

April 18, 1961

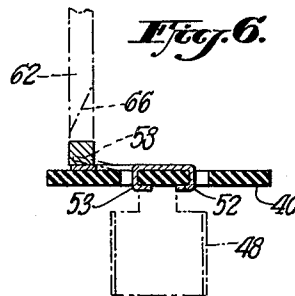
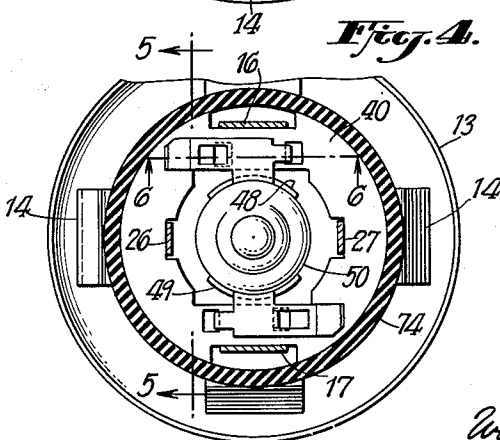
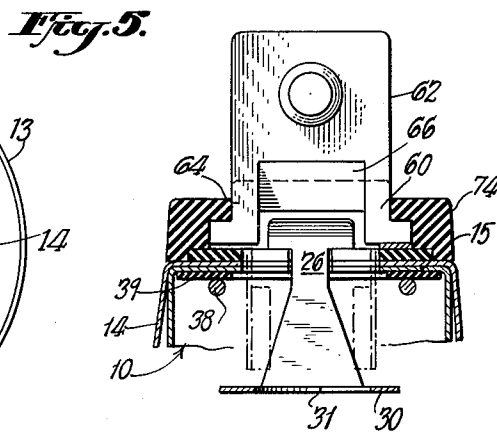
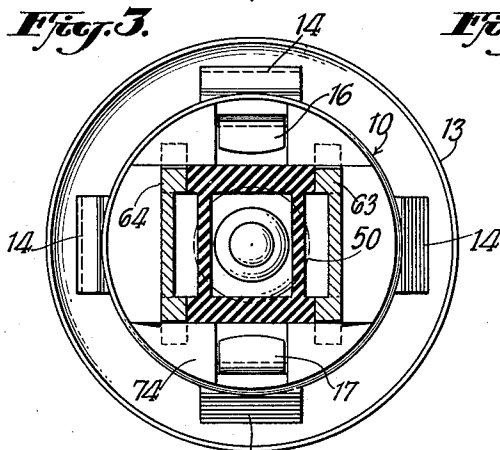
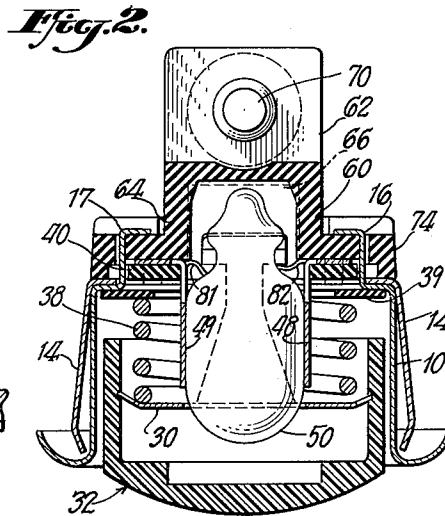
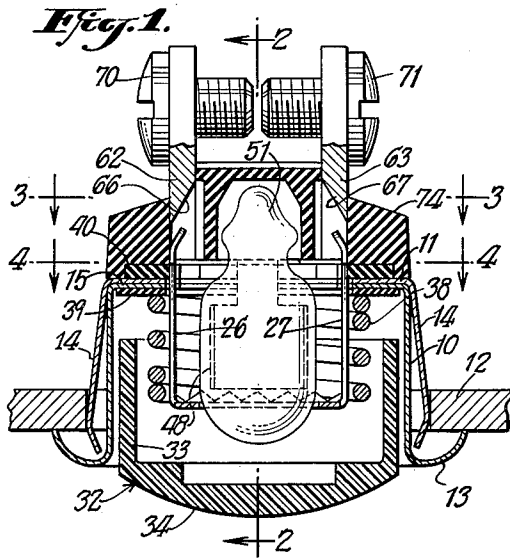
H. C. GOHS ET AL

2,980,784

ILLUMINATED PUSH BUTTON SWITCH

Filed Aug. 15, 1958

3 Sheets-Sheet 1



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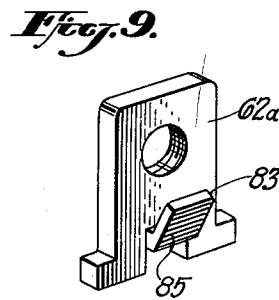
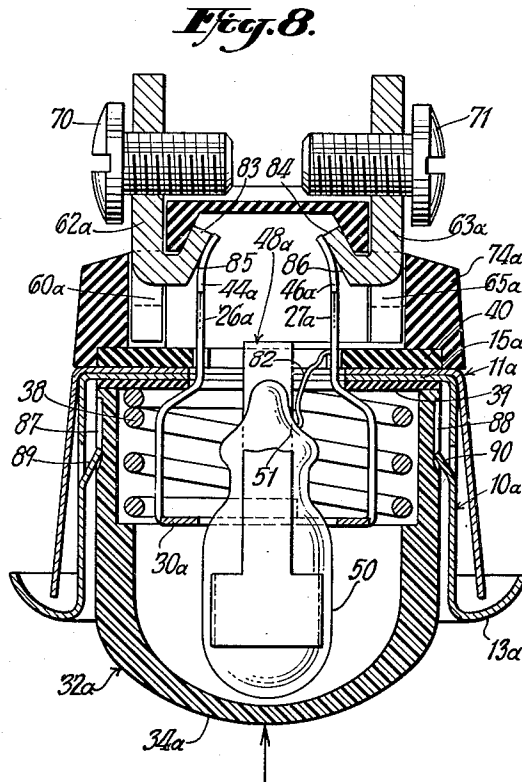
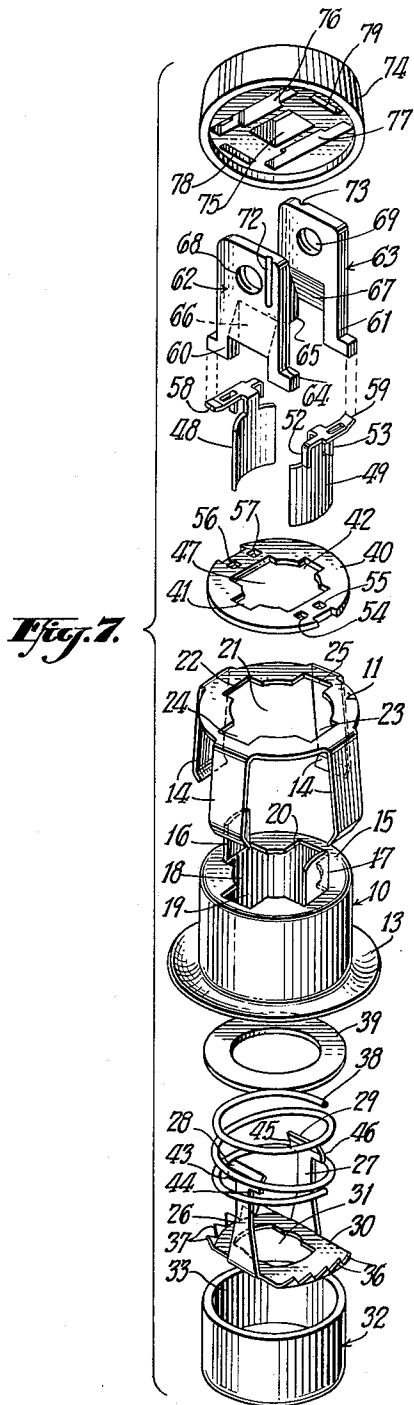
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ILLUMINATED PUSH BUTTON SWITCH

