INTEGRATED ELECTRICAL SWITCH AND LIGHT INDICATOR ASSEMBLY
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This invention relates generally to electrical switching devices, and more particularly to an integrated switch and light indicator assembly.

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 on the panel an indicator light which is shunted across the load and is actuated 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.

Accordingly, it is the main object of the invention to provide an integrated electrical switch and light indicator assembly wherein the switch and its associated indicator occupy a common housing, and in which the condition of the switch and the load controlled thereby are rendered immediately evident.

More specifically, it is an object of the invention to provide an integrated assembly of the above type, wherein a lamp, a current-limiting resistor therefor, and a pair of fixed switch contacts are contained within an open-top rectangular housing which is covered by a lens plate having an opening through which extends the actuating finger of a movable contact slider, the slider being received within the housing and being shiftable from a position bridging the switch contacts to a position engageing only one contact.

Also an object of the invention is to provide an assembly of the above type which is of simple, efficient and highly compact design, and which may be mass produced at low cost.

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 drawings, wherein:

FIG. 1 is a plan view of an integrated switch and light indicator assembly in accordance with the invention;
FIG. 2 is a longitudinal section taken in the vertical plane indicated by line 2—2 in FIG. 1;
FIG. 3 is a longitudinal section taken in the horizontal plane indicated by line 3—3 in FIG. 2;
FIG. 4 is a transverse section taken in the plane indicated by line 4—4 in FIG. 2;
FIG. 5 is a transverse section taken in the plane indicated by line 5—5 in FIG. 2;
FIG. 6 is a perspective view of the assembly;
FIG. 7 is a perspective view showing the electrical contacts of the assembly; and
FIG. 8 is a schematic diagram of the assembly in an operating circuit.

Referring now to the drawings, the integrated assembly is contained in a box-like, open-top housing 10, made of insulating material having good structural and heat-resistant properties, such as high-impact nylon. Disposed within the housing adjacent one end thereof is a lamp 11 and a resistor 12 connected in series therewith. The lamp may be a high-brightness neon or miniature incandescent unit, the resistor serving to limit current flow therein. It will be appreciated that when the lamps are operated below their rated voltage, their life may be increased considerably.

Positioned against the side wall 13 of housing 10 at the center thereof is a first fixed contact 14 having a foot portion 14a held by a rivet 15 to the base 16 of the housing. A terminal lug 17 is attached to rivet 15 on the exterior of the housing. Also mounted against side wall 13 adjacent the other end of the housing is a second fixed contact 18, whose foot portion is secured by rivet 19 to base 16, an exterior terminal lug 20 being attached thereto.

Disposed within the housing and slideable therewith respect to fixed contacts 14 and 18 is a slider element, generally designated by numeral 21, fabricated of insulating material which may be the same as that forming the housing. Slider 21 is of molded construction and is constituted by a shoe portion 22 which rides along base 16 of the housing and a shank portion 23 having a rectangular flange 24 which rides along the upper rim of the housing, above which flange is an actuating finger portion 25 which may be manipulated by the switch operator.

Covering the housing 10 is a rectangular lens plate 26, having a small window 27 therein, through which window slider finger 25 projects, the longitudinal dimension of the window limiting the movement of the slider. Lens plate 26 is formed of a suitable translucent plastic material and may be in any desired color, such as red, amber, clear, or white. The underside of the lens plate is preferably optically graded to provide for uniform light diffusion. Lens plate 26 is secured to the housing by means of a metallic bezel 28, having spring fingers 29 and 30 at the ends thereof to facilitate panel-mounting of the assembly.

Secured to the shank 23 of the slider 21 is a wiper contact 31, this contact as well as fixed contacts 14 and 18 being preferably made of Phosphor Bronze or other highly conductive and resilient metal suitable for contacts. As best seen in FIG. 7, fixed contacts 14 and 18 are each formed with a vertical ridge 14b and 18b, respectively. The ridges act as detents, the spacing therebetween corresponding to the length of the generally rectangular wiper contact 31. Hence when wiper contact 31 lies between the two fixed contacts to bridge same and thereby close the switch, the wiper contact is held between ridges 14b and 18b to maintain a positive connection.

Wiper contact 31 is formed with a central groove 31a whose dimensions complement those of the ridges on the fixed contacts. Hence when the slider is shifted to the off position, the wiper contact rests over the fixed contact 18, with ridge 18b being received in groove 31a to maintain the off position.

A lead 32 is connected to lug 20 and hence to fixed contact 18; a lead 33 is connected to lug 17 and hence to fixed contact 14, whereas a lead 34 is connected to the terminal of lamp 11, the other terminal thereof being connected through resistor 12 to lug 17 and hence to fixed contact 14.

The equivalent electrical circuit is shown in FIG. 8. By connecting leads 32 and 33 in series with a power supply 35 and a load 36 which may take any form such as a motor or an electronic device, the load will be energized when the switch is closed. Lead 34 is connected to
the other end of the load, hence when the switch is closed, lamp 11 will light. Thus only three leads are necessary in the integrated assembly, as against four when the lamp and switch are separate units.

It is also possible to make the switch and lamp assembly into a message light by hot-stamping a legend into the plastic lens. It will be appreciated that while a single assembly has been shown, a unitary bank of such assemblies may be formed by the use of a multicellular housing, each cell containing a switch and indicator lamp combination.

While there has been shown and described a preferred embodiment of integrated electrical switch and light indicator assembly in accordance with the invention, it will be appreciated that many changes and modifications may be made therein without, however, departing from the essential spirit of the invention as defined in the annexed claims.

1. An integrated electrical switch and light indicator assembly comprising:
   (a) an open-top housing,
   (b) a lamp disposed adjacent one end of said housing,
   (c) first and second resilient fixed contacts mounted at spaced positions adjacent one side of said housing,
   (d) a slider having a wiper contact therein shiftable within said housing from a first position bridging said fixed contacts to a second position engaging but one of said contacts, said slider having a finger projecting above said housing,
   (e) a lens plate covering said housing and having a window therein through which said finger extends, said window having a longitudinal dimension limiting the movement of said slider to said first and second positions, and

2. An assembly, as set forth in claim 1, further including a current-limiting resistor in said housing in series with said lamp.

3. An assembly, as set forth in claim 1, wherein said fixed contacts have central ridges therein, the spacing between said ridges being equal to the length of said wiper contact, whereby said wiper contact is maintained in the bridged position.

4. An assembly, as set forth in claim 1, wherein said lens is formed by a translucent plastic plate which is held by a bezel to said housing.

5. An assembly, as set forth in claim 1, wherein said lamp is a high-intensity neon lamp.

6. An assembly, as set forth in claim 1, wherein said lamp is a miniature incandescent lamp.

7. An assembly, as set forth in claim 1, wherein said housing and said slider are fabricated of nylon.

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