Oct. 23, 1956 E. H. BLADH 2,767,498

ILLUMINATED SWITCH

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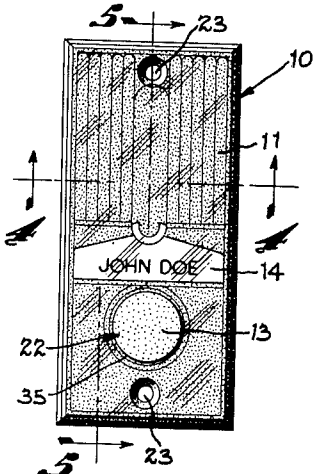


Fig. 1

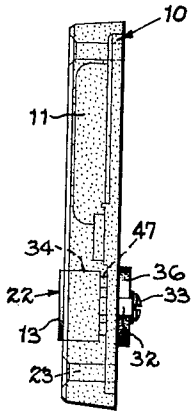


Fig. 2

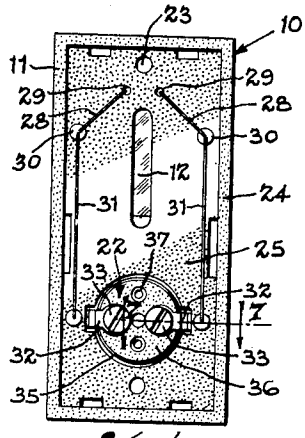


Fig. 3

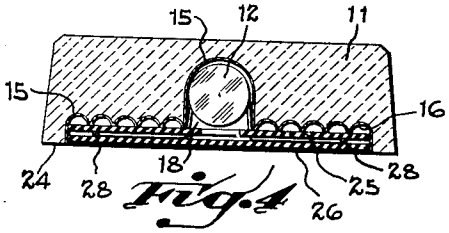


Fig. 4

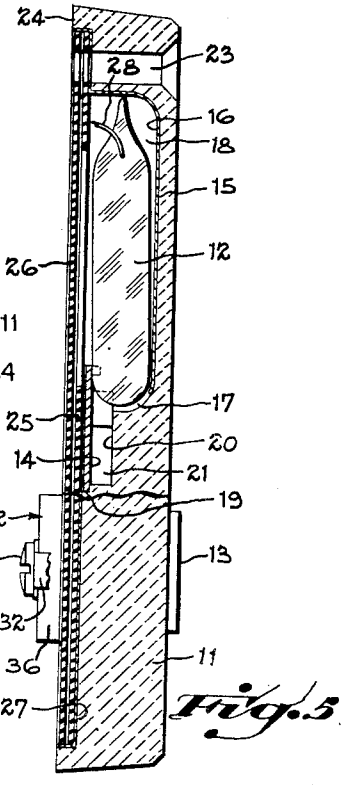


Fig. 5

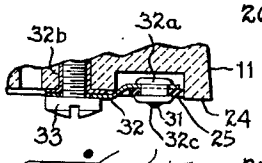


Fig. 7

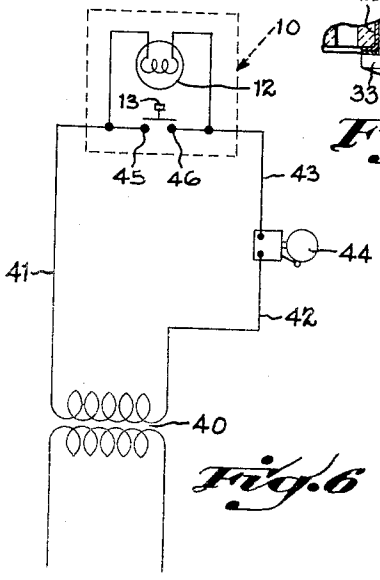


Fig. 6

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ILLUMINATED SWITCH

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1 Claim. (Cl. 40—130)

This invention relates to push button switches of the type adapted for use in residential signal circuits. It is directed particularly to a low voltage switch embodying an electric lamp bulb therein by means of which the push button and appropriate indicia, such as the name of the residence occupant, may be illuminated for visibility.

