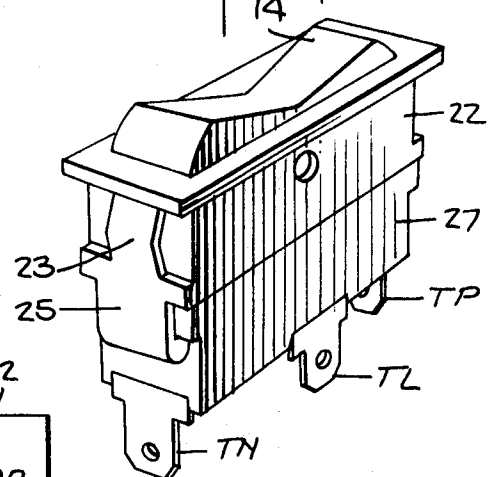
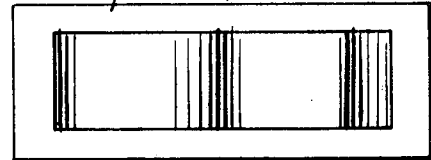
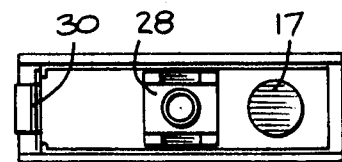
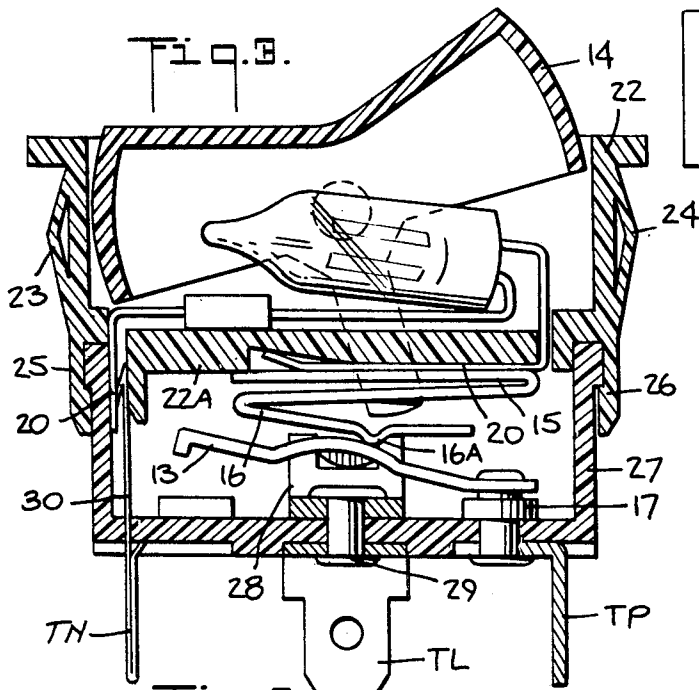


Fig 4.



T19.3.



T<sup>19.7</sup>.

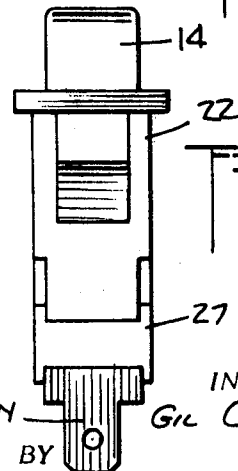
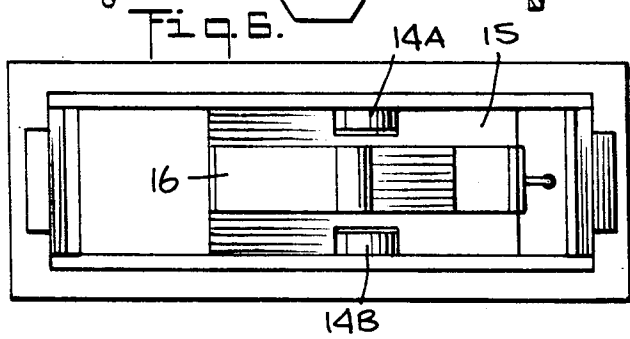



Fig. 6.



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## INTEGRATED ROCKER-SWITCH AND INDICATOR-LIGHT UNIT

### BACKGROUND OF THE INVENTION

This invention relates generally to electrical switching devices, and more particularly to an integrated rocker-switch and light-indicator unit.

In electrical systems, current is conventionally supplied to a load through a switch having an "on" and "off" position, the switch usually being located on a control panel. When the load is remote from the control panel, the operator is unable to tell whether the load is energized, even though the switch is in the "on" position. Hence, it is common practice to mount an indicator lamp on the panel, which lamp is shunted across the load and is illuminated when power is supplied thereto. Thus when the operator throws the switch to the "on" position, the indicator light assures him that the load is energized and that the circuit is operative.

In a complex panel arrangement involving a multitude of switches, the need for banks of light-indicators operating in conjunction with the switches complicates the panel display and in some instances leads to confusion, for it may be difficult for the operator to correlate the operative switches with the illuminated indicators. Moreover, where space is at a premium, the need for separate switches and indicator lights is a distinct drawback.