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3 Sheets-Sheet 2



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ILLUMINATED PUSH BUTTON SWITCH

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3 Sheets-Sheet 3

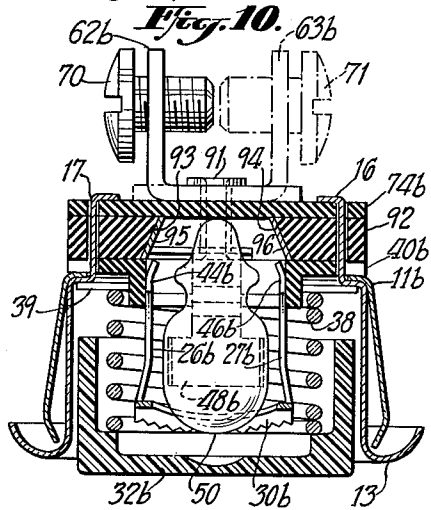


Fig. 10.

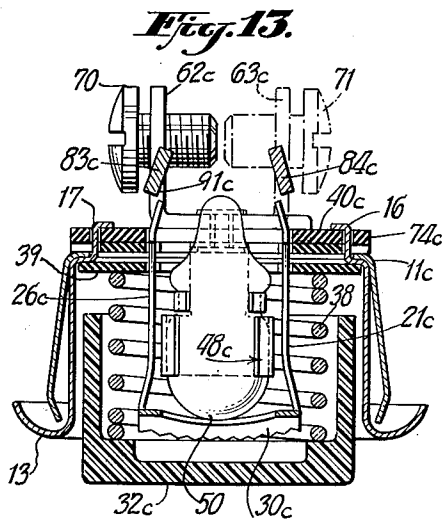


Fig. 13.

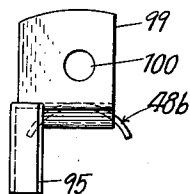


Fig. 11.

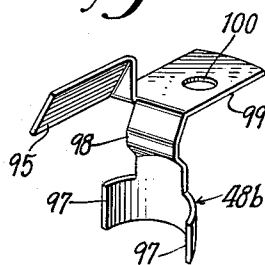


Fig. 12.

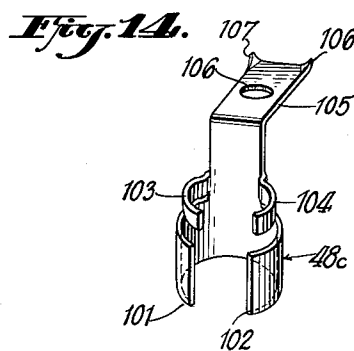


Fig. 14.

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2,980,784

ILLUMINATED PUSH BUTTON SWITCH

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13 Claims. (Cl. 200—159)

This invention relates to illuminated push button switches and particularly to illuminated push button switches intended to replace non-illuminated push button switches which are flush mounted on a plate or other support.

Miniature push button switches, generally of the type disclosed in United States Patent No. 1,699,491, are well known and many thousands of such switches are in use at the present time. These switches are employed in many instances for the closing of bell or annunciator circuits and are flush mounted through a hole in a metal mounting plate. The switches in general use are not illuminated and are relatively small in size, ranging in size from about five-eighths to three-quarters of an inch in diameter by about three-quarters of an inch in length.

In recent years there has been a trend toward the use of illuminated switches particularly for the operation of door bells. Illuminated switches of various types are available, but they are unsuitable, because of their shape and/or size, for replacing push button switches of the above-mentioned type. Thus, as pointed out above, the push button switches frequently are flush mounted through holes in metal plates, and it is not practical to enlarge the hole to receive a push button switch of larger diameter. Furthermore, the cost of the plates is a large proportion of the cost of an installation, and some of the plates, e.g. the mail box plates commonly employed in apartment houses, are relatively large and are several times more expensive than the push button switch itself. Also, in some cases several push button switches are mounted on a single large plate. If flush mounting is to be maintained without replacement of the plates, the replacement push button switch must be small enough and of a configuration which will permit mounting it in the holes in the existing plates and substantially flush with the exterior of the plate.

Due to the variety of bell transformers employed in the various installations, the voltage available for the operation of an illuminating lamp varies over a range of several volts, e.g. 16-24 volts. It is not practical or economical to provide a different push button switch having a different lamp for each installation, and therefore, a lamp intended for use in existing installations must provide sufficient illumination for a switch under widely varying voltage conditions. The smallest available lamp which is low in cost and which will meet these requirements is a type GE-1764 lamp sold by the General Electric Co., New York, New York, and is approximately seven-thirty-seconds of an inch in diameter and one-half inch long, excluding the pig-tail leads which extend from the base of the lamp.

It will be apparent, therefore, that it is difficult to construct a push button switch which will replace the known-type of push button switch and which contains an illuminating lamp suitable for use in existing installations. Such illuminated push button switch must also be adapted for economical mass manufacture and, accordingly, can-

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not be difficult to assemble or require the maintenance of dimensions within close tolerances. Furthermore, light pressure, current carrying contacts and non-wiping, circuit controlling contacts should be avoided if reliable operation is to be obtained. Considerable effort has been devoted over an extended period of time to the solution of the problem, and the embodiments of the invention disclosed herein provide an illuminated push button switch which is well suited for the replacement of push button switches of the above-mentioned type. Of course, it will be obvious that the push button switch of the invention may be used also in new installations.

One object of the invention is to provide an illuminated push button switch which is suitable for the replacement of known types of non-illuminated, flush mounted push buttons of small size.

Another object of the invention is to provide an illuminated push button switch which is small in size and yet is simple and economical to manufacture and easy to assemble.

A further object of the invention is to provide a push button switch of small size and containing an illuminating lamp which may be simply and economically replaced.

Other objects of the invention will be apparent from the following detailed description of the manner in which we now prefer to practice the invention, which description refers to the accompanying drawings in which:

Figs. 1 and 2 are cross-sectional, side elevation views, on an enlarged scale, of the preferred embodiment of the push button switch of the invention;

Figs. 3 and 4 are cross-sectional, plan views, taken respectively along the lines 3—3 and 4—4 indicated in Fig. 1, of the preferred embodiment shown in Figs. 1 and 2;

Figs. 5 and 6 are fragmentary, cross-sectional, side elevation views of portions of the embodiment shown in Figs. 1 and 2;

Fig. 7 is an exploded view, with the illuminating lamp omitted, of the parts of the embodiment shown in the preceding figures;

Fig. 8 is a cross-sectional side elevation view, of a further embodiment of the illuminated push button switch of the invention;

Fig. 9 is a perspective view of one of the electrical connecting terminals employed as part of the embodiment shown in Fig. 8;

Fig. 10 is a cross-sectional side elevation view of a further embodiment of the illuminated push button switch of the invention;

Figs. 11 and 12 are respectively plan and perspective views of one of the lamp holding clips employed in the embodiment shown in Fig. 10;

Fig. 13 is a cross-sectional side elevation view of further embodiment of an illuminated push button switch of the invention; and

Fig. 14 is a perspective view of the lamp holding clip forming part of the embodiment shown in Fig. 13.

The embodiments shown in the several figures of the drawings are illustrated in greatly enlarged scale for clarity in illustration, it being understood that the actual embodiments of the push button switches to be used for replacement purposes are only approximately one-fourth the size of the switches shown in the drawings. However, it will also be understood that illuminated push button switches embodying the invention may be of any desired size.

