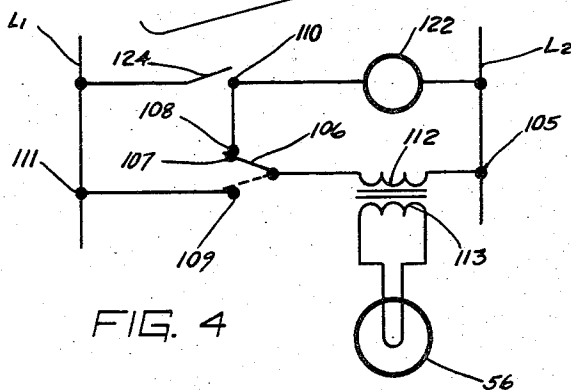
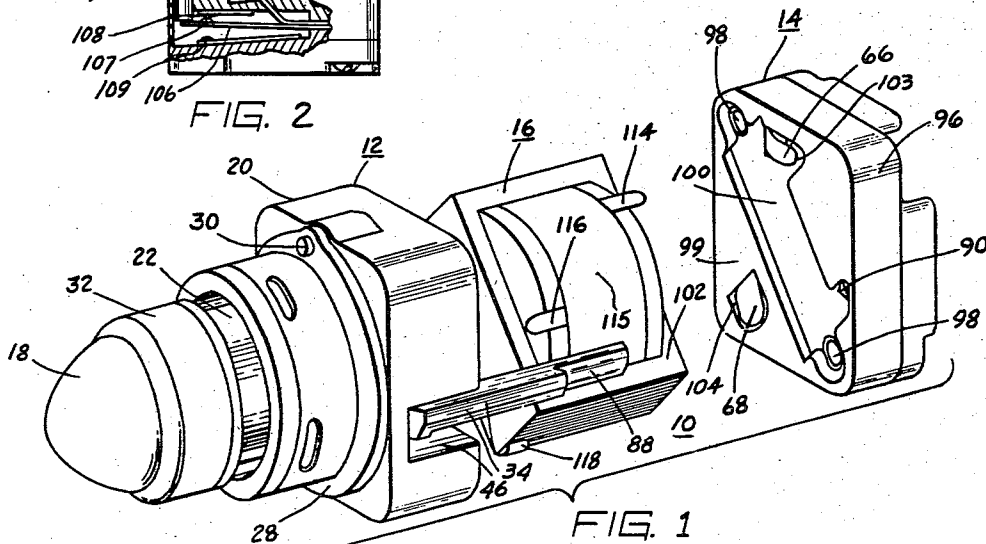
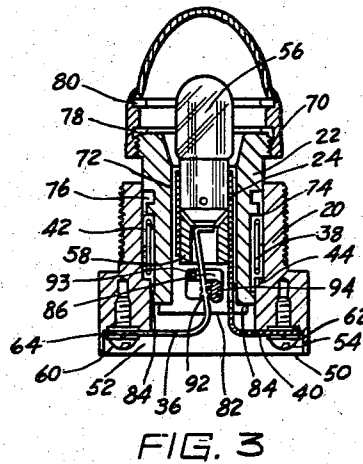
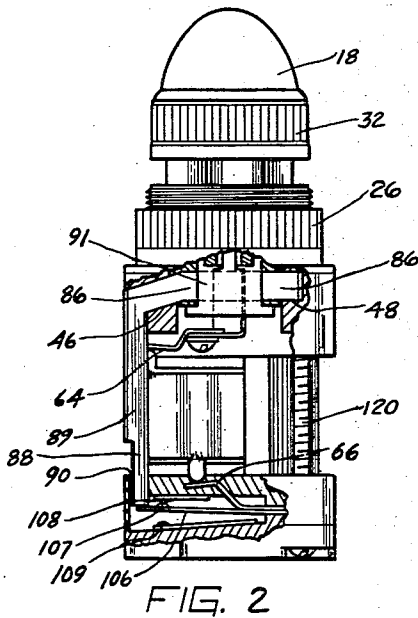


May 21, 1963

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INDICATING LIGHT ASSEMBLY

Filed Dec. 16, 1957

3,090,892



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INDICATING LIGHT ASSEMBLY

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Filed Dec. 16, 1957, Ser. No. 702,940
11 Claims. (Cl. 315-129)

This invention relates to electrical devices and more particularly, to a novel pilot light assembly which includes an arrangement for testing the operability of the assembly.

