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ILLUMINATED PUSH BUTTON SWITCH WITH ROTARY LATCHING MEANS

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Fig. 2.

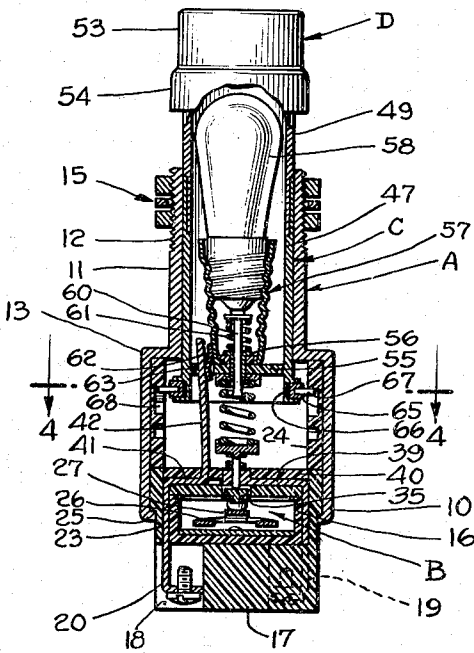


Fig. 1.

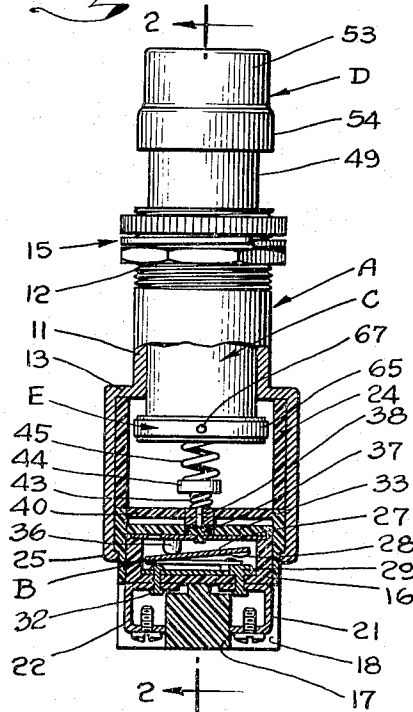


Fig. 3.

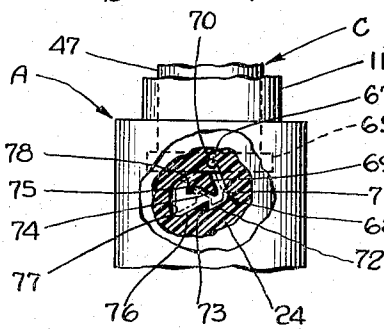


Fig. 5.

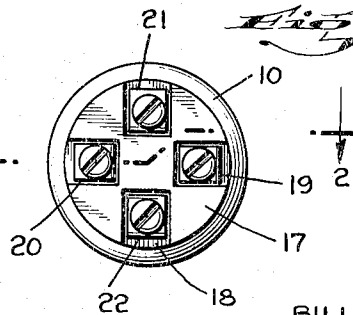
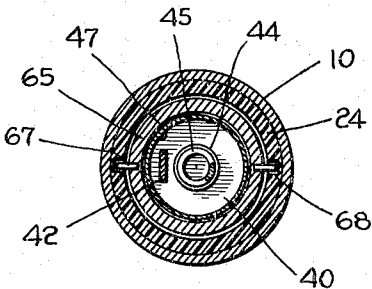


Fig. 4.



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1

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ILLUMINATED PUSH BUTTON SWITCH WITH ROTARY LATCHING MEANS

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14 Claims. (Cl. 200—159)

This invention relates to push button switches in general and in particular to a combination of push button switch and indicator light which I choose to designate generally as an illuminated push button switch. The general object of the present invention is to provide an improved push button switch adapted, in response to depression of its push button from a normally open position, to become self latched in closed position and, in response to a further depression of the push button, to be self releasing back to its normally open position.

