United States Patent

Bedocs

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[45] **July 4, 1972**

[54] PANEL-MOUNTED SWITCH

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[73] Assignee: **Cherry Electrical Products Corporation,** Highland Park, Ill.

[22] Filed: **Oct. 23, 1970**

[21] Appl. No.: **83,497**

[52] **U.S. Cl.** .....**200/168 C,** 200/172 R

[51] **Int. Cl.** **H01h 3/12**

[58] **Field of Search** .....200/168 C, 168 R, 153 LA, 172 R

[56] **References Cited**

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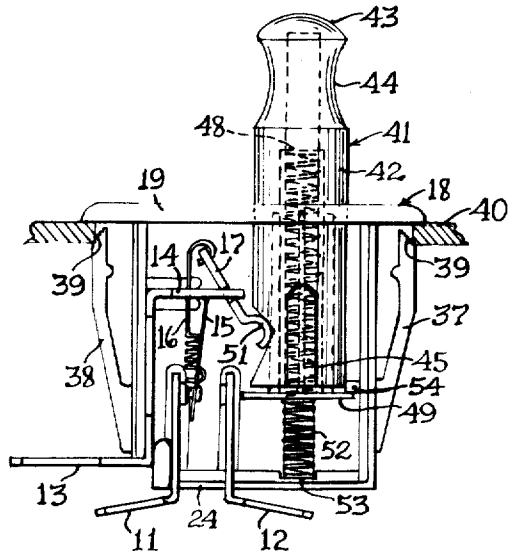
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Primary Examiner—H. O. Jones
Attorney—Edward C. Threedy

[57] **ABSTRACT**

A switch housing adapted to be mounted in an opening formed in a wall panel having a construction comprising complementary case and cover, each providing an inner structural configuration by which various switch actuators resulting in different conventional operations of the switch components, may be accommodated. The switch components employed with the various actuators comprise spaced apart terminals fixedly mounted in the switch housing, a combination terminal and pivot post for a switch blade, and a coil spring overcentering mechanism. The switch housing provides external yieldable arms by which the switch may be fixedly positioned in the opening formed in the wall panel, with the actuator exposed for ready operation.

4 Claims, 16 Drawing Figures



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SHEET 1 OF 2

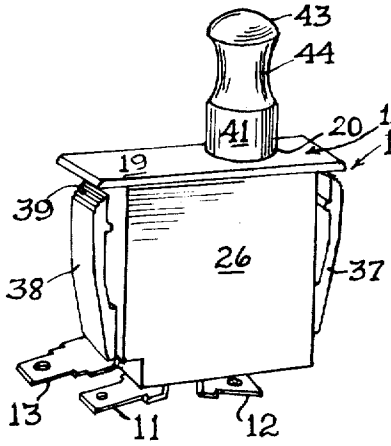


Fig. 1.

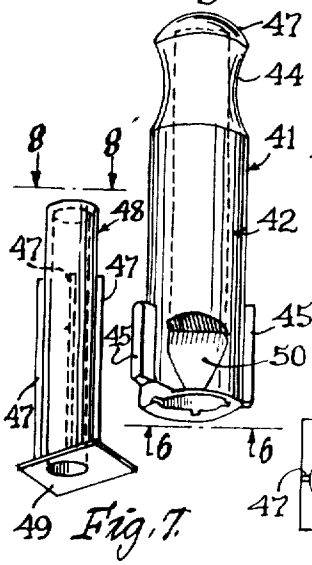


Fig. 5.

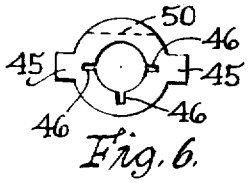


Fig. 6.

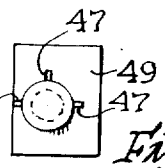


Fig. 8.

