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Leff

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[54] **LAMP-SWITCH ACTUATOR APPARATUS WITH INTEGRAL LAMP EJECTOR**

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[52] **U.S. Cl.** ..... **200/167 A,** 339/45 T

[51] **Int. Cl.** **H01h 9/16**

[58] **Field of Search** ..... 200/167 A; 339/45 T; 240/151, 152, 52.1

[56] **References Cited**

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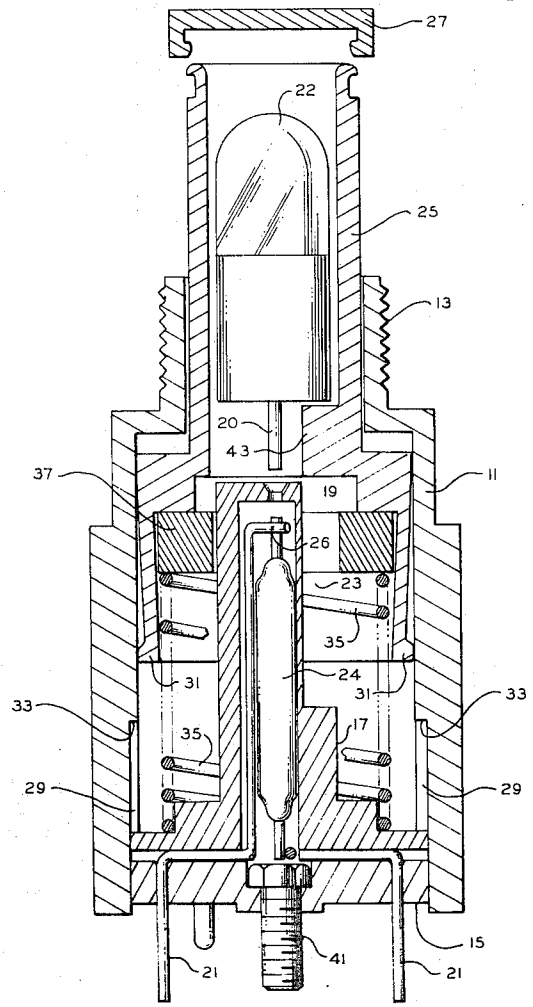
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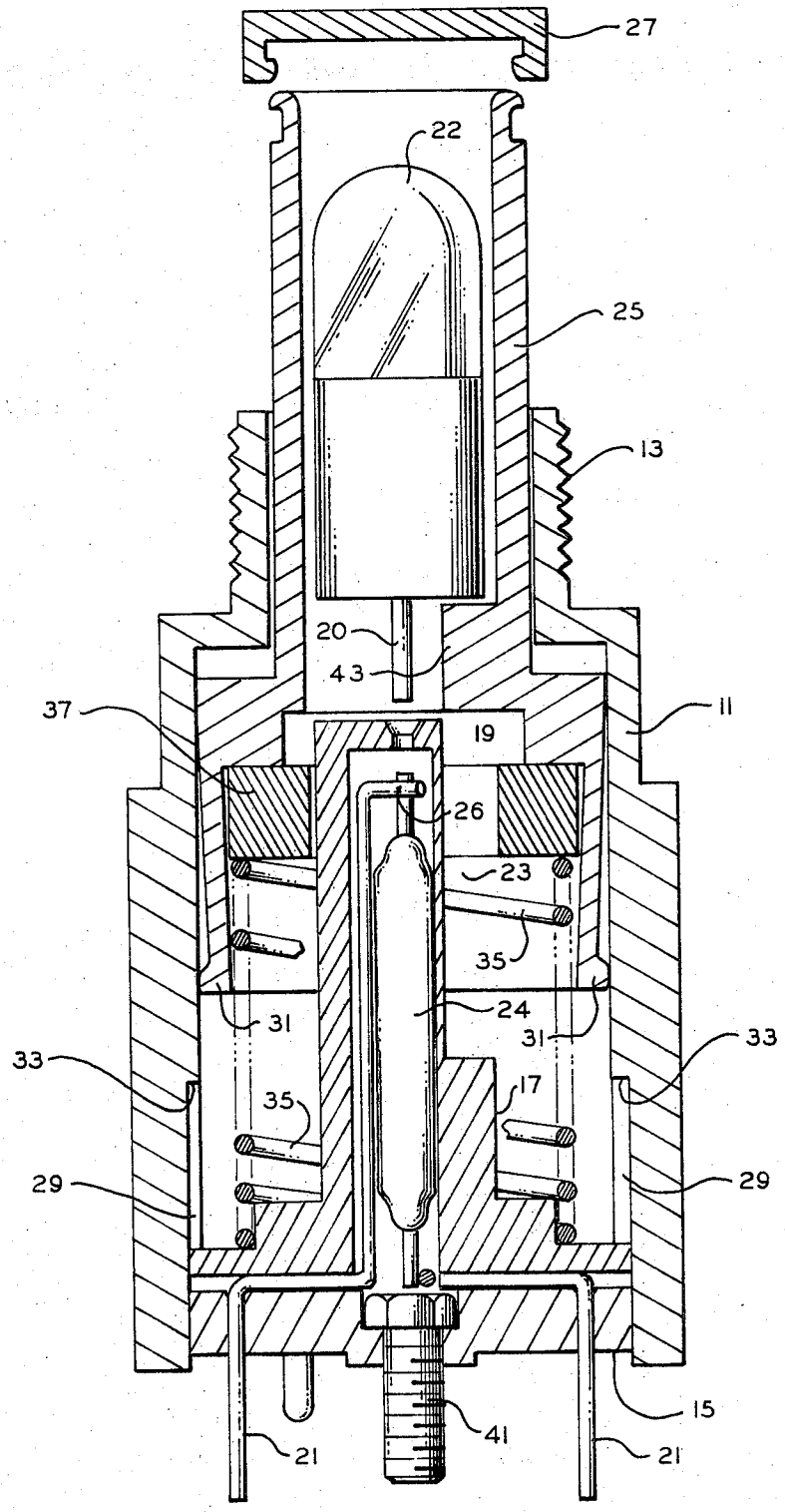
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[57] **ABSTRACT**

