The invention relates to electric switches and particularly switches which may be attached to a wall or building structure and which are operated by a luminous plate rather than the conventional push button.

Among the objects of the invention is to provide, therefore, a new and improved plate push button switch which, while incorporating an illuminating means, is at the same time compact in design and economical of manufacture.

Another object of the invention is to provide a new and improved electric switch capable of utilizing a plate for operating the switch contact points with provision being made for readily removing the plate whenever it is desired to gain access to the interior.

Still another object of the invention is to provide an electric switch construction which is adapted to be permanently secured to a wall or other building structure wherein the number of parts has been kept relatively to a minimum and so arranged that they can be readily assembled and disassembled without being necessary to shut off the electric current.

A further object of the invention is to provide a wall type electric switch having an illuminated control plate or panel of a relatively large size so that the switch can be readily located at all times and operate with particular ease.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in the claims and illustrated in the accompanying drawings, in which:

Figure 1 is a longitudinal elevational view of the device shown partly in section and mounted upon a building structure.

Figure 2 is a sectional view showing the back of the device taken on the line 2—2 of Figure 1.

Figure 3 is a longitudinal sectional view of the device taken on the line 3—3 of Figure 2.

Figure 4 is a wiring diagram of the switch circuit in a typical installation.

Figure 5 is a wiring diagram of an alternative switch circuit.

A definite need for an improved electric switch, avoiding the difficulties of locating and operating the old fashioned wall mounted push button switch with its small button or lever, is now widely recognized.

A plate push button switch of the kind herein disclosed is especially adapted to use in circuits where only an instantaneous connection may be needed. One advantageous use of the switch is in the remote control of an impulse relay constituting the immediate switch means for closing a circuit such as a lighting circuit, with the impulse relay located nearer to the light or other device to be energized, than is the push-button switch. When used in circuits involving a relay a momentary closure is sufficient to excite the relay which may then through suitable mechanism be adapted to close another switch. When put to such use electric connections between the switch and the relay need carry but a relatively light, safe voltage, and heavy voltage lines may be confined to the relay switches.

The device comprising the subject matter of this invention is an electric switch in which an illuminating means is incorporated and which is further provided with a plate for replacing the ordinary push button, adapted to be illuminated throughout, thereby providing a switch unit which can be located and operated with exceptional ease wherever it may be installed.

In an embodiment chosen to illustrate the invention there has been provided a switch box 20 shown mounted upon a clip 11, attached to a wall structure 12 of a building. The switch box may be exposed or may, as shown in Figure 1, be concealed within the wall structure of the building so that the rim of the box is approximately flush with the wall surface.

Within the switch box is located a frame 13 providing a mounting for the entire switch mechanism. In order to secure the frame within the switch box there are provided spring elements 14 at the sides of the frame which are designed to press outwardly in order to frictionally grip the inside surface of the wall of the switch box whenever the frame is received therein as shown in Figure 1. Outwardly bent rim elements 15 on the frame engage the switch box to fix the position of the frame.

So that the frame may provide a suitable mounting for electric parts it has attached thereto a base 15. Tabs 17 of the frame have a straight portion which fits into slots 18 in the edge of the base and a bent over portion pressed against the outside face. The circumference of the base therefore rests on the bottom edge 19 of the frame. By this means the base will be securely held in place on the frame.

A push plate member 20 is mounted upon the opposite side of the frame and comprises an exterior plate element 21 which overlies both the frame and the switch box and which is wide enough and long enough so that it may be easily
located and operated. Also comprising a part of the push plate member is an inner plate section 22, parallel to and spaced from the plate element 21 by a laterally open space 23. On the inside surface of the push plate member there is provided a centrally located recess 33 extending into the push plate member so that the thickness of the member at the mid-portion is substantially the thickness of the plate element 21. When the member comprises a relatively translucent material such as glass, the lights behind the member will readily pass through and illuminate it. For holding the member in place there are provided turned-over lips 24 at the edge of the frame which are adapted to engage portions of the inner plate section 22. By keeping the dimension between the bottom of one space 23 and the edge of the plate section 22 on the opposite side approximately the same or slightly more than the distance between opposite edges of the lips 24, the plate section may readily be inserted into the frame to the position shown by Figure 3. When in position it may be shifted laterally so that the plate section engages the lips 24 on both sides. One side may be considered as a hinge and the other side as a latch.

