

June 29, 1965

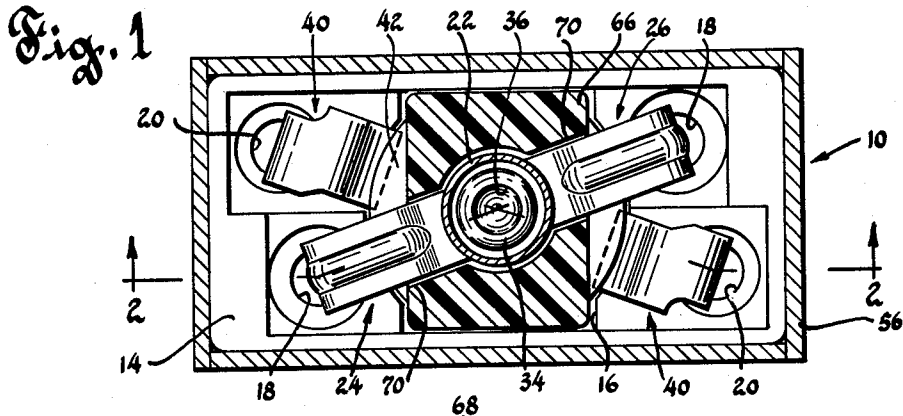
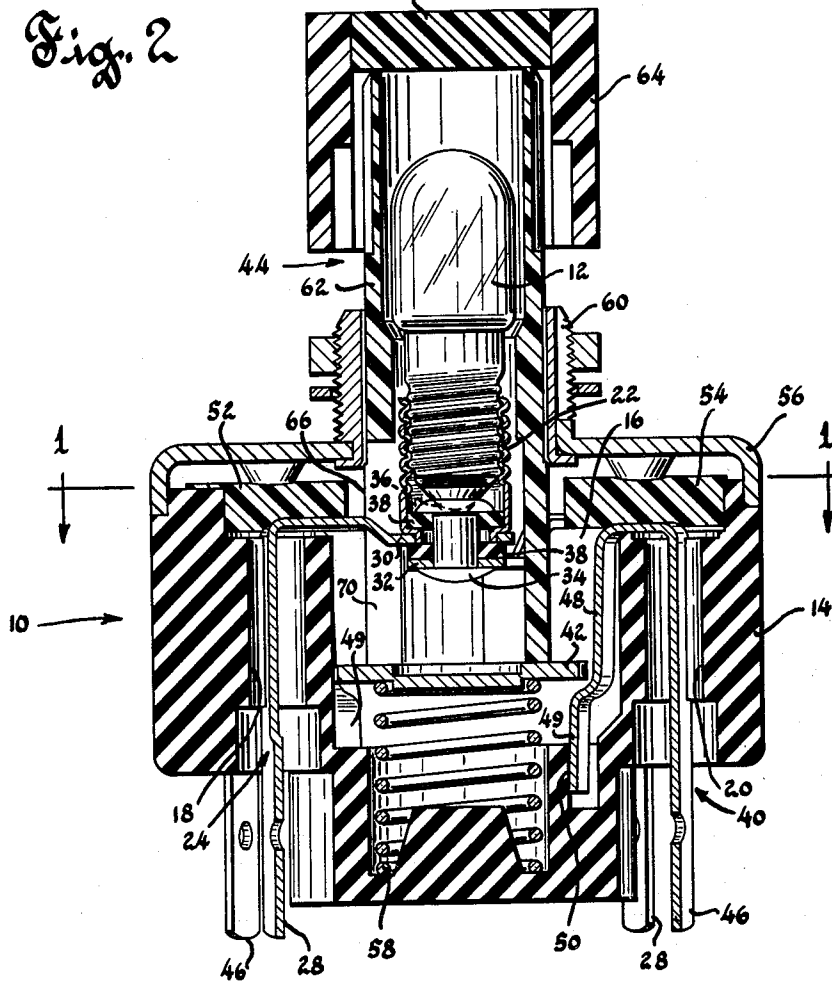
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3,192,352