More particularly, the invention aims to provide a push button switch having latching means embodying a rotary latching part including a combined latching and camming finger cooperating with a track in the housing of the device, for actuation from switch open to switch closed position and vice versa upon successive depression and release of the push button of the device.

A further object is to embody such a latching switch in combination with an illuminated lens cap as the embodiment of the push button part of the device, together with dual circuits to the switch and to the illuminating light bulb of the device, both circuits utilizing conductors which enter the rear end of the device, with the illuminating circuit bypassing the switch.

A further object is to provide such a device wherein a switch housing has at one end a mounting for the switch and its electric terminals and at its other end is provided with a tubular neck in which a switch actuator plunger is slidably mounted, said neck further being provided with means for mounting the entire unit in an opening in an instrument panel or the like.

Other objects and advantages will become apparent in the ensuing specification and appended drawing in which:

FIG. 1 is a side view of an illuminated push button switch unit embodying the invention, with the switch housing and switch parts shown in axial section;

FIG. 2 is an axial sectional view of the same taken on the line 2—2 of FIG. 1;

FIG. 3 is a fragmentary side view of the same, showing the switch housing from the outside with a portion broken away and shown in section to illustrate the camming mechanism;

FIG. 4 is a transverse sectional view taken on the line 4—4 of FIG. 2; and

FIG. 5 is an end view of the unit.

Referring now to the drawings in detail, there is shown therein as an example of one form in which the invention may be embodied, an illuminated push button switch embodying in general, a housing A, a switch unit B mounted in the rear end of the housing A, a combined switch actuator plunger and light casing C slidable in housing A and embodying a combined push button and lens cap unit on its outer end, a light assembly D mounted within the casing C, and rotary latching mechanism E including a rotary latching part on the inner end of plunger C and combined guide and latch detent means embodied in the housing A.

The following detailed description of the invention will take up these main units of the device in the order enumerated above.

The housing A.—Housing A embodies at its rear end a cylindrical switch housing 10 and at its forward end a

2

reduced cylindrical tubular barrel or neck 11 the end of which is threaded at 12. An annular flat radial shoulder 13 joins the neck 11 to the switch housing 10. A series 15 of retainer and lock nuts and interposed washer are threaded onto the threaded section 12 of neck 11 to secure the unit to a mounting panel, with the neck 11 extending through an opening therein.

In the rear end of housing 10 is a terminal and switch mounting insulator means comprising a switch mounting insulator cup 16 of cylindrical cup form to which is secured, as by bonding, a terminal insulator spider 17 having two pairs of recesses 18 (disposed at 90° spacing around the circumference thereof) in which are received, respectively, a pair of diametrically opposed switch terminals 21, 22 and a pair of diametrically opposed illuminating circuit terminals 19, 20, the latter being arranged at 90° spacing from terminals 21, 22.

Spider 17 has an integral collar portion 23 which extends into the rear end of switch housing 10 and has a thickened cylindrical rim snugly fitted within housing 10 and seated against a flange 25 which is spun inwardly at the rear end of housing 10 and holds the parts in assembly. To illustrate the integral connection between spider 17 and collar 23, FIG. 2, at its lower right corner shows a section through one of the corner segments intervening between recess 18. Recesses 18 are open through the web between spider 17 and collar 23, so that the terminals 19—22 can be assembled.

Within switch housing 10, and held between the inner end of collar 23 and the shoulder 13 of the housing, is a cam sleeve 24 of insulating material which is fairly hard and wear resistant (e.g. nylon). Formed in the sleeve 24 are the latching detents and guide tracks which will be described more in detail as part of the latching mechanism E.

The specific features of switch B form no part of the invention. It may be of any type, either normally open or normally closed, embodying a movable contact which is yieldingly biased to a normal position and actuated to an alternate position by pressing lens cap D.

Switch B.—For example, it may be of the "W"-blade type, including primarily a stamped ring sheet metal part 26 embodying a spring arm 27 carrying a movable contact 28, and a fixed contact 29 having a stem riveted through the bottom of switch mounting cup 16 and through a radial leg of terminal 19 to secure the latter in assembly. The switch part 26 may be mounted on a metal disc 31 which in turn is shown as secured by rivets including the rivet 32 to the bottom of mounting cup 16, the rivet 32 extending through the radial leg of terminal 21 and securing the latter in assembly.