In my prior U.S. Pat. No. 3,317,696, there is disclosed an integrated switch and light-indicator assembly wherein the switch and its associated indicator occupy a common housing whereby the condition of the switch and the load controlled thereby are rendered immediately evident. In this assembly, the switch is of the slider type, the slider finger extending through an opening in a lens plate which covers the housing, behind which plate is located the light-indicator bulb.

While an arrangement of the type disclosed in my prior patent integrates the light-indicator and the electrical switch in a common assembly and thereby represents a significant advance over earlier arrangements in which these elements are distinct from each other, this assembly is relatively difficult and expensive to make. Because the lamp and its current-limiting resistor must be connected between a neutral terminal and one of the switch contacts, it is necessary in my prior arrangement to weld or solder these connections within the assembly. This operation, which can only be carried out by hand, adds materially to the cost of production.

Moreover, since the slider switch finger projects through a window in the lens plate for the lamp, this reduces the effective area of illumination, so that a substantial area of the plate remains dark when the lamp is light. Also, since the lamp and its current-limiting resistor are separate from the switch within the housing, the common housing for these elements has to be relatively large, further adding to the cost of the assembly.

### SUMMARY OF THE INVENTION

In view of the foregoing, it is the primary object of this invention to provide an integrated rocker-switch and light-indicator unit which is efficient and reliable in operation and which may be constructed and sold at low cost.

More specifically, it is an object of the invention to provide a unit of the above type wherein the rocker actuator of the switch is hollow and formed of translucent material, the actuator serving to house the indicator lamp and its resistor, whereby when the rocker-switch is closed, the actuator is illuminated to indicate this condition.

Among the advantages of the present invention are the following:

1. The use of the rocker-type actuator rather than a sliding actuator makes it easier to turn the switch on and off.
2. The fact that the entire actuator is illuminated when the switch is "on" affords a more effective indication.
3. The incorporation of the light-indicator and its resistor within the hollow actuator effects an important economy in space requirements.

Also an object of the invention is to provide a unit of the above type wherein the indicator lamp and its resistor are connected to the switch without the need for soldering or similar means, thereby effecting a substantial saving in production costs.

Briefly stated, these objects are attained in an integrated unit including a hollow actuator pivotally mounted in an insulating box, the actuator being formed of a translucent plastic material within which is disposed the series combination of an indicator lamp and resistor provided with a lamp lead and a resistor lead, which leads pass through bores in the bottom of the box, the lamp lead being bent to lie along said bottom, the resistor lead extending downwardly therefrom.

The actuator is provided with legs which project through slots in the bottom of the box and operatively engage a conductive slide plate which overlies the bent lamp lead, whereby when the rocker is manipulated to shift from the "off" to the "on" state, the slider plate is translated from an "off" to an "on" position while maintaining electrical contact with the lamp lead.

The slider plate is provided with a spring extension which presses against a conductive rocker arm pivotally mounted in an insulating base attachable to the box. The base includes a neutral terminal connected to an upright blade which resiliently engages the resistor lead, a load terminal which is connected to the rocker arm, and a power terminal which is connected to a stationary contact.

The arrangement is such that when the slider plate slides in one direction to its "on" position, the rocker arm is caused to engage the stationary contact to close the switch circuit and energize the lamp, and when the slider plate slides in the reverse direction to its "off" position, the rocker arm is disengaged from the stationary contact to open the switch and turn off the lamp.

### OUTLINE OF THE DRAWING

For a better understanding of the invention, as well as other objects and further features thereof, reference is made to the following detailed description to be read in conjunction with the accompanying drawing, wherein:

FIG. 1 is a schematic circuit diagram of an integrated switch and indicator unit in accordance with the invention, the unit being shown as it is connected to supply current to a load;

FIG. 2 is a perspective view of the unit;

FIG. 3 is a longitudinal section taken through the unit;

FIG. 4 is a top plan view of the unit;

FIG. 5 is a side view of the unit;

FIG. 6 is a plan view of the underside of the box included in the unit; and

FIG. 7 is a plan view of the top of the base included in the unit.

### DESCRIPTION OF THE INVENTION

Referring first to FIG. 1, there is shown the circuit of an integrated unit in accordance with the invention, designated generally by numeral 10, the unit functioning to connect a power source 11 to a load 12 which may take any form, such as a motor or any electronic device. The unit is provided with three terminals, namely a power terminal TP which connects to the live side of the power source, a load terminal TL which connects to one side of load 12, and a neutral terminal TN which connects to the grounded side of the source.

The unit switch includes a conductive rocker arm 13 whose position is controlled by an actuator 14 through a conductive slider 15 having a spring extension 16 which presses against the arm and causes it to swing in one direction or the other, such that when the actuator is manipulated to the "on" state, arm 13 engages a stationary contact 17 to close the switch. But when the actuator is in the "off" state, the arm is lifted from the stationary contact to open the switch. Arm 13 is connected to terminal TL, and stationary contact to terminal TP, whereby when the switch is closed, power is supplied from source 11 to load 12.