ILLUMINATED PUSHBUTTON SWITCH

Filed Dec. 2, 1960

3 Sheets-Sheet 1



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ILLUMINATED PUSHBUTTON SWITCH

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Fig. 3

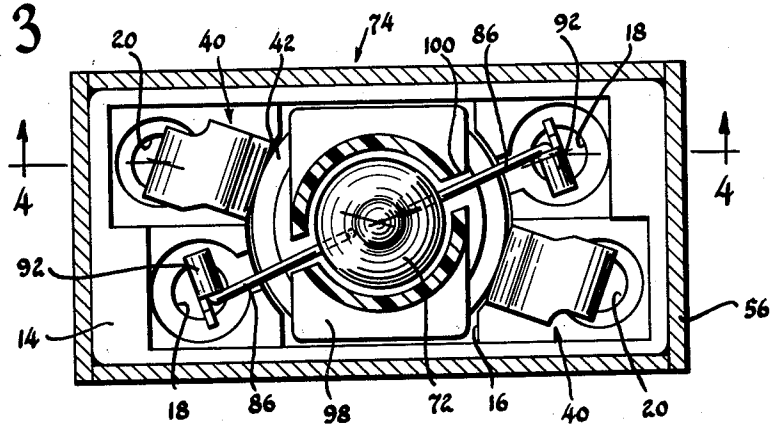
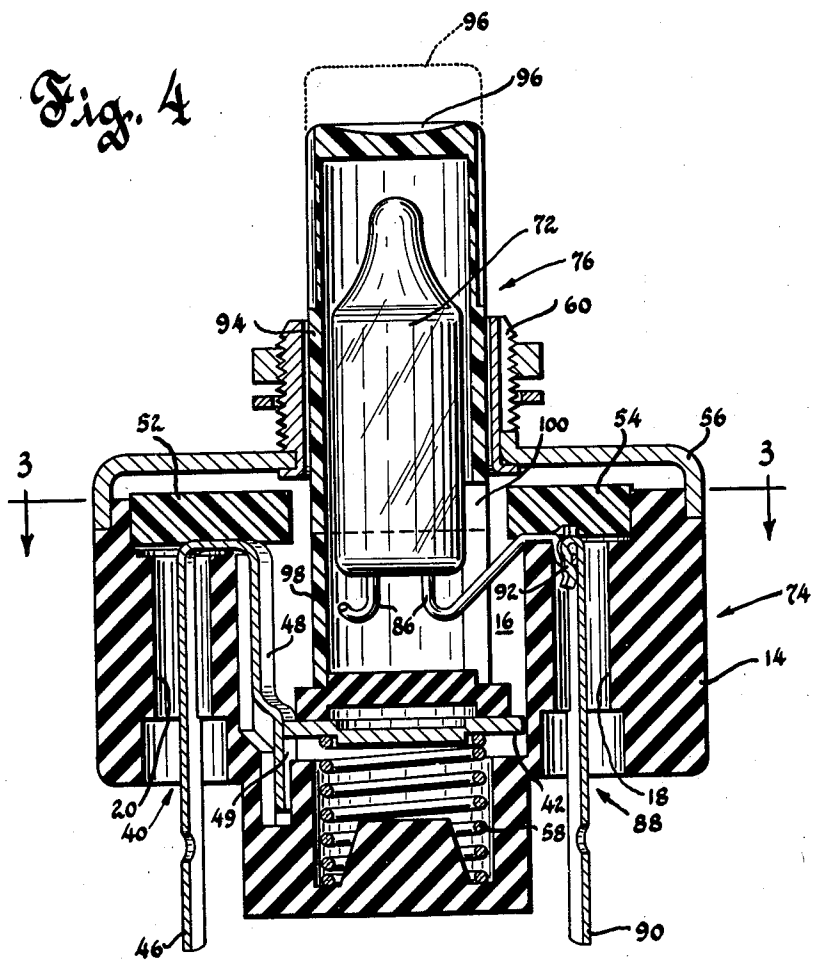


Fig. 4



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ILLUMINATED PUSHBUTTON SWITCH