An improved lamp-switch actuator apparatus in which the switch plunger is provided with flexible detents which permit pulling out to override stops in the lamp case whereupon a portion of the plunger which fits in a cut-away section of the lamp socket will eject the lamp from its socket. The plunger has a removable cover so that upon again depressing the plunger, the lamp will be exposed and may be removed and a new lamp inserted.

7 Claims, 1 Drawing Figure




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LAMP-SWITCH ACTUATOR APPARATUS WITH INTEGRAL LAMP EJECTOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to illuminated actuators in general and more particularly to an illuminated switch actuator with an improved lamp ejector.

2. Description of the Prior Art

The use of switches having integral lamps to indicate the status of the switch or a system which the switch is controlling have gained widespread use. Because the lamps used in such indicators have a finite life, means must be provided for lamp replacement. This has been accomplished in the prior art through the use of wide plungers which do not have a bearing neck or through the use of special lamp removal tools. The former method has the disadvantage of excessive plunger play and unacceptable keytop alignment. The latter method requires that special tools always be available for lamp replacement. Another solution used in the prior art has been the use of a threaded indicator which protrudes from the panel far enough to permit free access to the lamp. Such an arrangement is shown in U.S. Pat. Nos. 2,995,737 and 3,355,566. However, this arrangement is unacceptable in applications requiring minimum lamp protrusion. Thus it can be seen that there is a need for an illuminated switch which does not protrude excessively from the panel but permits free lamp replacement access.

SUMMARY OF THE INVENTION

The arrangement of the switch of the present invention satisfies this need by incorporating into the plunger a protrusion which moves in a recess in the lamp socket. In normal operation, plunger travel is limited by detents which ride against an up stop recess in the case with the plunger held in its up position by a spring. However, when it is desired to replace a lamp, the plunger may be pulled by hand to cause the detents to override the up stop, thereby causing the protrusion on the plunger to push the lamp out of the socket. The plunger may then be depressed leaving the lamp up and free of the socket. The plunger has a removable key top permitting the lamp to be freely grasped with the fingers when the plunger is depressed. A new lamp may then be inserted and seated in the socket while the plunger is depressed. After replacement of the key top, the unit is ready for operation again.