The indicator for the unit is a lamp 18, which may be a high-brightness neon or miniature incandescent light, connected in series with a resistor 19 which serves to limit current flow therein. It will be appreciated that by operating the lamp well below its rated voltage, its life may be increased considerably. This is desirable, for, in the unit in accordance with the invention, the lamp cannot be replaced without dismantling the unit.

The series combination of lamp 18 and resistor 19 is provided with a lamp lead 20 going to the slider 15, and a resistor lead 21 going to terminal TN. Hence, when the switch is closed, power from supply 11 is fed to the lamp to energize same, thereby indicating that the switch is "on," but when the switch is open, the lamp is deenergized.

Referring now to FIGS. 2 to 7, the actual construction of the unit is illustrated in various views. Actuator 14 is pivotally mounted within a boxlike, open-top housing 22, made of insulating material having good structural strength and heat-resistant properties, such as high-impact nylon or polypropylene. Actuator 14 is of hollow construction and is formed of a suitable translucent plastic material of any desired color, such as red, amber or white, depending on the switch function. To facilitate panel mounting, the ends of box 22 are provided with resilient knuckles 23 and 24.

Resistor lead 21 passes through a bore in the bottom 22A of the box and extends downwardly therefrom adjacent one end thereof, whereas lamp lead 20 goes through another bore and is bent inwardly to lie along the box bottom. As best seen in FIG. 6, rocker actuator 14 is provided with a pair of legs 14A and 14B at either side thereof which extend through rectangular notches in conductive slider plate 15, preferably made of phosphor bronze, such that when actuator 14 is manipulated, plate 15 is translated along the bottom 22A of the box. Plate 15 slides over lamp lead 20 and is electrically in contact therewith at all positions, so that this connection is maintained without soldering.

Box 22 is provided at either end with flexible ears 25 and 26 which extend downwardly therefrom and are adapted to latch onto shoulders at the end of an insulating base 27 attachable to the bottom of the box. Pivotally mounted on a conductive pedestal 28 in the base is the conductive rocker arm 13, whereby arm 13 is free to seesaw on its pedestal. Pedestal 28 is attached by an eyelet 29 to load terminal TL, thereby effecting a connection between this terminal and the rocker arm.

Rocker arm 13 is curved to define a convex central portion 13A which is engaged by a crimp 16A in the spring extension 16 of the slider plate 15, which presses against the arm, such that when slider plate 15 moves toward the right as a result of the movement of actuator 14, the right end of arm 13 engages stationary contact 17 which is connected to power terminal TP, thereby closing the switch.

Neutral terminal TN on base 27 is connected to an upwardly extending flexible conductive blade 30 having an arrowhead which, when the base is coupled to box 22, engages resistor lead 21, thereby connecting this lead to terminal TN without soldering. The head of blade 30 presses lead 21 against the end of the base to ensure a good connection.

Thus to assemble the unit, one first installs the actuator and slide plate in the box after placing the lamp and resistor within

the actuator with the leads thereof going through the bores in the bottom of the box, and then one places the rocker arm in the base, after which the base is coupled to the box, in which action the resistor lead becomes connected to the neutral terminal by way of the blade.

The structure described above is a single-pole, single-throw switch. It will be obvious that by modifying the contact arrangement, one may use essentially the same arrangement for creating a single-pole, double-throw, or other types of switching actions.

While there has been shown and described a preferred embodiment of an integrated rocker-switch and indicator-light unit, it will be appreciated that many changes and modifications may be made therein without, however, departing from the essential spirit of the invention.

I claim:

1. An integrated electrical switch and light-indicator unit comprising:

A. an open-top insulating box,

B. a hollow actuator pivotally mounted in said box and formed of translucent material, said actuator having at least one leg extending through a slot in the bottom of the box,

C. an indicator lamp in series with a current-limiting resistor and provided with first and second connecting leads, one of which projects downwardly through a bore in said bottom adjacent one end thereof, the other of which passes through a bore in said bottom adjacent the other end thereof and is bent to lie along said bottom,

D. an insulating base attached to said box,

E. a conductive slider plate overlying said bent lead and operatively engaged by said leg, whereby when said actuator is rocked from an "on" state to an "off" state, said slide is translated from an "on" position to an "off" position, said slider plate having a spring extension, and

F. a conductive rocker arm pivotally mounted in said base and subjected to pressure by said spring extension, said rocker arm being caused by said spring extension to swing into engagement with a stationary contact to close the switch when said slider plate is shifted to its "on" position and to swing out of engagement with said contact when said slider plate is shifted to its "off" position.

2. A unit as set forth in claim 1, wherein said base includes a load terminal connected to said rocker arm, a power terminal connected to said contact, and a neutral terminal connected to said one lead.

3. A unit as set forth in claim 2, wherein said neutral terminal is connected to said one lead through a resilient blade which engages said one lead and presses it against one end of said base.

4. A unit as set forth in claim 1, wherein said box is provided at its opposing ends with ears which engage end shoulders on said base to hold the base thereto.

5. A unit as set forth in claim 1, wherein said box is provided at its ends with resilient knuckles to facilitate panel mounting of the unit.

6. A unit as set forth in claim 1, wherein said lamp is a neon lamp.