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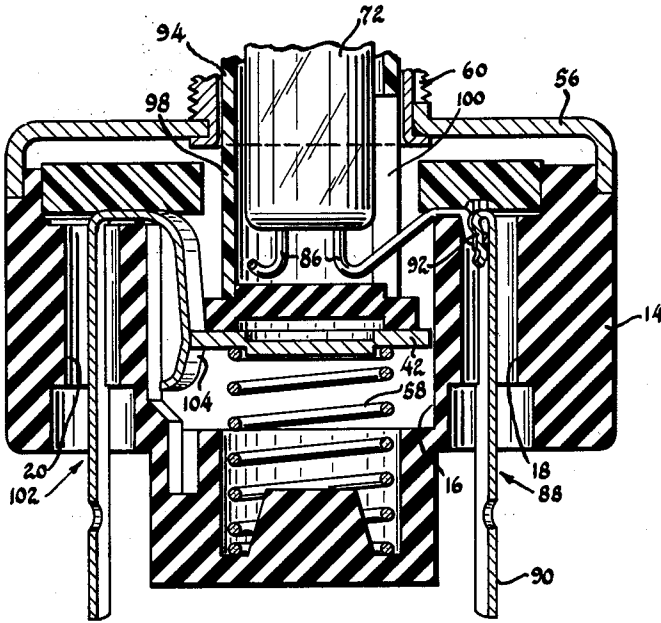


Fig. 5

Fig. 6

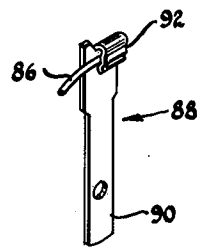


Fig. 7

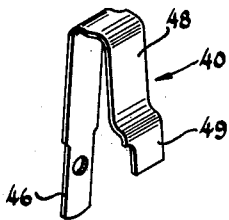


Fig. 8

Fig. 9

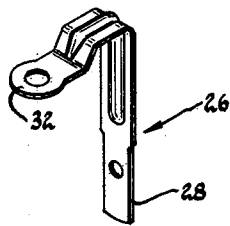
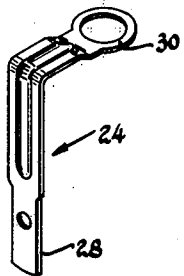


Fig. 10



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ILLUMINATED PUSHBUTTON SWITCH
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2 Claims. (Cl. 200-167)

This invention relates to switches of the pushbutton type having a means for illuminating the pushbutton of the switch.

The primary object of this invention is to provide an illuminated pushbutton switch which is of relatively simple construction and can be readily assembled.

Another object is to provide a switch of this type which has a wiping action at the contacts to produce self-cleaning and prevent contact welding.

Another object is to provide a switch of this type which is adapted for use with either normally open or normally closed contacts and with either incandescent or neon lamps with a minimum of modification.

The switch of this invention includes an insulating base having a central cavity and a plurality of openings therethrough. A hollow pushbutton assembly is slidably supported on the base and biased in one direction by a return spring. Pairs of lamp and switch contact clips are mounted in the openings in the base and have terminal portions extending through such openings exteriorly of the base to facilitate plug-in connection of the lamp and switch circuits. A lamp (either incandescent or neon) is mounted inside the pushbutton and supported therein by the lamp contact clips. The switch clips have spring arm contact portions extending into the central cavity of the base. The contact portions are adapted for sliding engagement with a movable contactor actuated by the pushbutton to provide a wiping action at the contacts each time the switch is actuated.

Either a normally open or normally closed switch operation is provided by simply substituting switch clips of slightly different configuration. Similarly, either a neon or incandescent lamp may be utilized by substituting a pushbutton and lamp contact clips of slightly different design. As will become apparent in the detailed description of the switch structure which follows, the invention provides an illuminated pushbutton switch of relatively few interchangeable parts which can be readily assembled.