When pilot lights are used to monitor electrical circuits, conventionally they are mounted on switch panels and the like remote from the devices to be monitored. Further, the indicating lamps are generally connected in the electrical circuits to be energized during normal operation of the monitored device. When this arrangement is employed, either one of two failures will cause the lamp to become extinguished. The first of these failures is the interruption of load current to the device to be monitored. This is the normal operation or function of the indicating lamp. However, the indicating lamp may also become extinguished if the filament of the bulb is burned out.

The device according to the present invention includes an arrangement for testing to determine if the bulb filament is burned out and includes a novel arrangement for mounting and utilizing the transformer which normally energizes the bulb for supplying current for testing the bulb.

It is an object therefore of the present invention to provide a pilot or indicating lamp assembly with a lens cap and to arrange the mounting for the cap so a slight depression of the cap will cause a switch at the base of the assembly to be actuated and connect a transformer for energizing the lamp to a test circuit.

It is a further object of the present invention to arrange the components of the indicating lamp assembly so a transformer for energizing the lamp is positioned between a base for the lamp socket and a switch for controlling the energization of the lamp.

In carrying out the above object it is another object to provide solderless electrical connections between the transformer terminals and the terminals on the switch and lamp base.

Another object of the present invention is to provide the switch of the assembly with a movable contact and to actuate the switch contact with an actuator which maintains a support for the lens cap of the device in position in the insulating base for the indicating lamp.

A still further object of the present invention is to position the transformer for the indicating lamp in recesses in the lamp base and the switch for controlling the current flow through the transformer and to provide tabs on the coil windings of the transformer which will impinge on resilient tabs on the lamp base and switch to provide an electrical circuit between the transformer and lamp base and switch.

A further object of the present invention is to provide a lamp base structure which has a bore extending therethrough and to position a lamp socket on one end of the bore with a mounting that extends from the other end of the bore and to hold a sleeve which is slideable between the socket and walls of the bore by a switch actuator which is held in position relative to the sleeve by one of the terminals of the socket.

Further objects and features of the invention will be readily apparent to those skilled in the art from the specification and appended drawing illustrating certain preferred embodiments in which:

FIG. 1 in perspective shows the lamp base, the trans-

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former and the switch prior to assembly to form the indicating device according to the present invention.

FIG. 2 is a view partly in section showing the assembly of the parts of the indicating device according to the present invention.

FIG. 3 is a sectional view of the lamp base as used in the indicating device in FIGS. 1 and 2.

FIG. 4 is a diagrammatic view showing the indicating device according to the present invention in an electric circuit.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1, which illustrates a preferred embodiment, a selectively operable indicating device or pilot lamp assembly 10 which has its various parts including; a lamp base 12, a switch 14 and a transformer 16 arranged so the switch 14 may be actuated by moving an illuminating lens 18 of the base 12 toward the switch 14.

The lamp base 12, most clearly shown in FIG. 3, includes a molded insulating housing 20, a sleeve 22, which is movable in the housing, a lamp socket 24, a ring nut 26, see FIG. 2, which is threaded on an external portion of the housing to compress a sealing gasket 28, see FIG. 1, which is seated on a flange of the housing 20 against the material which surrounds the opening in the panel whereon the device 10 is to be mounted. The lamp base also includes a dowel or pin 30 which may be received in a small opening in the panel to index the device 10 against rotation in the panel, a bezel 32 which threadedly engages the sleeve 22 to hold the lens 18 in position on the sleeve, a switch actuator 34 and terminal 36, which will be hereinafter described, a spring 38 and a mounting 40 for the socket 24.

The housing 20, which is preferably formed of a suitable molded insulating material, has a bore 42 extending therethrough which is restricted as shown to provide a shoulder 44. The housing 20 is also provided with notches 46 and 48. The notch 46 extends from the bore 42 to the exterior of the housing while the notch 48, which is on the opposite side of the bore 42 from notch 46, extends only a portion of the distance to the exterior of the housing 20.