Typical push button switches of the type to which the present invention relates are usually installed adjacent the door of a residence, the push buttons being interconnected electrically to bell, buzzer or chime circuits through which the presence of a caller may be announced upon switch actuation. Since switches of this type often are to be placed in narrow, shallow mouldings or door frames, it is requisite that the entire switch unit, even though it is to contain an electric lamp, be of small size. It is also very important that the switch, however small, be rugged and durable, both structurally and electrically, in order that it may withstand exposure to all kinds of weather, day after day, for many years. In addition, it is desirable that the switch be attractive in appearance, or at least inconspicuous, in order that it may not detract from the decor of the doorway or other point of installation.

Thus, the principal objective of the present invention has been to provide a small but reliable, and attractive but inexpensive, doorbell unit embodying an electric switch, a place within which indicia may be installed, such as the name of the occupant or a residence or apartment, and an electric lamp which is capable of operating from the energy of the signal circuit to furnish illumination upon the switch and indicia at nighttime or when the prevailing light is inadequate to make them visible.

It is also the objective of the invention to provide a switch construction in which the lamp is housed and protected against accidental breakage either during normal usage of the unit, or during the manipulation which is incidental to the insertion of indicia denoting a name, number, or the like, and the installation of the unit in a door frame.

The switch of the present invention consists essentially of a housing formed of transparent plastic material within which a push button is installed, the button being actuable from the front face of the housing for energization of a signal circuit. The transparent material such as Lucite, of which the housing is constructed, is capable of transmitting light which is focused upon or directed through it so that a lamp bulb mounted in one part of the housing is effective to illuminate a push button spaced remotely from it.

In the present construction, illumination is focused essentially upon the push button itself and upon the indicia denoting owner's name, etc., in order that the entire unit may serve its function without becoming conspicuously bright. To accomplish this result, the housing of transparent material is provided with a recess adjacent the push button, within which indicia may be inserted upon a card or piece of paper, and the housing contains a further recess within which an illuminating lamp is mounted.

The interior surfaces of the housing through which

light is not to be transmitted carry a film coating of a metallic paint or the like which lends an attractive metallic appearance to the unit as a whole, just as though it were made out of polished metal. For instance, if a gold paint is applied to the inner surfaces of the housing, the push button unit assumes the appearance of a brightly polished brass construction and is very ornamental in appearance. However, certain portions of the housing are uncoated to provide a light path through the housing from the lamp to the indicia and to the push button. Therefore, upon energization of the lamp, the lamp itself remains invisible, but light is shed upon the indicia and upon the push button so as to make them visible.

In the preferred construction of the present invention, the electric lamp is arranged in shunt circuit connection with the push button switch, and therefore, is energized at all times. The lead wires through which these connections are contrived are carried upon a backing piece which is adapted to be received by the housing and thereby form a closure at the back face thereof. The backing piece, therefore, serves the double purpose of supporting the electrical connector wires rigidly so that they do not tend to become detached or broken, and also serves as a substantially weather-tight enclosure for the casing protecting the lamp and indicia against the effects of weather. The backing also furnishes weather protection against the deterioration of the film of metallic paint which is applied to some of the recess surfaces, and thereby enables this paint to display an undiminished effect through the other side of the housing.

Thus, the transparent housing not only protects the metallic finish but, in addition, the housing itself provides a light conductive medium by means of which light may be transmitted from the light bulb to the push button which is preferably embedded in the housing at a point remote frim the bulb. Moreover, by providing a clear "window" portion in the metallic finish adjacent the bulb and push button, a name bearing card can be placed within the housing so that it is visible to anyone standing in position to press the button and will be illuminated by light passing from the bulb to the push button.

In the preferred embodiment of my invention, the name bearing card also functions to cushion the lamp bulb against vibrations. Although the housing absorbs most of the shock caused by depressing the push button, I have determined that it is advisable, to further minimize the effects of vibrations upon the lamp bulb, to resiliently support the bulb against the housing. Preferably, the lamp bulb is supported adjacent to its upper end by the two lead-in wires which are soldered to a base plate forming the back of the housing, the upper end of the glass envelope being spaced from both the base plate and the housing. The name bearing card is interposed between the bulb and base plate urging the bulb away from the plate and against the wall of a bulb receiving recess in the housing. Thus, the bulb is cushioned between the housing and the name plate, free from contact with anything else, so that the chance of vibratory damage to the bulb is further minimized.