Such a switch unit may also include a switch actuator part mounted between cup 16 and an insulator washer 33, including a spring finger carrying a button 36 in engagement with the switch arm 27, and, at the axis of the assembly, having a bearing pad 37 extending loosely into an aperture in the center of washer 33 and engaged by a pressure pin 38 which is slidably mounted in a bearing on the end of a radially inwardly extending arm 39 on terminal 19. This bearing is received in a central aperture of an insulator washer 40 which rests against terminal arm 39 and against an offset portion 41 of terminal 20, from which a contact blade 42 extends through an aperture in washer 40. A small coil spring 43 surrounds pressure pin 38 and is engaged under compression between the end of contact arm 39 and a cupped head 44 of pin 38. A second coil spring 45 is engaged under compression between the head 44 and the plunger assembly C which will now be described.

Plunger and light assembly C.—Plunger unit C may consist in any form of push stem. As shown, it includes

a sectional lamp casing of cylindrical tubular form, slidably mounted in the housing neck 11 and consisting in a body section 47 in the forward end of which is coupled a cap section 49. A cup-shaped lens 53 of light transmitting material such as translucent molded plastic material is secured to the forward end of light casing section 49 by a mounting collar 54.

Light assembly D.—Secured in the rear end of light causing 47, as by staking, is a lamp base disc 55 of insulating material to which is secured, by means of a grommet 56, a lamp socket 57 which supports an illuminating light bulb 58.

The forward end of spring 45 is engaged in a cupped head on the rear end of grommet 56 (preferably a separate cupped washer secured by the swaged rear end of grommet 56). Slidably mounted in the grommet 56 is a contact pin 60 having at its forward end a contact head engaged yieldingly by a coil spring 61 bearing against the forward end of grommet 56 and thereby yieldingly maintained in engagement with the tip contact of lamp bulb 58. An electrical connection to the tip contact of bulb 58 is thus established through contact pin 60, metal grommet 56, spring 45, pusher pin 38, and terminal arm 39 to the terminal 19 in one side of the illuminating circuit. Connection to terminal 20 in the other side of the illuminating circuit is provided by the yielding engagement of contact blade 42 against a small contact brush 62 attached to the socket. Blade 42 extends through an aperture 63 in the lamp base 55, and the contact brush 62 may also extend into the aperture 63 as shown.

Rotary latching mechanism E.—A latch ring 65 is mounted in an annular bearing channel 66 on the rear end of light casing section 47, for swivelling movement on the major axis of the device, and carries a pair of diametrically opposed radially projecting latch fingers 67 of cylindrical rod form. Fingers 67 extend into respective camming tracks 68 (FIGS. 2 and 3) in the form of closed-loop internal grooves in the cam sleeve 24, and are adapted to latch behind respective detents 69 consisting in integral projections on sleeve 24 in the centers of the respective tracks 68 and defining the inner bearing surface margins of the tracks. Referring now to FIG. 3, each track has an apex portion defining a retainer pocket 70 in which the respective latch finger 67 is retained to hold the plunger C in a normal, retracted position against the yielding retracting force of coil spring 43. In this retracted position of the plunger C, the pusher pin 38 is retracted and the switch B is open, the free length of the coil spring 45 (stiffer than coil spring 43) being so related to the length of the pin 38 as to permit such retraction of the pin 38.