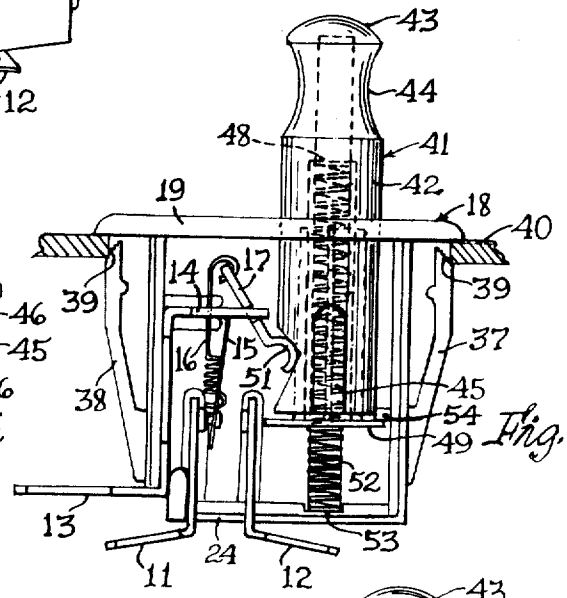


Fig. 2.

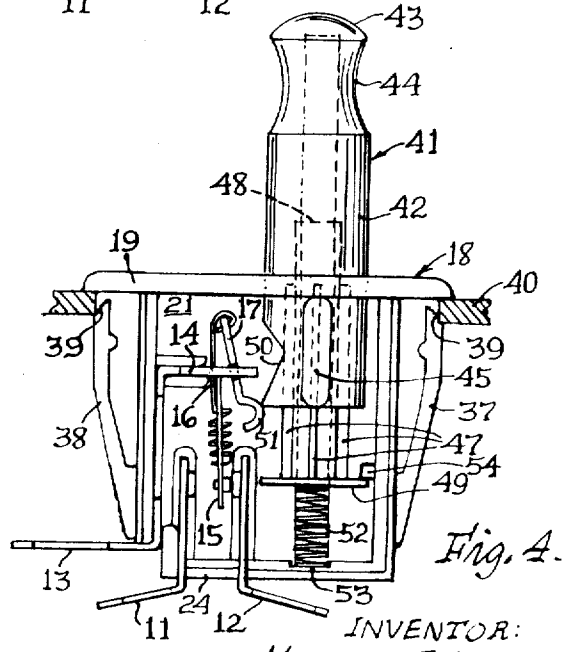


Fig. 4.

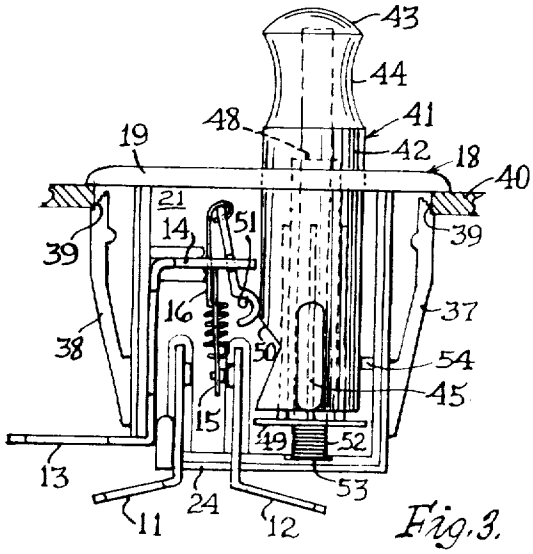


Fig. 3.

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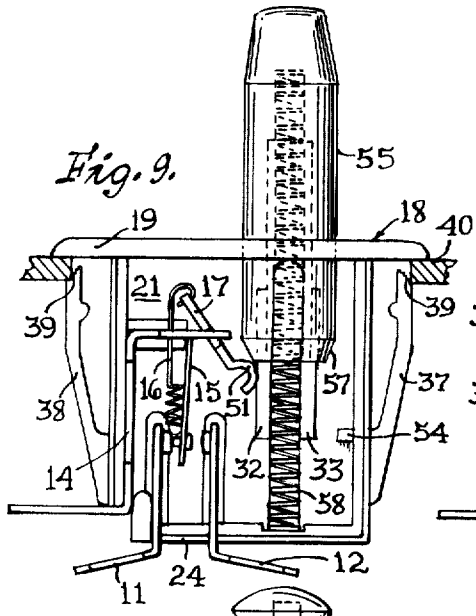


Fig. 9.