A still further object of my invention is to provide an illuminated light switch in which various component parts may be sub-assembled into units and the units then assembled to form the completed switch whereby the switch may be efficiently and cheaply produced. In the preferred embodiment, the lamp bulb, base plate, and wiring for connecting the lamp to the switch terminals are sub-assembled to form an insert unit and the housing and push button are pre-assembled to form a second unit. To complete the construction of the switch, the insert unit is placed in the housing and the two units are joined by means of two bolts which secure the lamp wiring to the switch terminals and also serve as the

structural members for holding the insert unit within the housing.

These and other objects of my invention will be more readily apparent from a consideration of the specification in conjunction with an illustration of one embodiment of my invention.

In the drawings:

Figure 1 is a front elevational view of an illuminated push button constructed in accordance with the present invention.

Figure 2 is a side elevational view of the illuminated push button.

Figure 3 is a rear elevational view of the push button, with the rear plate removed.

Figure 4 is a cross sectional view taken along line 4—4 of Figure 1.

Figure 5 is a cross sectional view taken along line 5—5 of Figure 1.

Figure 6 is a schematic wiring diagram showing an illuminated push button installed in a doorbell circuit.

Figure 7 is a cross sectional view of one of the connectors, the view being taken along line 7—7 of Figure 3.

The illuminated push button shown generally at **10** preferably comprises a transparent housing **11** formed of Lucite or some similar material, a light bulb **12**, a push button **13**, and a name plate **14**. In the preferred embodiment, the interior of the housing is serrated as at **15** or otherwise configurated to give the unit a fanciful and pleasing appearance. Additionally, the inner surface of the housing is sprayed or otherwise coated with a colored paint such as bronze enamel **16** to give a metallic appearance to the housing. Two portions of the housing are not coated with paint; those portions are the light emitting end **17** of bulb receiving recess **18**, and that portion of the housing intermediate light bulb **12** and push button **13** which I shall call window **20**. An indicia or name bearing card **14** is mounted within the housing behind window **20** so that the name imprinted upon the card is readily visible when the switch is viewed from the front.

More particularly, the housing **11** is molded or otherwise formed to provide a bulb receiving recess **18** which is substantially semi-circular in cross section and is disposed adjacent to a removed portion **21** forming a part of window **20**. An aperture is provided for receiving a push button assembly **22** and openings **23** are provided for screws by means of which the housing is secured to the door frame or other structural member upon which it is to be mounted. A marginal flange or rim **24** is provided on the rear of the housing for facial abutment with the member to which the housing is to be secured. Flange **24** also embraces base plate **25** and cover plate **26** which constitute the back members of the illuminated switch unit. Base plate **25** and cover plate **26** are constituted of any non-conductive material such as oil impregnated pressed paper, fiberboard, or the like.

As shown in Figures 1 and 5, the entire inner surface of the housing is painted or sprayed as with a bronze paint, for example, except for light emitting portion **17** of bulb receiving recess **18**, and window **20**. It will be noted that the light emitting portion **17** is disposed outwardly (toward the front face of the housing **11**) of painted surface **27** which extends below the window and surrounds the push button assembly **22**. The light emitting portion **17** is also spaced outwardly of card **14** which rests against shoulder **19** provided in housing **11**. The light rays from the bulb **12** are thus directed onto the name bearing card **14** to illuminate it and pass downwardly through the transparent housing **11** to illuminate the push button assembly **22**.

Bulb **12** resides within recess **18** and is mounted upon base plate **25** by means of two lead-in wires **28** which are electrically connected to the filament of the bulb and pass through apertures **29—29** in base plate **25**. The ends of lead-in wires **28** are soldered to solder spots **30** which are formed on rivets driven through base plate **25** or are attached in any similar manner. Leads **31** interconnect solder spots **30** and connectors **32**. Connectors **32** are riveted or in some similar manner secured to base plate **25** and are bolted as by bolts **33** to the terminals of the switch button assembly **22**. More specifically, as shown particularly in Figure 7, connectors **32** are preferably provided with an opening in one end. A rivet **32*a*** is passed through this opening and through a similar aperture provided in base plate **25**. The two ends of the rivet are upset or overturned so that they engage both the connector and base plate holding the two securely together. Leads **31** are preferably joined to the connectors at the rivets by means of solder spots **32*c***, the solder spots being formed by filling the open center of rivet **32*a*** with solder after the end of lead **31** has been placed therein. The opposite end of each of the connectors is also provided with an opening which is brought into registry with a similar opening in a terminal **32*b*** of the switch button. Each of the terminals **32*b*** is provided with an internal threaded portion and bolts **33** are passed through the openings in the connectors and threadably engage the terminals whereby the connectors are both electrically and structurally secured to the switch button assembly. The circuit leads (not shown) for the bell are also connected to the terminals of the switch button assembly by means of bolts **33**.