Each cam track further includes, on one side thereof (the right side as viewed in FIG. 3) a ramp portion 71 the inner side of which is defined by a ramp surface on detent 69 which engages the respective latch finger 67 as the plunger C is depressed and guides the finger 67 past this side of the detent, the latch ring 65 swivelling in one direction to follow the movement of the latch fingers. As the respective finger 67 passes this side of the detent 69, it is engaged by an outer ramp surface of a portion 72 of the track and thereby guided toward the return side of the track to a position behind the detent 69, the ring 65 swivelling in the opposite direction. At this point, the respective latch finger is engaged by a stop shoulder 73 in the respective track, thus arresting this stage of movement of the finger at a point behind the detent 69, so that, upon release of the pressure against the plunger C, the finger will be retracted, under the loading of spring 43, into engagement with the rear side of detent 69. This rear side embodies a ramp 74 having an inclination opposite to that of ramp 72, whereby the spring loaded engagement of the finger 67 thereagainst results in further movement of the respective latch finger 67 toward the return side of the track, clearing the stop shoulder 73, until the finger engages in a retaining pocket 75 of detent 69, where it

will be retained so as to hold the plunger C in a depressed position. In this position, the pusher pin 38 will be projected rearwardly, the yielding resistance of coil spring 43 being overcome by the greater resistance of coil spring 45, and the switch B will thereby be closed, the projecting movement of pin 38 being transmitted through bearing pad 37 to spring blade 35 of the switch actuator, and the blade 35 thereby being flexed rearwardly to transmit movement from button 36 to switch arm 27, thereby shifting the movable switch contact 28 into engagement with the contact 29. Thus a circuit is established across switch terminals 21, 22 to close the circuit that is controlled by the device.

Each camming track 68 further includes a ramp 76, extending substantially as a parallel continuation of ramp 72 beyond stop shoulder 73, and functioning when engaged by the respective cam finger 67 upon a further depression of plunger C, to shift the respective latch finger 67 further toward the return side of the track, until it engages a stop surface 77 at the margin of said return side, and extending parallel to the major axis of the device in spaced relation to the adjacent side of detent 69 so as to guide the respective finger 67 past this side of the detent in a retracting movement of the plunger C in response to the spring loading of coil spring 43 when the manual pressure of the second depression of the plunger is released. The finger 67 will then engage a return ramp 78 which will guide the finger back to the retaining pocket 70.

In those portions 71 and 78 of the track which adjoin the retaining pocket 70, the outer ramp surfaces are parallel to the opposed surfaces of detent 69 defining the inner surfaces of these ramp portions of the track.

Operation.—The operation of the apparatus has been described in detail in connection with the foregoing description of the apparatus, and will be reviewed here only in a general way. The illuminating circuit through terminals 19, 20 to light bulb 58 may be constantly energized to illuminate the lens 53 constituting the push button part of the switch mechanism. In many cases a legend will be imprinted on the face of lens 53 to designate the character and function of the particular switch in a multiple circuit system, and the illumination will facilitate the reading of the legend. When the operator desires to close the particular circuit controlled by the device, he presses against the lens 43, projecting the plunger C rearwardly against the light yielding resistance of spring 38, and causing the latch fingers 67 to ride in the rightward side of tracks 68 as viewed in FIG. 3, until further depression of the plunger is arrested by engagement of fingers 67 against stop shoulders 73. In the depression of the plunger C, the spring 45, overriding the lighter spring 43, will project the pusher plunger 38 to close the switch B. Upon releasing the pressure against lens 43, the plunger will be retracted by spring 38 and fingers 75 will engage detent 69 and advance to the pocket 75 thereof where the retracting movement of the plunger will be arrested. This retracting movement of the plunger is insufficient to permit the re-opening of switch B, which will be held closed by the latching of the plunger.

When the operator desires to open the switch, he simply presses against the push button-lens 43 a second time, projecting the latch fingers 67 against ramps 76 which shift them into the return portions of the respective tracks 68 and against return side 77 thereof. The pressure against the plunger is then released, and it will be shifted by spring 38 back to its normal position, the latch fingers 67 being guided by the sides 77 and then the ramps 78 back to their starting positions where they will be retained in retainer pocket 70 in position to again move into the ramp portions 71 of the tracks upon a further depression of the plunger. The switch B is opened in this retracting movement of the plunger. During the depressing and retracting movements of the plunger C, contact brush 62 will slide against the terminal brush 42 while maintaining electrical connection

therewith under pressure of blade 42 which is established by an inward springing of the brush 62 from an unstressed position.