Other objects and advantages will be pointed out in, or be apparent from the specification and claims, as will obvious modifications of the several embodiments shown in the drawings, in which:

FIGURE 1 is a horizontal sectional view taken along line 1-1 of FIG. 2 showing one embodiment of the invention wherein an incandescent lamp is used to illuminate the pushbutton;

FIG. 2 is a vertical sectional view taken along line 2-2 of FIG. 1;

FIG. 3 is a horizontal sectional view taken along line 3-3 of FIG. 4 showing a second embodiment of the invention wherein a neon lamp is used to illuminate the pushbutton;

FIG. 4 is a vertical sectional view taken along line 4-4 of FIG. 3;

FIG. 5 is a vertical sectional view similar to FIG. 4 but showing contact clips designed to provide a normally closed switch;

FIG. 6 is a perspective view of a lamp contact clip designed for use with wire lead lamps;

FIG. 7 is a perspective view of a switch contact clip designed for a normally open switch;

FIG. 8 is a perspective view of switch contact clip designed for a normally closed switch; and

FIGS. 9 and 10 are perspective views of a pair of lamp

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contact clips designed for use with a midget screw base lamp.

Referring to the drawings in detail, FIGS. 1 and 2 show a pushbutton switch 10 adapted for illumination by an incandescent lamp 12. The switch includes an insulating base 14 having a central cavity 16 and pairs of lamp and switch contact clip openings 18 and 20, respectively.

Lamp 12 is threadably mounted in a socket 22 supported at the center of cavity 16 by a pair of lamp contact clips 24 and 26 (FIGS. 9 and 10) mounted in openings 18. Clips 24 and 26 each have a terminal portion 28 extending exteriorly of base 14 and adapted for quick connection to terminals or solder connection to a source of electricity for energizing lamp 12. Clip 24 has a lug 30 for connection to the base of lamp socket 22 and clip 26 has a lug 32 for connection to a contact rivet 34 to complete the circuit to lamp 12. An indentation 36 is provided in one end of rivet 34 to receive the tip of lamp 12 and a pair of insulating washers 38, 38 are provided to insulate rivet 34 from lug 30 and socket 22. Thus, it is seen that lamp clips 24 and 26 serve to both mechanically support the lamp and electrically connect it into an energizing circuit.

The switch structure of the device includes a pair of normally open switch contact clips 40, 40 and a movable contactor plate 42 adapted for actuation by a pushbutton assembly 44. Clips 40 are mounted in openings 20 and have terminal portions 46 which extend exteriorly of the base for plug-in connection to a circuit to be controlled by the switch. As clearly shown in FIG. 7, clips 40 are provided with spring arm portions 48 having offset contact portions 49 adapted for sliding contact with opposite edges of contactor 42 when the pushbutton is depressed. Spring arm portions 48 of the switch clips are biased toward the contactor 42 and abutments 50 (FIG. 2) formed on base 14 are provided to limit the movement of offset contact portions 49 toward the contactor to thus prestress such portions prior to contact with the contactor. This insures good contact pressure when the switch is closed. The lamp and switch contact clips are held firmly in the base by retainer members 52 and 54 held in place by a frame 56 staked to the base.

Contact 42 is actuated against the bias of a return spring 58 by pushbutton 44. Pushbutton 44 is slidably mounted in a bushing 60 mounted on frame 56 and includes a hollow cylindrical body portion 62 extending through the bushing and a cap member 64 mounted on the open upper end of the body. Body 62 has a lower end portion 66 of rectangular cross section to retain the pushbutton in bushing 60 and limit its upward movement under the bias of return spring 58. Cap 64 is frictionally engaged on the end of body 62 and has a translucent lens 68 in the top of the cap to transmit light from lamp 12. Rectangular end portion 66 of the pushbutton body is slotted as at 70 to permit movement of the pushbutton with respect to lamp contact clips 24 and 26.

With the parts in the normal position shown in FIG. 2, there is no contact between contactor 42 and offset contact portions 49 of clips 40 so the switch is "open." When the pushbutton is depressed contactor 42 will make sliding contact with prestressed portions 49 of clips 40 to thus "close" the switch. The sliding engagement of contactor 42 with the prestressed contact portions 49 of the switch clips provides a very effective wiping action to maintain clear contact surfaces and prevent welded contacts. Lamp 12 can be replaced when burned out by simply removing cap 64 from pushbutton body 62. It is apparent that the above described structure provides an extremely simple and compact arrangement of an independent switch and lamp circuit incorporated into a single unit.