The preferred embodiment of the invention illustrated in Figs. 1-7 comprises a tubular, cylindrical shell 10 and a friction finger member 11, these elements of the push button switch being commonly employed in the prior art push button switches described above and hav-

ing external dimensions and shapes substantially the same as the corresponding elements in prior art push button switches so that the push button switch will fit readily into the switch receiving aperture in the mounting plate 12 of existing installations. At its outer end the shell 10 has a curved, radially extending rim 13 which bears against the face of the mounting plate 12. The friction finger member 11 bears against the inner end of the shell 10 and has a plurality of fingers 14 which extend from adjacent the inner end of the shell 10 toward the outer end of the shell 10 and adjacent the exterior thereof. The fingers 14 are compressed when the push button switch is pressed into the aperture in the mounting plate 12 and the fingers 14 bear against the wall of the aperture in the mounting plate 12 and maintain the push button switch in the desired position.

A second rim or flange 15 extends radially inwardly from the inner end of the shell 10 and a pair of securing tabs 16 and 17 extend axially or longitudinally from the rim or flange 15. The rim 15 defines a central or co-axial opening 18 and the rim 15 is provided with a pair of apertures 19 and 20 to permit the passage of the contact fingers hereinafter described therethrough.

The finger member 11 also has a central opening 21 therein, has a pair of apertures 22 and 23 for receiving the securing tabs 16 and 17 and has a pair of apertures 24 and 25 which permit passage of the contact fingers 26 and 27 therethrough. The contact fingers 26 and 27 are made of conductive material, such as metal, and preferably are made of a resilient metal such as beryllium copper. The fingers 26 and 27 extend longitudinally or axially of the shell 10, are flexible and have a pair of free ends 28 and 29. At their opposite ends the fingers 26 and 27 are secured to, and preferably are integral with, a conductive plate 30 having a central opening 31 therein.

A non-conductive push button 32 having a hollow cylindrical portion 33 closed at its outer end by a translucent or light transmitting portion 34 is mounted with its open end facing into the interior of the shell 10 and with the light transmitting portion 34 spanning the outward open end of the shell 10. The cup-like button 32 preferably is made of the same material throughout and preferably is made of a translucent plastic material such as polystyrene. Although the light transmitting end portion 34 preferably is translucent, it may also be light transparent. The button 32 is mounted with the exterior of the cylindrical portion 33 in sliding engagement with the interior of the shell 10 so that when the button 32 is depressed the button 32 remains substantially co-axially with the shell 10.

The plate 30 which electrically connects the contact fingers 26 and 27 has a plurality of teeth 36 and 37 at its opposite ends, which teeth 36 and 37 dig into the interior wall of the cylindrical portion 33 when the plate 30 is pressed into the interior of the cylindrical portion 33. Thus, after the plate 30 is assembled with the button 32 the fingers 26 and 27 are mounted on the button 32 so that the contact fingers 26 and 27 and the button 32 move as unit. A helical spring 38 encircles the contact fingers 26 and 27 and is mounted between the fingers and the interior wall of the cylindrical portion 33. The spring 38 bears, at one end, against the plate 30 and, at the opposite end, against an insulating washer 32 which in turn bears against the inner side of the rim 15 on the inner end of the shell 10. Thus, it will be apparent that the spring 38, which is a compression spring, acts between the shell 10 and the fingers 26 and 27 and urges the fingers 26 and 27, as well as the button 32, outwardly of the shell 10. The washer 39 insulates the spring 38 and the fingers 26 and 27 with respect to the shell 10.

A second insulating washer 40 is mounted co-axially with the shell 10 and adjacent the inner end thereof, the washer 40 bearing against the finger member 11 which

in turn bears against the rim 15. The insulating washer 40 has a pair of apertures 41 and 42 therein which receive the intermediate portions of the fingers 26 and 27. The apertures 41 and 42 are slightly wider in a direction transverse to the radius of the washer 40 than the intermediate portions of the fingers 26 and 27 so that the fingers 26 and 27 may be moved a predetermined distance longitudinally thereof while the intermediate portions of the fingers 26 and 27 are in contact with the walls of the apertures 41 and 42. However, the contact fingers 26 and 27 are provided at their free ends with projections 43-46 which are wider between their ends than the widths of the apertures 41 and 42 so that the ends of the fingers 26 and 27 cannot pass through the apertures 41 and 42. Since the friction finger member 11 and the shell 10 preferably are made of metal and since the contact fingers 26 and 27 should be kept out of contact with the shell 10 and the finger member 11, the apertures 19, 20, 24 and 25 therein are wider than the intermediate portions of the fingers 26 and 27 and the spacing between the walls of the apertures 41 and 42 in the radial direction is less than the corresponding spacing between the corresponding walls of the apertures 19, 20, 24 and 25. During assembly of the parts described, the contact fingers 26 and 27 are bent toward each other as they are passed through the central opening 47 in the washer 40 and after the projections 43-46 pass through the central opening 47 the fingers 26 and 27 are released. After the parts previously described are assembled, the fingers 26 and 27 are limited in their outward movement from the shell 10 by the striking of the projections 43-46 against the face of the washer 40, and these so assembled parts form one unit of the push button switch assembly.

A lamp 50, such as the General Electric Company GE-1764 lamp previously described, is mounted co-axially with the shell 10 and extends longitudinally thereof. The head of the lamp 50 extends within the shell 10 and the base 51 thereof extends through the opening 18 in the shell 10, through the opening 21 in the friction finger member 11 and through the opening 47 in the washer 40. The spacing between the head of the lamp 50 and the interior of the portion 34 of the button 32 is such that the interior of the portion 34 does not strike the lamp 50 when the button 32 is fully depressed. On the other hand, the spacing between the head of the lamp 50 and the interior of the portion 34 is maintained as small as possible so as to reduce the projection of the portion 34 beyond the outer end of the shell 10 to a minimum. Accordingly, in order to keep the projection of the portion 34 outside of the shell 10 to a minimum when the button 32 is fully released, the base 51 of the lamp 50 extends exteriorly beyond the inner end of the shell 10.

The opening 31 in the plate 30 is larger than the exterior diameter of the head of the lamp 50 so that when the button 32 is depressed the head of the lamp 50 may pass through the aperture 31 without touching the walls of the aperture 31. Furthermore, the aperture 31 is elongated as illustrated in Fig. 7 so as to permit passage of the clips 48 and 49 therethrough with the lamp 50 therebetween.

The lamp 50 is held in place by a pair of identical lamp holding clips 48 and 49 which are mounted on the insulating washer 40. The clips 48 and 49 are oppositely disposed, are mounted intermediate the contact fingers 26 and 27 and preferably are made of metal so as to aid dissipating the heat produced by the lamp 50 when the lamp 50 is energized. Each of the clips 48 and 49 is provided with a pair of securing tabs 52 and 53 which pass through the apertures 54-57 in the washer 40. After the tabs 52 and 53 are passed through the apertures 54-57 they are bent over (Fig. 6) so as to maintain the clips 48 and 49 in assembled relationship with the washer 40. When the clips 48 and 49 are mounted on the washer 40 and the washer 40 is assembled as part of

the unit previously described, the lower portions of the clips 48 and 49 extend into the interior of the shell 10 as illustrated in Figs. 1 and 2.

The upper portions of the clips 48 and 49 are provided with bent end portions 58 and 59 (Figs. 6 and 7) which engage with legs 60 and 61 respectively of the electrical connecting terminals 62 and 63 in the manner hereinafter described. The lamp 50 is provided with a pair of leads or terminals 81 and 82 (Fig. 2) which are inserted between the bent-end portions 58 and 59 and the washer 40 to provide electrical connections between the terminals 62 and 63 and the filament of the lamp 50.