I claim:

1. In a push button switch: a housing; a switch mounted in one end thereof; a plunger slidable axially in the other end of said housing; means yieldingly loading said plunger to a retracted position in which said switch is in one position; said plunger having a projecting outer end terminating in a push button and at its inner end being associated with said switch for actuating the same to an alternate position when depressed; means pivotally mounted on said plunger near its inner end for oscillating movement with respect to the plunger about the major axis thereof, said last means having a latching finger projecting radially outwardly; means fixed to the inner wall of said housing providing an inwardly facing latching detent for engaging said finger to hold said plunger in depressed, switch-actuating position, and an internal, inwardly facing camming track of closed-circuit form surrounding said detent and including means co-operable with said finger during depression of said plunger, to guide said finger from a starting position past one side of said detent to a position behind the detent from which, upon release of the plunger, the finger will be received and held by the detent in the switch actuating position, said camming track further including means, operative upon a further depression of the plunger, to guide the respective finger circumferentially to a position clearing the other side of the detent so that, upon release of the plunger, it will be returned by said yielding loading means to said retracted position, with said finger passing said other side of the respective detent and returning to said starting position.

2. In an illuminated push button switch: a tubular housing comprising at one end a switch housing portion and at its other end an open, reduced tubular neck; a switch mounted in said switch housing portion; a tubular plunger slidable axially in said neck, projecting through the open end thereof; means yieldingly loading said plunger to a retracted position in which said switch is released to a normal position; said plunger having at its outer end a combined push button and lens cap, and having its inner end arranged to actuate said switch to an alternate position upon depression thereof; a light bulb in said tubular plunger in a position to illuminate said lens cap; electrical connections to said light bulb past said switch; means pivotally mounted on the inner end of said plunger and having a camming and latching finger projecting radially therefrom for oscillating movement with respect to the plunger about the major axis thereof, said housing having an internal, inwardly facing camming track of closed circuit form receiving said finger and a latching detent surrounded by said track and defining a latching pocket in which said finger is receivable to latch said plunger in its depressed position, said camming track including means to guide said finger from a starting position in which said plunger is retracted, past one side of said detent during depression of said plunger, to a position behind said detent whereby upon release of said plunger said finger will be retracted by said yielding loading into the latching recess to hold the plunger in switch actuating position, and said track further including means operative upon further depression of the plunger, to guide said finger circumferentially to a position clearing the other side of the detent so that, upon release of the plunger, it will be returned by said yielding loading means to its retracted position, with said finger passing said other side of the detent and returning to said starting position.

3. In an illuminated push button switch: a tubular housing comprising at one end a switch housing portion and at its other end an open, reduced tubular neck; a switch mounted in said switch housing portion, said switch including a fixed contact, a movable contact and

a spring arm carrying said movable contact and normally holding it in an open position; a tubular plunger slidable axially in said neck, projecting through the open end thereof, having at its outer end a combined push button and lens cap, and having at its inner end, a projection to engage said spring arm during depression thereof, to close said switch; a light bulb in said tubular plunger in a position to illuminate said lens cap; electrical connections to said light bulb past said switch; means yieldingly loading said plunger to a retracted position in which said switch is released to its open position; a latching ring pivotally mounted on the end of said plunger and having diametrically opposed camming and latching fingers projecting radially therefrom, said housing having a pair of diametrically opposed camming tracks of closed circuit form receiving respective fingers, and latching detents surrounded by the respective tracks and defining respective latching pockets in which respective fingers are receivable to latch said plunger in its depressed position, each camming track including means to guide a respective finger from a starting position in which said plunger is retracted, past one side of a respective detent during depression of said plunger, to a position behind a respective detent whereby upon release of said plunger said fingers will be retracted by said yielding loading into the respective latching recesses to hold the plunger in switch closing position, and each track including means operative upon further depression of the plunger, to guide the respective finger circumferentially to a position clearing the other side of the respective detent so that, upon release of the plunger, it will be returned by said yielding loading to its retracted position, with said finger passing said other side of the respective detent and returning to said starting position.