A second embodiment of the invention is shown in

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FIG. 3 and 4 wherein a neon lamp 72 is employed in a switch 74 for illuminating a pushbutton 76. The switch 74 includes an insulating base 14 having a central cavity 16 and pairs of lamp and switch contact clip openings 18 and 20, respectively.

Lamp 72 has a pair of bare wire leads 86, 86 connected to the top of lamp contact clips 88 (FIG. 6) mounted in openings 18. Clips 88 are of identical design each having a terminal portion 90 extending exteriorly of base 14 and adapted for plug-in connection to a source of electricity for energizing lamp 72. The clips have crimping lugs 92 at the tops thereof for securely connecting leads 86 thereto. In this embodiment leads 86 serve to both mechanically support the lamp 72 and electrically connect it to clips 88.

The switch structure of this embodiment is identical to that shown in FIGS. 1 and 2. Such structure includes a pair of normally open switch contact clips 40 and a movable contactor 42 adapted for actuation by a pushbutton assembly 76. Clips 40 are mounted in openings 20 and have terminal portions 46 which extend exteriorly of the base for plug-in connection to a circuit to be controlled by the switch. Clips 40 are provided with spring arm portions 48 having offset contact portions 49 adapted for sliding contact with the opposite edges of contactor 42 when the pushbutton is actuated from the position shown in FIG. 2 to that shown in FIG. 4.

Contactor 42 is actuated against the bias of a return spring 58 by pushbutton 76. The pushbutton is slidably mounted in a bushing 60 mounted on frame 56 and includes a cylindrical body portion 94 extending through the bushing. Body 94 has a closed upper end 96 and a lower end portion 98 of rectangular cross section to retain the pushbutton in the bushing. The entire pushbutton is made of translucent material to transmit the light produced by neon lamp 72. Rectangular end portion 98 of the pushbutton body is slotted as at 100 to prevent interference between the pushbutton and the lamp leads 86 when the pushbutton is actuated.

A normally closed switch arrangement is shown in FIG. 5. In this modification a pair of switch contact clips 102, as shown in FIG. 8, are employed. Clips 102 have spring arm contacting portions 104 which are designed to lie in sliding engagement with contactor 42 when the pushbutton is released and biased upwardly by spring 58. Thus, when the pushbutton is depressed contactor 42 will slide out of engagement with contact portions 104 to thus open the switch. Similarly, when the pushbutton is released the switch will close and remain closed until the pushbutton is again depressed.

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Although several embodiments of the present invention have been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. In an illuminated pushbutton switch, an insulating base having a central cavity and a plurality of openings therethrough, a hollow pushbutton slidably supported on said base, a pair of lamp contact clips mounted on said base, said lamp contact clips having terminal portions extending through openings in said base exteriorly of said base, a lamp mounted inside said pushbutton and supported by said lamp contact clips, means for electrically connecting said lamp to said lamp contact clips, a pair of switch contact clips mounted on said base and having terminal portions extending through openings in said base exteriorly of said base, said switch clips having spring arm contact portions extending into said central cavity, said base having a pair of abutments adapted to engage said spring arm portions and prestress them, a contactor movable in one direction by said pushbutton, said contactor being movable in reverse directions into and out of sliding engagement with said spring arm portions to open and close the switch, and a return spring biasing said pushbutton and contactor for movement in the direction opposite said one direction.

2. An illuminated pushbutton switch according to claim 1, in which said lamp has a screw type base and said means for electrically connecting said lamp to said lamp clips includes a lug on each clip, a screw socket connected to one lug, a center rivet connected to the other lug and a pair of insulated washers mounted on said rivet insulating said rivet from said socket, said rivet having an indentation in one end thereof to make good electrical contact with the end of said lamp.

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