The electrical connecting terminals 62 and 63 are made of conducting material, such as brass, and may be identical as illustrated in Fig. 7. Each terminal 62 and 63 comprises a pair of legs 60, 64, 61 and 65. Portions 66 and 67 of the terminals 62 and 63 intermediate the legs 60, 64, 61 and 65 form contact surfaces extending at an acute angle to the path of movement of the fingers 26 and 27 and hence are slidably engageable with the ends 28 and 29 of the contact fingers 26 and 27 when the button 32 is depressed. Thus, the ends of the contact fingers 26 and 27 wipe the contact surfaces 66 and 67 whenever the button 32 is depressed reducing the possibility of faulty operation due to oxidation or corrosion of the contact surfaces 66 and 67 and the ends 28 and 29 of contact fingers 26 and 27. It will be noted that since the portions forming the contact surfaces 66 and 67 are integral with the terminals 62 and 63, they are electrically connected to the terminals 62 and 63.

Each of the terminals 62 and 63 is also provided with holes 68 and 69 having threaded walls for engaging wire securing screws 70 and 71. The terminals 62 and 63 may be provided with longitudinally extending channels 72 and 73 for receiving the ends of connecting wires and for holding such ends in place during the turning of the screws 70 and 71 for the purpose of securing such ends to the terminals 62 and 63.

A non-conducting closure member 74, preferably made of a synthetic resin, has a cavity 75 therein for receiving the base 51 of the lamp 50. The closure member 74 also has a pair of apertures 76 and 77 therein which permit the passage of the upper portions of the terminals 62 and 63 therethrough, the closure member 74 being formed on each side of the apertures 76 and 77 as shown in Figs. 5 and 7 so as to engage the bent ends of the legs 60, 64, 61 and 65. The closure member 74 has a pair of apertures 78 and 79 extending therethrough for receiving the securing tabs 16 and 17. Except for the apertures 76-79, the closure member 74 is impermeable so that when it is assembled with the parts previously described the inner end of the shell 10 is substantially sealed with respect to the passage of dust, dirt, water, etc. The connecting terminals 62 and 63 fit snugly in the apertures 76 and 77 so that when the terminals 62 and 63 are pressed or pushed into the apertures 76 and 77 the closure member 74 in combination with the terminals 62 and 63 form a second unit of the push button switch assembly.

After the two units push button switch assembly have been assembled as described above, the closure member 74 with the terminals 62 and 63 therein is pressed against the washer 40 with the securing tabs 16 and 17 extending through the apertures 78 and 79. With the closure member 74 firmly pressed against the washer 40, and, in some cases against the finger member 11 as illustrated in Fig. 1, the ends of the securing tabs 16 and 17 are bent inwardly as illustrated in Fig. 2 so as to maintain the two units in assembled relationship. If it is necessary to replace the lamp 50, the securing tabs 16 and 17 are straightened, the inner unit comprising the closure member 74 and the terminals 62 and 63 is removed, and the ends of the contact fingers 26 and 27 are pushed toward each other releasing the washer 40. The washer 40 may then be removed along with the holding clips 48 and 49

and the lamp 50, and the purchaser may then return the washer 40, the holding clips 48 and 49 and the lamp 50 to the seller for replacement or he may merely replace the lamp 50.

When the units are assembled and the tabs 16 and 17 are bent over as described above, the leg 60 presses the portion 58 of the clip 48 toward the washer 40 and causes it to firmly engage the lead 82 of the lamp 50. Similarly, the leg 61 causes the portion 59 of the clip 49 to firmly engage the lead 81 of the lamp 50.

When the push button switch previously described is installed, the connecting terminals 62 and 63 are connected electrically in series with the bell, or other device which is to be operated and with the bell energizing source. It will be noted from an examination of Figures 1-7 as well as from the description previously given that when the terminals 62 and 63 are so connected, the filament of the lamp 50 is connected in series with the bell and the energy source. The resistance of the filament of the lamp 50 is such that with conventional bells or chimes and with an energy source voltage of approximately 16 to 24 volts, light will be emitted by the filament of the lamp 50 but the current flow is such that the bell will not operate. The light from the filament of the lamp 50 is transmitted through translucent portion 34 of the push button 32 which is thereby illuminated.

When the push button 32 is depressed, the ends of the contact fingers 26 and 27 engage the contact surfaces 66 and 67 providing a low resistance shunt circuit between the terminals 62 and 63. The lamp 50 is thereby extinguished and sufficient current flows in the bell circuit to produce operation of the bell or other device. When the button 32 is subsequently released, the shunt circuit is interrupted and the lamp 50 again becomes illuminated.

In the following description of other embodiments of the push button switch of the invention, parts of the switches which are identical with parts described above will be identified by the same reference numerals and parts which perform the same function as parts previously described, but which differ in shape or structure will be identified by the same reference numerals followed by a letter such as "a," "b," etc.

The embodiment of the illuminated push button switch illustrated in Fig. 8 differs from the embodiment previously described primarily in the location of the lamp 50 and in the configurations of the electrical connecting terminals 62a and 63a, the contact fingers 26a and 27a and the push button 32a. Although the embodiment illustrated in Fig. 8 has the disadvantage that it is somewhat longer than the push button switch illustrated in Figs. 1-7 and is slightly more expensive to manufacture, the embodiment of Fig. 8 has the following advantages:

(a) There is less obstruction of the head of the lamp 50 by the plate 30a so that more light is transmitted through the push button 32a and undesirable shadows are not cast on the outer end of the button 32a.

(b) Due to the location of the head of the lamp 50 as well as the configuration of the outer end of the button 32a, the push button 32a is more readily visible particularly at large angles with respect to the axis of the button 32a and the shell 10a.

(c) There is a greater amount of clearance between the contact fingers 26a and 27a and the lamp 50 particularly at the free ends of the fingers 26a and 27a permitting greater tolerances in the manufacture and assembly of the various parts of the switch. It is to be noted that it is particularly important that the lamp 50 not be moved during operation of the push button 32a because the electrical connecting leads extending from the base of the lamp 50 are relatively small and fragile.

In the embodiment illustrated in Fig. 8 the base 51 of the lamp is substantially entirely within the shell 10a causing the head of the lamp 50 to extend outwardly beyond the outer end of the shell 10a. Accordingly, the

translucent end portion 34a of the button 32a is bowed outwardly in order to accommodate the head of the lamp 50.

The lower ends of the fingers 26a and 27a, that is the ends which are attached to the plate 30a, are spaced farther apart than the corresponding ends of the fingers 26 and 27 illustrated in Figs. 1-7. In order to permit the contact fingers 26a and 27a to pass through the openings in the insulating washer 39, the shell 10a, the friction finger member 11a and the washer 40, the intermediate portions of the fingers 26a and 27a are bent inwardly as illustrated in Fig. 8. The connecting terminals 62a and 63a, one of which is illustrated in perspective in Fig. 9, are provided with inwardly extending projections 83 and 84 having contact surfaces 85 and 86 thereon which extend at an acute angle with respect to the paths of movement of the fingers 26a and 27a and which are slidably engageable with the free ends of the contact fingers 26a and 27a.