4. In a push button switch: a tubular housing comprising at one end a switch housing portion and at its other end an open, reduced tubular neck; a switch mounted in said switch housing portion; a plunger slidable axially in said neck; means yieldingly loading said plunger to a retracted position in which said switch is released to a normal position; said plunger projecting through the open end of said neck, having at its outer end a push button and having its inner end arranged to actuate said switch to an alternate position upon depression thereof; means pivotally mounted on the end of said plunger and having diametrically opposed camming and latching fingers projecting radially therefrom, said housing having a pair of diametrically opposed camming tracks of closed circuit form receiving respective fingers and latching detents surrounded by the respective tracks and defining respective latching recesses in which respective fingers are receivable to latch said stem in its depressed position, each camming track including means to guide a respective finger from a starting position in which said plunger is retracted, past one side of a respective detent during depression of said plunger, to a position behind a respective detent whereby upon release of said plunger said fingers will be retracted by said yielding loading into the respective latching recesses to hold the plunger in switch-actuating position, and each track including means operative upon further depression of the plunger, to guide the respective finger circumferentially to a position clearing the other side of the respective detent so that, upon release of the plunger, it will be returned by said yielding loading to its retracted position, with said finger passing said other side of the respective detent and returning to said starting position.

5. A switch as defined in claim 4, including an annular external bearing channel on the inner end of said plunger, and in which said pivotally mounted means comprises a latching ring rotatably mounted in said channel for rotation on the major axis of said plunger.

6. A switch unit as defined in claim 4, wherein said neck and plunger are cylindrical, said neck is threaded at its forward end, and including ring nuts threaded onto

7

said forward end of the neck for mounting the same in an opening in an instrument panel.

7. A combined indicator light and switch unit as defined in claim 4, wherein said indicator lens cap is a separate part and includes a tubular throat portion telescoping within the outer end of said plunger.

8. In a push button switch: a tubular housing comprising at one end a switch housing portion and at its other end an open, reduced tubular neck; a switch mounted in said switch housing portion, said switch including a fixed contact, a movable contact and a spring arm carrying said movable contact and biasing it toward a normal position; a plunger slidable axially in said neck, projecting through the open end thereof, having at its outer end a combined push button and lens cap, and having its inner end arranged to actuate said switch to an alternate position; means yieldingly loading said plunger to a retracted position in which said switch is released to its normal position; a circular external bearing channel on the rear end of said plunger; a latching ring swivelled in said channel and having diametrically opposed camming and latching fingers projecting radially therefrom, said housing having a pair of diametrically opposed camming tracks of closed circuit form receiving respective fingers and latching detents surrounded by the respective tracks and defining respective latching pockets in which respective fingers are receivable to latch said plunger in its depressed position, each camming track including means operative, in response to initial depression of the plunger, to guide a respective finger from a starting position in which said plunger is retracted, past one side of a respective detent during depressing movement of said plunger, to a position behind a respective detent whereby upon release of said plunger said fingers will be retracted by said yielding loading into the respective latching recesses to hold the plunger in switch-actuating position, a stop shoulder to arrest said initial plunger depression at a point where the respective latching finger has arrived at said position behind the respective detent, and each track including means operative, upon further depression of the plunger, to guide the respective finger circumferentially to a position clearing the other side of the respective detent so that, upon release of the plunger, it will be returned by said yielding loading to its retracted position, with said finger passing said other side of the respective detent and returning to said starting position.