The lamp **12** is preferably of the tungsten coiled-coil filament type. Such lamps are capable of being energized at the lowest voltages upon which the usual signal circuits operate and yet give satisfactory service in any installation, even through prevailing voltage conditions vary from residence to residence. Normally, in a shunt circuit connection of the type disclosed, the signal circuit voltage is impressed across the lamp filament, but when the switch is actuated the primary circuit is closed through the switch and the bulb goes out. As soon as the push button is released, the lamp again is energized to furnish illumination. This effect furnishes a clearcut signal indication to the caller.

The only available coiled-coil tungsten filament lamp is a small, delicate lamp having two frail lead-in wires which emerge from one end of the glass envelope. These wires are quite susceptible to breakage and it is of extreme importance that the lamp be protected from vibrations, the cumulative effect of which would be to fracture the lead-in wires.

In the embodiment shown in Figures 1 through 5, the lamp bulb is secured to the base plate by means of lead-in wires **28** in such a manner that the glass envelope, when inserted in the bulb receiving recess, is spaced from both the base plate and the wall of the housing. The lower end of the bulb is resiliently urged against the front wall of the bulb receiving recess by means of the name card **14** which is disposed intermediate the bulb and the base plate. The name card is effective to cushion the bulb against any shocks introduced by manipulation of the push button **13**.

The push button assembly **22** may be of any conventional type and includes a casing **34** which resides in an opening **35** provided in housing **11**, a push button **13**, slidably mounted within the casing **34**, a non-conductive washer **36** which fits against the back of the housing **11**, and rivets **37** or some similar means for securing the washer to the casing thereby holding the push button assembly firmly in place within the housing **11**.

As shown diagrammatically in Figure 6, the secondary of a low voltage transformer **40** is connected through leads **41**, **42**, and **43**, and a coil of bell **44** to the terminals of **45** and **46** of push button **13**. Lamp bulb **12** is shunted across the terminals of the switch so that it glows continuously except when the push button is depressed and the lamp is short-circuited (it being understood that depressing button **13** completes the circuit across terminals **45** and **46**). Bell **44** is energized sufficiently to cause it to ring

only when the button 13 is depressed since the lamp is of sufficiently high resistance that when the switch is not closed, the current flowing through the bell is not large enough to cause the bell to ring.

The manufacture of the preferred embodiment of my illuminated switch button is greatly simplified through the use of a base plate 25 upon which the entire insert unit is assembled. Base plate 25 may be stamped to size and the openings 29 for leads 28 and openings 23 for the mounting screws may be simultaneously formed therein.

The bulb may be mounted upon base plate 25 by passing wires 28 through openings 29 and soldering them to solder spot 30 formed on rivets driven through base plate 25. Connectors 32 may then be riveted to base plate 25 and leads 31 soldered to solder spots 30 and to the connectors. Thus, the lamp bulb, its support, and all necessary wiring may be pre-assembled and then merely inserted into the rear of the housing, where it is automatically positioned by rim 24. The connectors may then be bolted to the terminals of the push button assembly 22. It will be understood that the push button and housing were previously assembled by means of rivets 37, which connect casing 34 and washer 36. Connectors 32 thus serve as structural clips securing the entire insert unit within the housing. Name bearing card 14 can be inserted behind bulb 12 and against shoulder 19 by bending the flexible base plate 25 to permit insertion of the card. To complete the assembly, cover plate 26 is inserted over base plate 25 and is secured in place as by cement.

Having described my invention, I claim:

An illuminated switch comprising a transparent housing, a base plate, a lamp, said lamp including a glass envelope and lead-in wires emerging from one end thereof, said lead-in wires being secured to said base plate, a push button mounted in said housing, said lamp being disposed so that the end from which said lead-in wires emerge is remote from said push button, a name card disposed intermediate said base plate and the end of said lamp bulb disposed toward said push button, said card being effective to urge the end of said bulb against said housing whereby said bulb is cushioned against vibration.

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