The contact fingers 26a and 27a have projections extending transversely to the length thereof, such as projections 44a and 46a, which engage the insulating washer 40 when the push button 32a is released and hence, which function in the same manner as the projections 43-46 on the contact fingers of the embodiment shown in Figs. 1-7 to limit the movement of the push button 32a outwardly of the shell 13a. However, the push button 32a is provided with a pair of slots 87 and 88 which are closed at their ends and which receive fingers or tabs 89 and 90 struck inwardly from the shell 13a. The lengths of the slots 87 and 88 are such that the button 32a may be fully depressed, as illustrated in Fig. 8, and are such that the ends of the fingers 89 and 90 may engage the end walls of the slots 87 and 88 when the button 32a is fully released. Thus, the fingers 89 and 90 limit the outward movement of the button 32a and provide additional means for limiting movement of the button 32a outwardly of the shell 13a. Such additional means for limiting the outward movement of the button 32a may be used in addition to the above-described projections on the free ends of the contact fingers or may be used in place thereof both in the embodiment shown in Fig. 8 and in the other embodiments described in this specification and illustrated in the drawings.

The embodiment of the invention illustrated in Fig. 10 differs from the preceding embodiments primarily in the configuration of the terminals 62b and 63b, the closure member 74b, the insulating washer 40b and the lamp holding clips. The closure member 74b may be a simple washer of insulating material having apertures therein for receiving the securing tabs 16 and 17 and for permitting passage of tubular securing rivets, such as the tubular rivet 91 therethrough, which tubular rivets secure the connecting terminals 62b and 63b and the lamp holding clips, such as clip 48b, to the closure member 74b. The closure member 74b cooperates with a second insulating washer 92 to seal the inner end of the assembly against dirt and moisture and the washer 92 may be a separate member as shown or may be integral with the closure member washer 74b. The washer 92 has a pair of sloping surfaces 93 and 94 against which the contacts 95 and 96 bear, the contacts 95 and 96 being slidably engageable with the free ends of the contact fingers 26b and 27b when the button 32b is depressed.

The embodiment shown in Fig. 10 comprises a pair of lamp holding clips both of which are identical and one of which is illustrated in detail in Figs. 11 and 12. The lamp holding clip 48b shown in Figs. 11 and 12 preferably is made of metal and comprises a resilient lamp engaging arms 97, an inwardly extending portion 98 which engages the neck of the lamp 50, an outwardly extending securing portion 99 having an aperture 100 therein permitting the passage of the securing rivet 91 therethrough and an inwardly extending contact portion 95. The inner surface of the contact portion or contact

95 extends at an acute angle with the path of movement of the contact finger 26b so that when the button 32b is depressed the free end of the contact finger 26b slidably engages the surface of the contact 95.

When the lamp holding clips and the lamp 50 are assembled with the washer 92, the closure member 74b and the terminals 62b and 63b, the leads of the lamp 50 which connect to the filament thereof are disposed between the portion 99 and the washer 92. It will be noted that when these parts are so assembled, they form a sub-assembly and may be assembled with or removed from the switch as a unit. Furthermore, it will be noted that such unit may be removed from the switch without releasing the free ends of the contact fingers 26b and 27b from their engagement with the insulating washer 40b.

The embodiment illustrated in Fig. 13 is similar to the embodiment illustrated in Fig. 8 but because of the disposition of the lamp 50 therein, the embodiment of the switch illustrated in Fig. 13 may be made shorter than the embodiment of the switch illustrated in Fig. 8. The embodiment illustrated in Fig. 13 differs from the embodiment illustrated in Fig. 8 primarily in the configuration of the terminals 62c and 63c, the member 74c and the lamp holding clip 48c, only one lamp holding clip 48c being required.

The member 74c may be a simple washer of insulating material having apertures therein for receiving the securing tabs 16 and 17, apertures permitting the passage of the tubular securing rivets, such as the rivet 91c, therethrough and an aperture permitting the passage of the contact fingers 26c and 27c and the base of the lamp 50 therethrough. Due to the presence of the last mentioned aperture in the member 74c, the inner end of the switch assembly is not sealed against dirt and moisture but the aperture permits the circulation of air into the shell 13 and around the lamp 50 and, therefore, assists in the cooling of the lamp 50.

The lamp holding clip 48c is illustrated in greater detail in Fig. 14 and comprises a pair of resilient arms 101 and 102 which extend more than half-way around the periphery of the lamp 50. The clip 48c also comprises a pair of resilient arms 103 and 104 which engage the neck of the lamp 50 and which extend more than half-way around the periphery of the neck of the lamp 50. An outwardly extending securing portion 105 has an aperture 106 therein which permits the passage of the securing rivet 91c therethrough and has teeth 107 and 108 thereon which bite into the lower surface of the member 74c so as to prevent rotation of the clip 48c around the rivet 91c. Preferably, the clip 48c is made of metal such as beryllium copper.

The embodiment illustrated in Fig. 13 is similar to the embodiment illustrated in Fig. 10 in that when the terminals 62c and 63c, the member 74c, the clip 48c and the lamp 50 are assembled by means of the rivet 91c as well as by means of a similar rivet (not shown) which secures the terminal 63c to the member 74c, these parts form a single unit which may be assembled with or removed from the remainder of the switch without requiring disengagement of the contact fingers 26c and 27c from the washer 40c. Thus, the embodiment of Fig. 13, like the embodiment of Fig. 10, comprises two separable units, one of which includes the lamp 50.

Having thus described our invention with particular reference to the preferred form thereof and having shown and described certain modifications, it will be obvious to those skilled in the art to which the invention pertains, after understanding our invention, that various changes and other modifications may be made therein without departing from the spirit and scope of our invention, as defined by the claims appended thereto.

What is claimed as new and desired to be secured by Letters Patent is:

1. An illuminated push button switch comprising a tubular shell having open ends, one of said ends being an

inner end and the other being an outer end, a tubular button having a light transmitting outer end, said button being mounted in said shell with the exterior thereof in sliding engagement with the interior of said shell and with said outer end of said button adjacent said outer end of said shell, a pair of flexible conductive, spaced contact fingers mounted on said button and movable therewith, said fingers extending longitudinally inside of said shell and having their free ends spaced from said outer end of said shell in the direction of said inner end of said shell, spring means acting between said shell and said fingers and urging said free ends of said fingers toward said outer end of said shell, means limiting the movement of said fingers in the direction in which they are urged by said spring means for maintaining said fingers and said button within said shell, a lamp having a head and a base and mounted with said head and said base disposed longitudinally of said shell, said lamp also being mounted with the head thereof in a fixed position within and in relation to said shell and nearer to said outer end of said button than said base and being adapted to fit between said fingers, said button, said fingers and said spring means being disposed with respect to said lamp so as to provide a light transmitting path between the head of said lamp and said outer end of said button, and said fingers and said button being movable with respect to both said lamp and said shell, a closure member mounted on said shell adjacent said inner end of said shell, a pair of electrical connecting terminals mounted on said closure member, means electrically connected to said terminals and slidably engageable with said ends of said fingers when said button is moved inwardly of said shell, means electrically connecting said terminals with the terminals of said lamp, and means maintaining said closure member in assembled relationship with said shell.

2. An illuminated push button switch comprising a pair of units, one of said units comprising a tubular shell having open ends, a cup-like button having its closed end formed by translucent material and mounted with its open end facing into said shell and with its exterior in sliding engagement with the interior of said shell, a pair of spaced and electrically connected, conductive, contact fingers mounted on said button and extending longitudinally within said shell, spring means acting between said shell and said fingers and urging said fingers away from said one end of said shell, and an insulating washer member mounted against said one end of said shell and having an opening therein smaller in size than the opening in said one end of said shell, and means for limiting the movement of said fingers in the direction in which they are urged by said spring means, the other of said units comprising a non-conducting closure member having a pair of electrical connecting terminals mounted on one side thereof, and means electrically connected to said terminals for slidably contacting said ends of said fingers, one of said units further comprising a lamp having a head and a base and mounted on one of said members and extending therefrom with said base nearer said one member than said head, at least one holding clip mounted on said one member and engaging said lamp for holding said lamp in a fixed position in relation to said shell, and means electrically connecting the terminals of said lamp to said connecting terminals, said units being mounted with said closure member adjacent said washer member and with said lamp within said shell and said button and between said fingers, and means for maintaining said units in assembled relationship.