The bottom surface 50 of the housing 20 has a recess 52 which is generally sized and shaped to position the transformer 16 therein. Secured in the recess 52 by means of a screw 54 is the mounting 40 for the lamp socket 24. The socket 24 is preferably arranged to receive a bayonet type bulb 56 and is positioned by mounting 40 to be co-axially located at one end of bore 42. The socket 24 also includes an insulating sleeve 58 which prevents engagement between the end of terminal 36, which engages the central terminal of bulb 56 as shown, with the walls of the socket 24. The terminal 36 is secured in the recess 52 by screw 60. The screws 54 and 60 which secure the mounting 40 and terminal 36 respectively also are used to secure spring tabs 62 and 64 respectively. The tabs 62 and 64 are arranged to extend above the bottom of the recess 52, as shown in FIG. 2, and are similar to spring tabs 66 and 68 on switch 14. The purpose of these tabs will become hereinafter apparent.

The sleeve 22 which is most clearly shown in FIG. 3 has its outer end threaded at 70 to threadedly receive the bezel 32. The interior bore 72 is substantially smooth and of a diameter greater than the external diameter of the socket 24. The exterior of the sleeve has a shoulder 74 to provide a seat for one end of the spring 38 which has its other end resting on shoulders 44 when the sleeve 22 is positioned within the housing 20. If desired, an annular sealing ring may be positioned in the annular

groove 76 to prevent passage of oil and outer fluids between the sleeve 22 and bore 42 from the front surface of the device to the interior thereof. In this connection seals 78 and 80 are provided to prevent fluids from entering the chamber for bulb 56.

The bottom end 82 of sleeve 22 is provided with notches 84 to provide clearance for the terminal 36 and mounting 40 when the sleeve 22 is moved to its furthest bottom position. In this connection, if desired, the bore 72 may also be provided with a notch, not shown, to assure proper clearance with the mounting means 40 during movement of the sleeve 22 in bore 42.

Diametrically extending in the walls of the sleeve 22 are openings 86 which are alignable with notches 46 and 48. The purpose of openings 46 and 48 will become hereinafter apparent.

The switch actuator 34 is generally L-shaped. One arm 89 of the L-shaped actuator is reduced as at 88 so as to permit the passage of the end 88 through the opening 90 in the switch 14. The other arm 91 of the L-shaped actuator 34 is sized to be received in notches 46 and 48 and to pass through openings 86. The openings 86 are preferably twice the thickness of the material which forms the arm 91 which has an opening 92 therein to permit the terminal 36 to extend therethrough when the lamp base 12 is assembled. Upwardly extending along the edge of the top surface of arm 91 is a boss 93 which has a lateral dimension substantially equal to the outer diameter of the portion of the sleeve 22 wherein openings 86 are disposed and has a vertical dimension when added to the thickness of arm 91, substantially equal to the vertical dimension of openings 86. Projecting downwardly along the other edge of arm 91 is a second boss 94 which has a lateral dimension substantially equal to the internal bore 72 and a vertical dimension sized to permit the arm 91 to be inserted into opening 86 when the arm is slightly rotated a slight angle relative to the longitudinal axis of the sleeve.

When the lamp base 12 is assembled, the socket 24 and tab 62 are first secured in position by means of screw 54. The sleeve 22 and spring 38 are then inserted into bore 42 from the threaded portion 74 end of the housing. When the above parts are in position the sleeve 22 will be axially movable against the force of spring 38 in the bore and will be disposed between the socket 24 and the walls of bore 42. Further when the sleeve is bottomed in the housing 20, that is, when the threaded portion 70 is in engagement with the top surface of the housing which surrounds bore 42, the openings 86 will be aligned with notches 46 and 48 so the arm 91 may be inserted through notch 46 and openings 86 and enter notch 48. When the parts are thus positioned, the sleeve 22 will be held in the bore 42 against the force of spring 38 by the switch actuator.

After the sleeve 22 and actuator 34 are in position, the terminal 36 is inserted through opening 92 and sleeve 58 with the bent end thereof in position to contact the central terminal of the bulb 56. The spring tab 64 and terminal 36 are then secured to the housing 20 by screw 60. When the parts are thus assembled, the actuator will be maintained in position in the housing 20 by the terminal member 36.

The assembly of the lamp base is completed when the bulb is inserted in socket 24 and the bezel 32 is threaded on portion 70 to secure the lens 18 in position.