In order to retain the push plate member in proper position there is provided on the lower side of the frame a somewhat U-shaped spring arm 25, one end 26 of which is riveted to the base by means of a rivet 27 and having a free end 28 adapted to enter the recess 33 at the lower outer side corner where a shallow depression may be provided for its reception if desired.

At the upper side of the frame, as shown in Figure 3, there is provided a second spring contact arm 30 of less resistance than the spring arm 25 which likewise has one end 31 anchored in place upon the base by a peened or riveted end 34 of an extension of a binding post 35. The arm 28 has a curved free end 31 pressed against the inside surface of the inner plate section 22. By the combined action of the spring arm 25 and spring contact arm 28 the inner plate section is pressed outwardly into contact with the lips and because of the lateral thrust of the spring arm 28 is prevented from shifting in an edgewise direction in the plane of the lips 24.

The binding post 35, shown mounted at the rear of the base, has an inside neck 33 extending through the end 39 of the contact arm where it is riveted over as previously noted so that the single riveted connection secures both the binding post and end of the arm in position. It will be clear, also, that the rivet provides an electric contact between the arm and the binding post. A wire aperture 35' in the binding post facilitates the making of a good electric connection.

A second binding post 36 is located adjacent the first post and is similarly provided with a central wire aperture 37 and an inside riveting end 38. The riveting end is designed to extend through one end 39 of a second arcuate spring contact member 40, a free end 41 of which is curved to a position spaced from but adjacent the free end 31 of the contact arm 29.

On some occasions a relay incorporating a three-way switch may be desirable. For this purpose, there is incorporated a resilient contact member 58 attached by means of a rivet 59 to the base 16 where it may be electrically connected to a binding post 36 having the same general description as the binding posts 35 and 36. As illustrated herein, the member 58 has a turned over end 60 adapted to normally engage a bent portion 61 of the contact arm 29. This provides for ready conversion of the unit into a three-way switch.

To provide a lamp socket for a lamp 52 the base has a lamp socket aperture 42 centrally located and of a diameter sufficient to permit the insertion of a lamp base 43. It will be noted that the end 39 of the contact member 40 has an angularly bent portion 44 extending into the aperture 42 and rearwardly into contact with a corresponding aperture in a back plate 45. The extension of the bent portion into the aperture prevents the contact member from rotating out of position around its single rivet connection. On the opposite side of the aperture to the end 29 of the spring arm 25 has a similar angularly bent portion 45 extending through the aperture to the back plate. The last described construction likewise prevents inadvertent rotation of the spring arm 25.

The back plate 46 provides reinforcement for the aperture and is applied to the rear of the base. The rivet 27, by means of which the spring arm 25 is mounted, is also utilized to anchor the plate to the base at one point. The plate is anchored at a second point by means of the rivet of 33 which binding post 25 thereby serves three distinct purposes, securing the binding post, back plate and contact member 40 to the base.

At the sides of the aperture 42 are provided oppositely disposed recesses 47 adapted to receive pins 48 at the sides of the lamp base when the lamp base is inserted into the aperture 42. Radially extending raised sections 49 in the plate 43 at the sides of the aperture 42 are provided, spaced a substantial distance from each other and adapted to retain one of the pins 48 between them, to latch the lamp base in place.

For holding the lamp base in mounted position there is provided a spring 50, a free end of which overlies the aperture 42 and which is anchored to the base by means of two rivets 51. The spring supplies a continuous pressure against the lamp base and presses the pin steadily against the back plate. The bulb of the lamp will be located within the frame and immediately behind the recess 33.