3. An illuminated push button switch comprising a pair of units, one of said units comprising a tubular shell having open ends, a cup-like button having its closed end formed by translucent material and mounted with its open end facing into said shell and with its exterior in sliding engagement with the interior of said shell, a pair of spaced and electrically connected, conductive, contact fingers mounted on said button and extending

longitudinally within said shell, spring means acting between said shell and said fingers and urging said fingers away from said one end of said shell, and an insulating washer member mounted against said one end of said shell and having an opening therein smaller in size than the opening in said one end of said shell, and means for limiting the movement of said fingers in the direction in which they are urged by said spring means, the other of said units comprising a non-conducting closure member having a pair of electrical connecting terminals mounted on one side thereof, a lamp having a head and a base and mounted on said member and extending from the opposite side thereof with said base nearer said member than said head, at least one holding clip mounted on said member and engaging said lamp for holding said lamp in a fixed position in relation to said shell, means electrically connecting the terminals of said lamp to said connecting terminals, and means electrically connected to said terminals for slidably contacting said ends of said fingers, said other of said units being adapted to be mounted with said closure member adjacent said washer and with said lamp within said shell and said button and between said fingers, and means for maintaining said units in assembled relationship.

4. An illuminated push button switch comprising a hollow cylindrical shell having one outward open end and having a centrally disposed inner opening in the other inward end thereof, a lamp mounted centrally of said shell and extending longitudinally in the interior of said shell, a pair of longitudinally movable, conductive, flexible contact fingers mounted on opposite sides of said lamp with their inner ends extending through said inner opening, said fingers being movable with respect to said lamp and the outer ends of said fingers being joined by a conductive plate having a central opening therein permitting the passage of the head of said lamp therethrough, an operating button comprising a hollow cylindrical portion closed at one end by a non-conducting, translucent outer portion, said button being mounted with the exterior of said cylindrical portion in axial sliding engagement with the interior of said shell and with said outer portion spanning said outward open end, said cylindrical portion encircling said fingers and said lamp and said plate being mounted in frictional engagement with said button to cause said fingers to move with said button, a spring acting between said shell and said plate to urge said fingers and said button outwardly of said shell, an insulating washer mounted adjacent the inner end and having a portion exteriorly of said shell and restrained by said inner end, said washer being mounted co-axially with said shell and having a central opening of a size smaller than said inner opening, said washer having a pair of oppositely disposed apertures therein for receiving the inner ends of said contact fingers, said inner ends of said contact fingers having projections thereon engageable with said washer for limiting the outward longitudinal movement of said contact fingers, a pair of lamp holding clips secured to said washer, said clips having lamp engaging portions extending through said inner opening into said shell and engaging said lamp, said portions being disposed on opposite sides of said lamp and intermediate said contact fingers, a pair of electrical connecting terminals extending axially away from the inner end of said shell, said terminals having portions forming contact surfaces extending at an acute angle with respect to the path of movement of the inner end of said contact fingers, said inner ends of said contact fingers being slidably engageable with said contact surfaces when said button is moved inwardly of said shell, a non-conducting closure member mounted against said washer and in engagement with said terminals and a pair of securing tabs secured at one end to said shell and engaging said closure member and thereby holding said closure member, said terminals and said washer in assembled relationship with said shell.

5. An illuminated push button switch comprising a cup-like shell having one outward open end and having a centrally disposed inner opening in the other inward end thereof, a lamp mounted centrally of said shell and extending longitudinally in the interior of said shell, a pair of longitudinally movable, conductive, flexible contact fingers mounted on opposite sides of said lamp with their inner ends extending through said inner opening, said fingers being movable with respect to said lamp and the outer ends of said fingers being joined by a conductive plate having a central opening therein permitting the passage of the head of said lamp therethrough, an operating button comprising a hollow cylindrical portion closed at one end by a non-conducting, translucent outer portion, said button being mounted with the exterior of said cylindrical portion in axial sliding engagement with the interior of said shell and with said outer portion spanning said outward open end, said cylindrical portion encircling said fingers and said lamp and said plate being mounted in frictional engagement with said button to cause said fingers to move with said button, a spring encircling said fingers and said lamp and mounted between said fingers and the interior of said cylindrical portion, said spring acting between said shell and said plate to urge said fingers and said button outwardly of said shell, an insulating washer mounted adjacent the inner end but exteriorly of said shell, said washer being mounted co-axially with said shell and having a central opening of a size smaller than said inner opening, said washer encircling the inner ends of said contact fingers and having a pair of oppositely disposed apertures therein for receiving the inner ends of said contact fingers, said inner ends of said contact fingers having projections thereon engageable with said washer for limiting the outward longitudinal movement of said contact fingers, a pair of lamp holding clips secured to said washer, said clips having lamp engaging portions extending through said inner opening into said shell and engaging said lamp, said portions being disposed on opposite sides of said lamp and intermediate said contact fingers, a pair of electrical connecting terminals extending away from the inner end of said shell, said terminals each being electrically connected to a terminal of said lamp and having a portion forming a contact surface extending at an acute angle with respect to the path of movement of the inner end of a contact finger, said inner ends of said contact fingers being slidably engageable with said contact surfaces when said button is moved inwardly of said shell, a non-conducting closure member mounted against said second washer and mounted in engagement with said terminals, said closure member also having a pair of securing tab apertures therein but otherwise being substantially imperforate, and a pair of securing tabs secured at one end to said shell and passing through said securing tab apertures, said tabs being in engagement with said closure member and holding said closure member, and said washer in assembled relationship with said shell.

6. An illuminated push button switch comprising a cylindrical, metal hollow shell having a first rim extending radially outwardly from one outward open end thereof and having a second rim extending radially inwardly from the other inward end thereof, said second rim defining an inner opening in said shell, a lamp mounted co-axially with said shell and extending axially through said inner opening and into the interior of said shell, a pair of axially movable, conductive, flexible contact fingers mounted on opposite sides of said lamp with their inner ends extending through said inner opening, said fingers being movable with respect to said lamp and the outer ends of said fingers being joined by a conductive plate having a central opening therein permitting the passage of the head of said lamp therethrough, an operating button comprising a hollow cylindrical portion closed at one end by a non-conducting, translucent outer portion,

said button being mounted with the exterior of said cylindrical portion in axial sliding engagement with the interior of said shell and with said outer portion spanning said outward open end, said cylindrical portion encircling said fingers and said lamp and said plate being mounted in frictional engagement with the interior of said button to cause said fingers to move with said button, a spring encircling said fingers and said lamp and mounted between said fingers and the interior of said cylindrical portion, said spring acting between said shell and said plate to urge said fingers and said button outwardly of said shell, an insulating washer mounted adjacent the inner end and exteriorly of said shell, said washer being mounted co-axially with said shell and having a central opening of a size smaller than said inner opening, said washer encircling the inner ends of said contact fingers and the base of said lamp and having a pair of oppositely disposed apertures in said portion thereof for receiving the inner ends of said contact fingers, said inner ends of said contact fingers having projections thereon engageable with said washer for limiting the axial movement of said contact fingers, a non-conducting closure member mounted against said washer, a lamp holding clip secured to said closure member, said clip having lamp engaging portions extending through said inner opening into said shell and engaging said lamp, said portions being disposed intermediate said contact fingers, a pair of electrical connecting terminals secured to said closure member and electrically connected to the terminals of said lamp, said connecting terminals having projections extending transversely to and forming contact surfaces extending at an acute angle with respect to the paths of movement of the inner ends of said contact fingers, said inner ends of said contact fingers being slidably engageable with said contact surfaces when said button is moved inwardly of said shell, said closure member also having a pair of securing tab apertures therein, and a pair of securing tabs secured at one end to said shell and passing through said securing tab apertures, said tabs being in engagement with said closure member and holding said closure member and said washer in assembled relationship with said shell.