The switch 14 preferably has an insulated housing 96 which is divided into two parts to facilitate the assembly of the switch contacts and terminals therein. The parts of the housing 96 are held assembled by tubular rivets 98. The top surface 99 of the housing has a recess 100 therein, which recess 100 is shaped to receive the extending laminated iron portion of the transformer core 102. The top surface 99 also has recesses 103 and 104 wherein the spring tabs 66 and 68 are disposed and arranged to have

a portion thereof extend above the bottom recesses. One of the tabs 68 is directly connected to a terminal, not shown, on the bottom surface of the switch which corresponds to junction 105 in FIG. 4. The other tab 66 is electrically connected to the leaf spring 106, in FIG. 2, which carries the movable contact 107 on its free end. The leaf spring 106 and contact 107 are diagrammatically shown in FIG. 4. The switch is also provided with the spaced stationary contacts 108 and 109 in FIG. 2 which are also diagrammatically shown in FIG. 4. The contacts 108 and 109 are both connected through suitably located terminals on the bottom of the switch 14 to junctions 110 and 111 respectively as shown in FIG. 4. The leaf spring 106 has its free end arranged to be in alignment with opening 90 in the switch housing 96 and is biased so the movable contact is normally in engagement with contact 108.

The transformer 16 is of the conventional type having a laminated core 102 with a coil winding 115 comprising a primary and a secondary winding on a central leg of the core 102. The windings are shown in FIG. 4 wherein numeral 112 designates the primary coil winding and 113 designates the secondary winding. The respective ends of the primary winding 112 of the transformer 16 are connected to a pair of relatively stiff tabs 114 extending from the bottom surface of the coil winding 115. Only one of the tabs 114 is shown in FIG. 1 which are arranged to engage the resilient tabs 66 and 68 in the switch. Similarly, the secondary winding 113 has its respective ends connected to a pair of relatively stiff tabs 116 extending from the top surface of coil winding 115 as in FIG. 1 wherein only one of the pair of tabs 116 is shown. The tabs 116 are disposed to engage spring tabs 62 and 64 located on the lamp base 12.

The transformer as used in the above device will permit the use of lower voltage bulbs in the lamp base 12. Therefore during assembly of the device 10 it is important that the primary windings receive energization from the terminals on the switch 14 and the secondary supply current to the lamp base 12. To accomplish the indexing of the transformer, the core is supplied with a projection 118 which is received in a suitably located enlargement in the bottom recess 52 to prevent reversal of the transformer in the combination.

The lamp base assembly 12, transformer 16 and switch are maintained assembled by a pair of screws 120 which extend through the tubular rivets 98 into threaded openings in the lamp base. The screws when tightened will cause the tabs 114 and 116 to be tightly pressed or bear against the proper resilient tabs 62, 64, 66 and 68 to assure a proper electrical connection while the transformer is held against movement by the recess 52 and 100 in the lamp base 12 and switch 14 respectively. When the parts are thus assembled the actuator 34 will have its arm 89 extending parallel and adjacent to the core 102 and entering through opening 90 into engagement with leaf spring 107. Thus whenever the lens 18 of the device 10 is pressed against the force of spring 38, the actuator 34 will cause the contact 107 to move from its engagement with contact 108 into engagement with contact 109.

When the device is used as shown in the circuit in FIG. 4 wherein numeral 122 designates an electric load such as a motor, the operation of which is to be monitored, which is connected through a control switch 124 to lines L₁ and L₂, the bulb 56 will be energized whenever switch 124 is closed as the transformer primary 112 will be energized by the voltage across load 122. In the event of an electrical failure in the circuit including load 122 the voltage across the primary 112 will be insufficient to cause the bulb to burn. This is the normal operation of the indicating lamp 56. However bulb failure will also cause the indicating bulb light to become extinguished. Therefore with the device according to the

present invention, whenever the bulb is extinguished, all that is required is to depress the lens cap 18 to cause the switch contacts 107 and 109 to close and thereby establish a separate energizing test circuit through junction 111 for the transformer winding. If the bulb burns when the test circuit is established, then the operator is instantly advised that the failure is in the load circuit and not in the indicating circuit.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

I claim:

1. In an indicating light assembly, the combination comprising; a switch having a pair of spaced stationary contacts and a movable arm having a movable contact thereon arranged to selectively engage both contacts and normally in engagement with one of the stationary contacts, an insulating base spaced from the switch, a sleeve axially movable in a bore in the base, a lens carried by the sleeve providing a concealment for a bulb carried by the base, and means comprising an L-shaped member for preventing removal of the sleeve from the bore and transmitting movement of the sleeve to the arm carrying the movable contact when the sleeve is moved in the bore.