BRIEF DESCRIPTION OF THE DRAWING

The drawing is a cross-sectional view of the preferred embodiment of the illustrated actuator of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The illuminated actuator of the present invention is contained within a case **11** which has a threaded neck portion **13** for insertion through a panel after which it may be secured in place by a nut screwed down on the threaded section **13** in conventional fashion. A threaded neck is shown here only by example; other well-known types of construction and mounting may equally well be used. The case **11** may be of circular or rectangular shape as dictated by the particular application in which the assembly is to be employed. At the

bottom portion of the case **11** is a header **15** for mounting of a switch to the assembly in conventional fashion. Secured to the header is a lamp socket **17** containing a pair of female contacts **19** into which the male contacts **20** of a lamp **22** may be inserted. The electrical leads **21** from the socket **17** are brought out through the header **15.** The socket **17** contains a cutaway portion **23** shown here as being cut from a cylindrical socket to form a D shape. Other forms of slots or cutaways may be used, for example, a rectangular radial slot could equally well be used. Slidably mounted within the case **11** is a plunger **25** having a shape the same as the inside of case **11** and having a neck portion which extends through the neck of the case. Attached to the top of the plunger **25** is a removable translucent cover or keytop **27.** The case **11** will have recessed portions **29** near its bottom to form up stops for detents **31** on the plunger **25.** The plunger **25** incorporates a protrusion **43** closely fitting the shape of socket **23,** in this instance forming a D shaped section.

In normal operation, lamp **22** will be fully inserted in the socket **17.** The detents **31** will be in the recesses **29** held against the edges **33** thereof by the force of a spring **35** pushing against the plunger **25** or in magnetically actuated switches, against a magnet **37.** Pressing down on the cover **27** will cause plunger **25** to move vertically within case **11.** In the embodiment shown a magnetic switch **24** having contacts **26** is operated by movement of the magnet **37.** Thus, switching action is obtained in conventional manner with the plunger **25** moving within the limits established by the recesses **29.** Detents **31** are constructed to have a springiness or flexibility. For example, the plunger **25** may be constructed of a plastic material which exhibits flexibility. To replace a lamp **22,** the cover **27** on the neck of the plunger **25** is grasped and pulled up. The detents **31** will override the ends **33** of the recesses **29.** Ejector protrusion **43** on plunger **25** which fits the cutaway **23** of socket **17** will normally be located below the base of the lamp **22.** But, when the detents **31** override the stops **33,** it will contact the base of lamp **22** and pull it out of the socket **17** as the plunger is raised. The cover **27** of the plunger may then be removed by exerting additional force and the plunger then pressed down again. The lamp **22,** which has been removed from its socket by the action of the ejector **43** will now project from the top of the plunger and may be freely removed with the fingers. With the plunger down, a new lamp **22** may be inserted by pressing it into place and the cover **27** replaced. The action of the ejector **43** which is made integral with the plunger **25** makes lamp replacement possible without the use of special tools and without requiring the neck portion of the assembly to be excessively long.

Thus, an improved lamp-switch actuator assembly which permits having a small protrusion of the assembly from a panel and still provides simply lamp removal has been shown. Although a specific embodiment has been illustrated and described, it will be obvious to those skilled in the art that various changes and omissions in the form and detail thereof may be made therein without departing from the spirit and the scope of the invention which is intended to be limited solely by the appended claims.

I claim:

1. Lamp-switch actuator apparatus comprising:

a. a hollow case having openings on both ends, having provisions at one end for mounting to a panel, and having on the inside of its other end at least one recessed portion;

b. a plunger slidably mounted inside said case, said plunger having a removable cover at the end of said case and having at least one flexible detent at its other end adapted to fit in the recess of said case;

c. a lamp socket mounted inside said case, said socket having a cutaway portion, said cutaway extending from the edge to the center of said socket a distance such as to be deeper than the outside diameter of the base of the lamp for which the socket is designed; and

d. an ejector section affixed to said plunger and fitting into said cutaway portion whereby, when there is a lamp installed in the socket, pulling up on said plunger will cause the detent to override said recess and said ejector will push the lamp out of the socket, whereupon by removing the cover of the plunger and pushing the plunger down, the lamp will be in a position where it may be freely removed without tools and a replacement lamp inserted.

2. The invention according to claim **1** wherein said one end of said case contains a threaded neck portion for use in attaching it to a panel.

3. The invention according to claim **1** wherein said cutout is D shaped.

4. The invention according to claim **1** and further including a spring inside said plunger adapted to held the plunger in an up position with said detent resting against the upper edge of said recess.

5. The invention according to claim **1** and further including a header at said other end of said case, said header being adapted to permit mounting a switch thereto and carrying or locating such other terminals, leads and mounting means such as threaded studs as required for the application.

6. The invention according to claim **1** wherein said plunger contains a plurality of detents and said case has matching recess portions for each of said detents.

7. The invention according to claim **1** wherein said ejector section is an integral part of said plunger.

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