9. In an illuminated push button switch device: a tubular housing comprising at one end a cylindrical switch housing and at its other end an open, reduced tubular neck; a cylindrical sleeve of insulating material lining the forward part of said switch housing portion and having a pair of diametrically opposed internal camming tracks of closed loop form and respective latching detents surrounded by the respective tracks; terminal and switch mounting insulator means including a cylindrical collar part mounted in the rear portion of said switch housing and retained against the rear end of said sleeve and defining a central switch cavity; a switch mounted on said insulator means in said cavity, said switch including a fixed contact, a movable contact and a spring arm carrying the latter and normally holding it in an open position; a pair of switch terminals mounted on said insulator means and connected respectively to said contacts; a tubular plunger slidable axially in said neck, projecting through the open end thereof, having at its outer end a combined push button and lens cap, and having at its inner end a lamp mounting base of insulating material; a lamp socket and a central lamp contact co-axially mounted on said base; a pair of lamp terminals mounted on said insulator means at 90° circumferential spacing from respective switch terminals, one of said lamp terminals having at its inner end a radially inwardly projecting arm and the other having at its inner end a contact brush offset radially inwardly and projecting forwardly alongside of and having a sliding electrical connection with said lamp socket

8

providing one side of an illuminating circuit, said lamp mounting base having an aperture through which said brush extends; means arranged to transmit switch closing movement from said lamp mounting base to said movable switch arm in response to depression of said plunger and also providing a conductor connection between said central lamp contact and said one lamp terminal constituting the other side of said illuminating circuit; means yieldingly loading said plunger for return to a normal, retracted position when released; an annular bearing channel on the inner end of said plunger; a latching ring swivelled in said channel and having diametrically opposed camming and latching fingers projecting radially therefrom, said housing having a pair of diametrically opposed camming tracks of closed circuit form receiving respective fingers and latching detents surrounded by the respective tracks and defining respective latching pockets in which respective fingers are receivable to latch said stem in its depressed position, each camming track including means operative, in response to initial depression of the plunger, to guide a respective finger from a starting position in which said plunger is retracted, past one side of a respective detent during depressing movement of said plunger, to a position behind a respective detent whereby upon release of said plunger said fingers will be retracted by said yielding loading into the respective latching recesses to hold the plunger in switch closing position, a stop shoulder to arrest said initial plunger depression at a point where the respective latching finger has arrived at said position behind the respective detent, and each track including means operative, upon further depression of the plunger, to guide the respective finger circumferentially to a position clearing the other side of the respective detent so that, upon release of the plunger, it will be returned by said yielding loading to its retracted position, with said finger passing said other side of the respective detent and returning to said starting position.

10. In an illuminated push button switch: a tubular housing comprising at one end a cylindrical switch housing portion and at its other end an open, reduced tubular neck; a cylindrical sleeve of insulating material lining the forward part of said switch housing portion and having a pair of diametrically opposed internal camming tracks of closed loop form and respective latching detents surrounded by the respective tracks; terminal and switch mounting insulator means including a cylindrical collar part mounted in the rear portion of said switch housing and retained against the rear end of said sleeve and defining a central switch cavity; a switch mounted on said insulator means in said cavity, said switch including a fixed contact, a movable contact and a spring arm carrying the latter and normally holding it in one position; a pair of switch terminals mounted on said insulator means and connected respectively to said contacts; a tubular plunger slidable axially in said neck, projecting through the open end thereof, having at its outer end a combined push button and lens cap, and having at its inner end a lamp mounting base of insulating material; a lamp socket and a central lamp contact coaxially mounted on said base; a pair of lamp terminals mounted on said insulator means at 90° circumferential spacing from respective switch terminals, one of said lamp terminals having at its inner end a radially inwardly projecting arm terminating in a bearing coaxial with the major axis of the switch and the other having at its inner end a contact brush offset radially inwardly and projecting forwardly alongside of and having a sliding electrical connection with said lamp socket, said lamp mounting base having an aperture through which said brush extends; a pusher pin slidably mounted in said bearing, having an abutment head at its forward end and arranged to transmit switch actuating movement to said movable switch arm; a relatively heavy coil spring engaged between said abutment head and said lamp mounting base and adapted to transmit switch actuating movement to said pusher pin in response to depression of said plunger; a relatively light coil spring