In order to connect the lamp in circuit a lead 53 extends from the rivet 34, electrically connected to the binding post 35, through a resistance 54 and thence to one of the rivets 51. By placing a resistance in the lead line less current is permitted to pass through the lamp which permits it a longer life. Current through the lead 53 passes through the spring 56 to the center contact of the lamp base. The opposite lamp base contact comprises a collar of conventional construction around the lamp base and is connected through the bent portion 44 of the spring contact member 40 to the binding post 33. The diagram of Figure 4 shows the resistance in circuit with the lamp, the resistance being of such magnitude that what current passes through it is insufficient to operate an electric device 55 until the resistance and lamp are short circuited out by closing contact between the contact arms 29 and 40.

When the device is to be installed electric wires are extended into the interior of the switch box 18, long enough to be drawn in into the box and connected to the respective binding posts 35 and 36 and also to 35' in case a three-way connection is needed, before the frame is applied to the box. After the connections have been made the frame may be pushed into the switch box.
into the position shown in Figure 1 where it is held in place by the spring elements 14 and retained additionally by the rim elements 15, which may be applied to the outside edge of the switch box. The push plate member and the lamp may be removed while the frame is being pushed into place. The lamp may now be applied by pushing the lamp base through the aperture 42 against the spring 50 and then twisting it so that one of the pins 48 falls between the raised sections 49 in the back plate 46. The push plate member may now be applied by placing the top of the inner plate section beneath the upper lip 24 so that the lip extends into the adjacent space 23. The plate member is pushed up high enough so that the lower side of the inner plate section slips past the edge of the lower lip 24. Meanwhile, the free end 28 of the spring arm 25 will find its way into the recess 33. With both top and bottom of the inner plate section 22 inside of the lips 24 the plate member may be shifted downwardly and there held by the spring arm 25 so that the lips engage on both sides. The plate member will be pressed outwardly by both the spring arm 25 and the contact arm 23, and in particular will be prevented from shifting laterally by the spring arm 25. The plate member may be removed by reversing this process whenever it might be desired to replace the lamp.

Figure 5 shows a circuit adapted to use three switches, two having three contact points. In a circuit of this description switch A may be of the conventional two-contact type, whereas, switches B and C may be of the three-contact type. In the arrangement shown switch A may be considered as a master switch capable of closing circuits normally operated by switches B and C regardless of the condition of switches B and C. Independently of the master switch either of switches B or C may be operated separately. The reference characters in Figure 5 will be found to correspond to the reference characters of Figure 3.

By the construction just described there has been provided a plate push button switch of compact design, all parts of which are mounted together so that the device may be applied as a unit to a switch box, and which is so designed that it may be readily disassembled for any servicing which might be necessary. The lamp will remain illuminated while the switch is open as long as current flows and will illuminate the broad face of the exterior plate element 21, so that it can be easily located and operated.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent structures.

Having described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A push plate electric switch structure for controlling an electric circuit in a building having a switch box mounted in a wall thereof, comprising: a metallic frame for mounting said structure in said box, said frame having a rear opening and having a front opening defined by lips projecting toward each other from opposite sides of the frame, a base of insulating material mounted in said frame and traversing said rear opening, switch contact members mounted on said base and extending forwardly with their forward ends normally in spaced relationship, and an integral push plate unit of insulating material including a forward push plate member, a neck portion projecting rearwardly from the central portion of said push plate member and having an area as to completely cover the front side of said search box when said frame is installed therein.

2. A push plate structure as defined in claim 1, wherein said frame has, in opposite sides thereof, outwardly struck lips, one of said switch elements bearing yieldingly against the rear side of said push plate unit and urging the same forwardly so that said fingers normally contact said lips, said frame being receivable in said search box in a position in which said push plate is disposed forwardly of the outer side of the box, and said spaces being of sufficient depth to permit rearward movement of said push plate such as to move the last mentioned contact into engagement with the other contact, said overhanging extremities of said push plate member being engagenable with said lips to limit such rearward movement.

3. A push plate structure as defined in claim 1, wherein said frame has, in opposite sides thereof, outwardly struck tongues adapted to resiliently engage the opposite inner walls of said search box whereby to frictionally retain said frame within said box.

WILHELM W. BROCKWAY.

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