7. An illuminated push button switch comprising a cylindrical, metal, hollow shell having a first rim extending radially outwardly from one outward open end thereof and having a second rim extending radially inwardly from the other inward end thereof, said second rim defining an inner opening in said shell, a lamp mounted co-axially with said shell and extending axially through said inner opening and into the interior of said shell, the base of said lamp extending exteriorly of said shell, a pair of axially movable, conductive, flexible contact fingers mounted on opposite sides of said lamp with their inner ends extending through said inner opening, said fingers being movable with respect to said lamp and the outer ends of said fingers being joined by a flexible conductive plate having a central opening therein permitting the passage of the head of said lamp therethrough, an operating button comprising a hollow cylindrical portion closed at one end by a non-conducting, translucent outer portion, said button being mounted with the exterior of said cylindrical portion in axial sliding engagement with the interior of said shell and with said outer portion spanning said outward open end, said cylindrical portion encircling said fingers and said lamp and said plate being mounted in frictional engagement with the interior of said cylindrical portion to cause said fingers to move with said button, a first insulating washer mounted within said shell against said second rim, said washer encircling said fingers and said lamp, a helical spring encircling said fingers and said lamp and mounted between said fingers and the interior of said cylindrical portion, said spring bearing, at one end, against said washer and, at the other end, against said plate to urge said fingers and said button outwardly of said shell, a friction finger member

mounted against the inner end of said shell and having a plurality of friction fingers extending adjacent the exterior of said shell from said inner end toward said first rim, a second insulating washer mounted adjacent the inner end and exteriorly of said shell of said second washer being mounted co-axially with said shell and having a central opening of a size smaller than said inner opening, said second washer encircling the inner ends of said contact fingers and the base of said lamp and having a pair of oppositely disposed apertures in said portion thereof for receiving the inner ends of said contact fingers, said inner ends of said contact fingers having projections thereon engageable with said second washer for limiting the axial movement of said contact fingers, a non-conducting closure member mounted against said second washer, a lamp holding, conductive clip secured to said closure member, said clip having lamp engaging portions extending through said inner opening into said shell and engaging said lamp, said portions being disposed intermediate said contact fingers, a pair of electrical connecting terminals secured to said closure member and electrically connected to the terminals of said lamp, said connecting terminals having projections extending transversely to and forming contact surfaces extending at an acute angle with respect to the paths of movement of the inner ends of said contact fingers, said inner ends of said contact fingers being slidably engageable with said contact surfaces when said button is moved inwardly of said shell, said closure member also having a pair of securing tab apertures therein, and a pair of securing tabs secured at one end to said shell and passing through said securing tab apertures, said tabs being in engagement with said closure member and holding said closure member, said second washer and said friction finger member in assembled relationship with said shell.

8. An illuminated push button switch comprising a cylindrical, metal, hollow shell having a first rim extending radially outwardly from one outward open end thereof and having a second rim extending radially inwardly from the other inward end thereof, said second rim defining an inner opening in said shell, a lamp mounted co-axially with said shell and extending axially through said inner opening and into the interior of said shell, a pair of axially movable, conductive, flexible contact fingers mounted on opposite sides of said lamp with their inner ends extending through said inner opening, said fingers being movable with respect to said lamp and the outer ends of said fingers being joined by a conductive plate having a central opening therein permitting the passage of the head of said lamp therethrough, an operating button comprising a hollow cylindrical portion closed at one end by a non-conducting, translucent outer portion, said button being mounted with the exterior of said cylindrical portion in axial sliding engagement with the interior of said shell and with said outer portion spanning said outward open end, said cylindrical portion encircling said fingers and said lamp and said plate being mounted in frictional engagement with the interior of said button portion to cause said fingers to move with said button, a spring encircling said fingers and said lamp and mounted between said fingers and the interior of said cylindrical portion, said spring acting between said shell and said plate to urge said fingers and said button outwardly of said shell, an insulating washer mounted adjacent the inner end and exteriorly of said shell and having a portion extending interiorly of said shell, said second washer being mounted co-axially with said shell and having a central opening of a size smaller than said inner opening, said washer encircling the inner ends of said contact fingers and the base of said lamp and having a pair of oppositely disposed apertures in said portion thereof for receiving the inner ends of said contact fingers, said inner ends of said contact fingers having projections thereon engageable with said washer for limiting the outward axial movement of said contact fingers,

a non-conducting closure member mounted against said washer, a pair of lamp holding, conductive clips secured to said closure member, the terminals of said lamp being electrically connected to said clips, said clips having lamp engaging portions extending through said inner opening into said shell and engaging said lamp, said portions being disposed on opposite sides of said lamp and intermediate said contact fingers and having projections extending transversely to and forming contact surfaces extending at an acute angle with respect to the paths of movement of the inner ends of said contact fingers, said inner ends of said contact fingers being slidably engageable with said contact surfaces when said button is moved inwardly of said shell, a pair of electrical connecting terminals secured to said closure member and electrically connected to said clips, said closure member also having a pair of securing tab apertures therein but otherwise being substantially imperforate, and a pair of securing tabs secured at one end to said shell and passing through said securing tab apertures, said tabs being in engagement with said closure member and holding said closure member and said second washer in assembled relationship with said shell.

9. An illuminated push button switch comprising a cup-like, metal, hollow shell having one outward open end and having a centrally disposed inner opening in the other inward end thereof, a lamp mounted centrally of said shell and extending longitudinally through said inner opening and into the interior of said shell, a pair of longitudinally movable, conductive, flexible contact fingers mounted on opposite sides of said lamp with their inner ends extending through said inner opening, said fingers being movable with respect to said lamp and the outer ends of said fingers being joined by a conductive plate having a central opening therein permitting the passage of the head of said lamp therethrough, an operating button comprising a hollow cylindrical portion closed at one end by a non-conducting, translucent outer portion, said button being mounted with the exterior of said cylindrical portion in axial sliding engagement with the interior of said shell and with said outer portion spanning said outward open end, said cylindrical portion encircling said fingers and said lamp and said plate being mounted in frictional engagement with said button to cause said fingers to move with said button, a spring encircling said fingers and said lamp and mounted between said fingers and the interior of said cylindrical portion, said spring acting between said shell and said plate to urge said fingers and said button outwardly of said shell, an insulating washer mounted adjacent the inner end but exteriorly of said shell, said washer being mounted co-axially with said shell having a central opening of a size smaller than said inner opening, said washer encircling the inner ends of said contact fingers and having a pair of oppositely disposed apertures therein for receiving the inner ends of said contact fingers, said inner ends of said contact fingers having projections thereon engageable with said washer for limiting the outward longitudinal movement of said contact fingers, a pair of lamp holding clips secured to said washer, said clips having lamp engaging portions extending through said inner opening into said shell and engaging said lamp, said portions being disposed on opposite sides of said lamp and intermediate said contact fingers, a pair of electrical connecting terminals extending axially away from the inner end of said shell, said terminals each having U-shaped ends, one leg of each said U-shaped end being mounted in engagement with one of said clips, the portion of each terminal intermediate said legs forming a contact surface extending at an acute angle with respect to the path of movement of the inner end of a contact finger, said inner ends of said contact fingers being slidably engageable with said contact surfaces when said button is moved inwardly of said shell, a non-conducting closure member mounted against said second washer and having apertures

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therein permitting said terminals to extend therethrough, said closure member also having a pair of securing tab apertures therein but otherwise being substantially imperforate, and a pair of securing tabs secured at one end to said shell and passing through said securing tab apertures, said tabs being in engagement with said closure member and holding said closure member, said terminals and said washer in assembled relationship with said shell.