2. In an indicating light assembly, the combination comprising; a switch, a bulb support axially spaced from the switch, a sleeve axially movable in the support, a lens carried by the sleeve providing a concealment for a bulb carried by the support, a transformer positioned axially between the support and switch, means axially extending between the switch and support for maintaining the switch, transformer and support assembled and means having a transversely extending portion for preventing removal of the sleeve from the support and an axially extending portion arranged for actuating the switch in response to axial movement of the sleeve in the support.

3. In an indicating light assembly, the combination comprising; a switch having spaced electrical tabs extending from one surface, a bulb retaining means having a bulb extending from a top surface and spaced electrical tabs extending from a bottom surface of the bulb retaining means, a transformer having a magnetic core receivable in a recess in the one surface of the switch and the bottom surface of the bulb retaining means, said transformer having core windings with electrical tabs extending therefrom arranged to engage the electrical tabs on the switch and bulb retaining means and means extending between the switch and bulb retaining means for maintaining the core of the transformer in the recesses and the tabs of the coil winding in electrical contact with the tabs on the switch and bulb retaining means.

4. The combination as set forth in claim 3 wherein the bulb retainer has a sleeve axially movable therein and a means extending through an opening in the switch maintains the sleeve in the bulb retaining means.

5. In an indicating light assembly, the combination comprising; a switch having a pair of spaced stationary contacts and a movable contact normally in engagement with one of the stationary contacts and movable into engagement with the other stationary contact, a pair of resilient tabs extending from one surface of the switch, one of said tabs being electrically connected to the mov-

able contact and the other tab being electrically connected to a line terminal for the switch, an insulated lamp base having a pair of spaced resilient tabs extending from one surface and a lamp socket extending from the other surface with electrical connections between the socket and tabs, a transformer positioned between the lamp base and switch and having; a magnetic core, a coil winding on the core, and tabs extending from opposite ends of the coil winding arranged to engage the tabs on the switch and base, means for holding the base, transformer and switch assembled, and means carried by the base and engaging the movable contact for actuating the switch.

6. In an indicating light assembly, the combination comprising; a switch having a pair of spaced stationary contacts and a movable contact normally in engagement with one of the stationary contacts and movable when actuated to engage the other stationary contact, a lamp base connected to the switch and having a central bore therein, a lamp socket mounted in the bore, a sleeve slideable in the bore between the socket and the walls of the bore, a pair of slots in the sleeve, a unitary member having a portion extending through the slots for maintaining the sleeve against removal from the bore and having a portion for actuating the movable contact of the switch whenever the sleeve is moved in the bore, and electrical connections between the socket and switch for energizing a lamp bulb in the socket whenever the switch is actuated.

7. In an indicating light assembly, the combination comprising; a switch having a movable contact arranged to engage a stationary contact, a lamp base connected with said switch having a central bore extending there-through, a lamp socket concentrically arranged in one end of the bore and having a mounting external to the other end of the bore, a sleeve movable in the bore between the socket and walls of the bore, abutments on the other end of the bore, spring means between the abutments and sleeve for constantly urging the sleeve toward the said one end of the bore, and means carried by the sleeve and in engagement with the movable contact of the switch for actuating the switch and maintaining the sleeve against the force of the spring in said bore.

8. The combination as set forth in claim 7 wherein a transformer is positioned between the switch and lamp base.

9. The combination as set forth in claim 7 wherein the means carried by the sleeve comprises an L-shaped member which is received in slots in the sleeve.

10. The combination as set forth in claim 9 wherein one of the terminals for the lamp socket extends through an opening in the L-shaped member.

11. The combination as set forth in claim 8 wherein the transformer has a coil winding with tabs extending therefrom which extend to engage resilient tabs extending from the switch and lamp base to provide a solderless electrical connection between the switch, transformer and lamp base when the device is assembled.

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