surrounding said pusher pin and engaged under compression between said abutment head and said bearing and loading said plunger for return to a normal, retracted position when released; said pusher pin and relatively heavy coil spring cooperatively providing an electrical connection between said central lamp contact and said one lamp terminal while said brush provides an axially slidable electrical connection between said lamp socket and said other lamp terminal; a pair of diametrically opposed latching fingers pivotally mounted on said plunger near its inner end and projecting radially; said housing having therein a pair of diametrically opposed latching detents for engaging said fingers to hold said plunger in depressed, switch-actuating position and camming tracks of closed-circuit form surrounding the respective detents; each of said detents providing a latching pocket in which a respective finger is receivable to latch said plunger in its depressed, switch closing position, and each of said camming tracks including means to guide said finger from a starting position in which said plunger is retracted, past one side of said detent during depression of said plunger, to a position behind said detent whereby upon release of said plunger said finger will be retracted by said yielding loading into the latching recess to hold the plunger in switch closing position, and said track further including means operative upon further depression of the plunger, to guide said finger circumferentially to a position clearing the other side of the detent so that, upon release of the plunger, it will be returned by said yielding loading to its retracted position, with said finger passing said other side of the detent and returning to said starting position.

11. A switch device as defined in claim 10, further including a switch actuator engaged by the rear end of said pusher pin and arranged to transmit switch closing movement to said spring switch arm in response to rearward movement of said pusher pin.

12. In a push button switch: a housing; a switch mounted in one end thereof; a plunger slidable axially in the other end of said housing; means yieldingly loading said plunger to a retracted position in which said switch is in one position; said plunger having a projecting outer end terminating in a push button and at its inner end being associated with said switch for actuating the same to an alternate position when depressed; means pivotally mounted on the said inner end of said plunger for oscillating movement with respect to the plunger in a radial plane about the longitudinal axis of the plunger, said means having diametrically opposed camming and latching fingers projecting radially outwardly therefrom; means fixed to said housing providing a pair of diametrically opposed internal camming tracks of closed circuit form receiving respective fingers and latching detents surrounded by the respective tracks and defining respective latching recesses in which respective fingers are receivable to latch said stem in its depressed position, each camming track including means to guide a respective finger from a starting position in which said plunger is retracted, past one side of a respective detent during depression of said plunger, to a position behind a respec-

tive detent whereby upon release of said plunger said fingers will be retracted by said yielding loading into the respective latching recesses to hold the plunger in switch-actuating position, and each track including means operative upon further depression of the plunger, to guide the respective finger circumferentially to a position clearing the other side of the respective detent so that, upon release of the plunger, it will be returned by said yielding loading to its retracted position, with said finger passing said other side of the respective detent and returning to said starting position.

13. A push button switch as defined in claim 1, wherein said switch is normally open and is closed by depression of said plunger.

14. In a push button switch: a housing; a switch mounted in one end thereof; a plunger slidable axially in the other end of said housing; means yieldingly loading said plunger to a retracted position in which said switch is in one position; said plunger having a projecting outer end terminating in a push button and at its inner end being associated with said switch for actuating the same to an alternate position when depressed; means pivotally mounted on the said inner end of said plunger for oscillating movement with respect to the plunger in a radial plane about the longitudinal axis of the plunger, said means having diametrically opposed camming and latching fingers projecting radially outwardly therefrom; means fixed to said housing providing a pair of diametrically opposed internal camming tracks of closed circuit form receiving respective fingers and latching detents surrounded by the respective tracks and defining respective latching recesses in which respective fingers are receivable to latch said stem in its depressed position, each camming track including means to guide a respective finger from a starting position in which said plunger is retracted, past one side of a respective detent during depression of said plunger, to a position behind a respective detent whereby upon release of said plunger said fingers will be retracted by said yielding loading into the respective latching recesses to hold the plunger in switch-actuating position, and each track including means operative upon further depression of the plunger, to guide the respective finger circumferentially to a position clearing the other side of the respective detent so that, upon release of the plunger, it will be returned by said yielding loading to its retracted position, with said finger passing said other side of the respective detent and returning to said starting position, said pivotally mounted means being in the form of a ring, said latching fingers being in the form of pins mounted in said ring at diametrically opposite points, and said plunger having at its inner end an annular peripheral bearing channel receiving said ring for oscillating movement therein.

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