10. An illuminated push button switch comprising a cylindrical, metal, hollow shell having a first rim extending radially outwardly from one outward open end thereof and having a second rim extending radially inwardly from the other inward end thereof, said second rim defining an inner opening in said shell, a lamp mounted co-axially in said shell, a pair of axially movable, conductive, flexible contact fingers mounted on opposite sides of said lamp with their inner ends extending through said inner opening, said fingers being movable with respect to said lamp and the outer ends of said fingers being joined by a flexible, conductive plate having a central opening therein permitting the passage of the head of said lamp therethrough, an operating button comprising a hollow cylindrical portion closed at one end by a non-conducting, translucent outer portion, said button being mounted with the exterior of said cylindrical portion in axial sliding engagement with the interior of said shell and with said outer portion spanning said outward open end, said cylindrical portion encircling said fingers and said lamp and said plate being mounted in frictional engagement with the interior of said cylindrical portion to cause said fingers to move with said button, a first insulating washer mounted within said shell against said second rim, said washer encircling said fingers and said lamp, a helical spring encircling said fingers and said lamp and mounted between said fingers and the interior of said cylindrical portion, said spring bearing, at one end, against said washer and, at the other end, against said plate to urge said fingers and said button outwardly of said shell, a friction finger member mounted against the inner end of said shell and having a plurality of friction fingers extending adjacent the exterior of said shell from said inner end toward said first rim, a second insulating washer mounted adjacent the inner end but exteriorly of said shell, said second washer being mounted co-axially with said shell and having a central opening of a size smaller than said inner opening, said second washer encircling the inner ends of said contact fingers and having a pair of oppositely disposed apertures therein for receiving the inner ends of said contact fingers, said inner ends of said contact fingers having projections thereon engageable with said second washer for limiting the axial movement of said contact fingers, a pair of lamp holding, conductive clips secured to said second washer, the terminals of said lamp being electrically connected to said clips, said clips having lamp engaging portions extending through said inner opening into said shell and engaging said lamp, said clips being disposed on opposite sides of said lamp and intermediate said contact fingers, a pair of electrical connecting terminals extending axially away from the inner end of said shell, said terminals each having U-shaped ends, one leg of each said U-shaped end being mounted in engagement with one of said clips and the other leg, in engagement with said second washer, each terminal having a projection intermediate said legs forming a contact surface extending toward the other terminal and extending at an acute angle with respect to the path of movement of the inner end of a contact finger, said inner ends of said contact fingers being slidably engageable with said contact surfaces when said button is moved inwardly of said shell, a non-conducting closure member mounted against said second washer and having apertures therein permitting said connecting terminals to extend therethrough, said closure member also having a pair of securing tab

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apertures therein but otherwise being substantially imperforate, and a pair of securing tabs secured at one end to said shell and passing through said securing tab apertures, said tabs being in engagement with said closure member and holding said closure member, said terminals, said second washer and said friction finger member in assembled relationship with said shell.

11. An illuminated push button switch comprising a cylindrical, metal, hollow shell having a first rim extending radially outwardly from one outward open end thereof and having a second rim extending radially inwardly from the other inward end thereof, said second rim defining a central inner opening in said shell, a lamp mounted co-axially with said shell and extending axially through said inner opening and into the interior of said shell, a pair of axially movable, conductive, flexible contact fingers mounted on opposite sides of said lamp with their inner ends extending through said inner opening, said fingers being movable with respect to said lamp and the outer ends of said fingers being joined by a conductive plate having a central opening therein permitting the passage of the head of said lamp therethrough, an operating button comprising a hollow cylindrical portion closed at one end by a non-conducting, translucent outer portion, said button being mounted with the exterior of said cylindrical portion in axial sliding engagement with the interior of said shell and with said outer portion spanning said outward open end, said cylindrical portion encircling said fingers and said lamp and said plate being mounted in frictional engagement with the interior of said cylindrical portion to cause said fingers to move with said button, a first insulating washer mounted in said shell against said second rim, said washer encircling said fingers and said lamp, a spring encircling said fingers and said lamp and mounted between said fingers and the interior of said cylindrical portion, said spring bearing, at one end, against said washer and, at the other end, against said plate to urge said fingers and said button outwardly of said shell, a second insulating washer mounted adjacent the inner end but exteriorly of said shell, said second washer being mounted co-axially with said shell and having a central opening of a size smaller than said inner opening, said second washer encircling the inner ends of said contact fingers and having a pair of oppositely disposed apertures therein for receiving the inner ends of said contact fingers, said inner ends of said contact fingers having projections thereon engageable with said second washer for limiting the axial movement of said contact fingers, a pair of lamp holding, conductive clips secured to said second washer, said clips having lamp engaging portions extending through said inner opening into said shell and engaging said lamp, said portions being disposed on opposite sides of said lamp and intermediate said contact fingers, a pair of electrical connecting terminals extending away from the inner end of said shell, said terminals each having U-shaped ends, one leg of each said U-shaped end being mounted in engagement with one of said clips and the other leg, in engagement with said second washer, the portion of each terminal intermediate said legs forming a contact surface extending at an acute angle with respect to the path of movement of the inner end of a contact finger, said inner ends of said contact fingers being slidably engageable with said contact surfaces when said button is moved inwardly of said shell, a non-conducting closure member mounted against said second washer and having apertures therein permitting said terminals to extend therethrough, said closure member also having a pair of securing tab apertures therein but otherwise being substantially imperforate, and a pair of securing tabs secured at one end to said shell and passing through said securing tab apertures, said tabs being in engagement with said closure member and holding said closure member, said terminals and said second washer in assembled relationship with said shell.

12. An illuminated push button switch comprising a

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hollow cylindrical shell having an open outer end and an opposite inner end, a button having a light transmitting outer end, said button being mounted in said shell with the exterior thereof in sliding engagement with the interior of said shell and with said outer end of said button adjacent said outer end of said shell, a conductive, contact finger mounted in said shell and movable with said button, said finger extending longitudinally inside of said shell and having its free end spaced from said outer end of said shell in the direction of said inner end of said shell, spring means acting between said shell and said finger and urging said free end of said finger toward said outer end of said shell, means limiting the movement of said finger in the direction in which it is urged by said spring means for maintaining said finger and said button within said shell, a lamp mounted with the head thereof in a fixed position within and in relation to said shell and adjacent said outer end of said button and with the base thereof remote from said outer end of said button, said button, said finger and said spring means being disposed with respect to said lamp so as to provide a light transmitting path between the head of said lamp and said outer end of said button, and said button and said finger being movable with respect to both said shell and said lamp, a member mounted on said shell adjacent said inner end of said

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shell, a pair of electrical connecting terminals mounted on said last-mentioned member, means electrically connected to said terminals and engageable with said end of said finger when said button is moved inwardly of said shell, means electrically connecting said terminals with the terminals of said lamp, and means maintaining said last-mentioned member in assembled relationship with said shell.

13. An illuminated push button according to claim 12 in which said terminals have channels therein for receiving connecting wires and further comprising means on said terminals for fastening wires to said terminals, said last-mentioned means overlying said channels for securing said wires in said channels.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,980,784

April 18, 1961

Howard C. Gohs et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, lines 61 and 62, for "requirement" read
-- requirements --; column 5, line 60, after "units" insert
-- of the --; column 17, line 1, for "hollow cylindrical" read
-- tubular --.

Signed and sealed this 10th day of October 1961.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents

USCOMM-DC