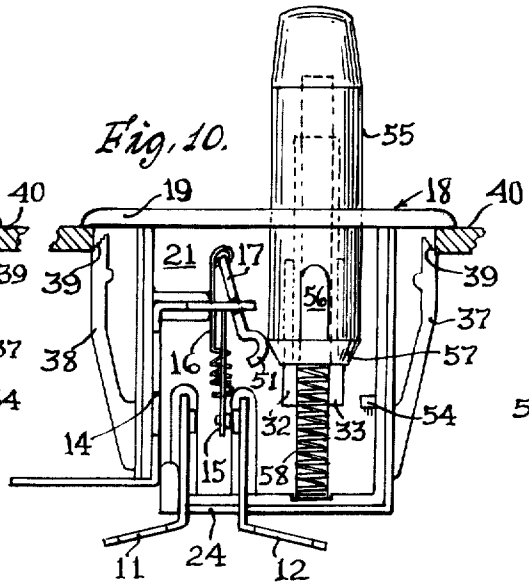


Fig. 10.

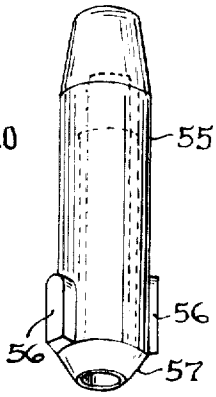


Fig. 11.

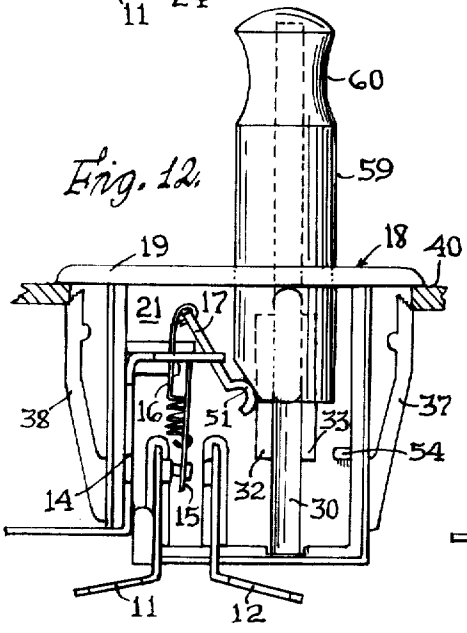


Fig. 12.

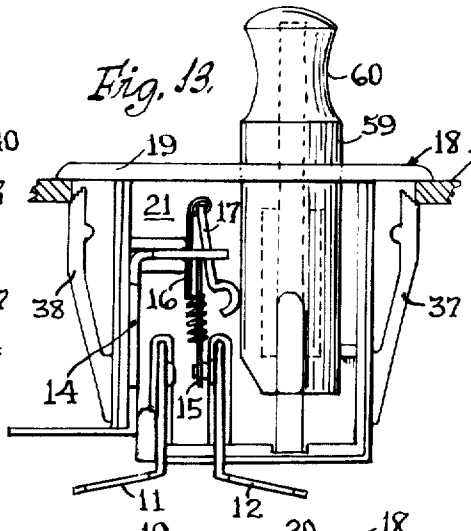


Fig. 13.

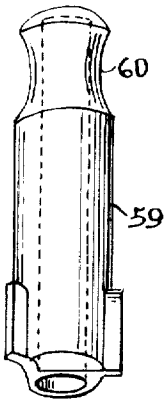


Fig. 14.

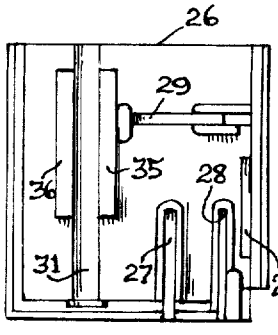


Fig. 15.

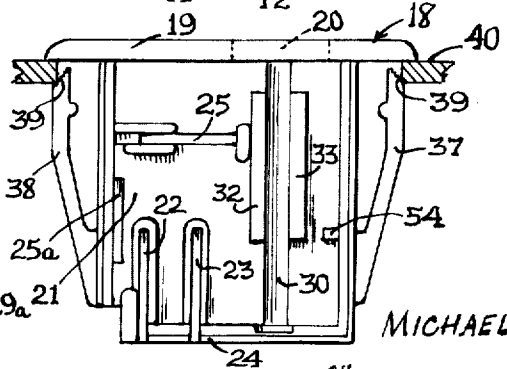


Fig. 16.

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PANEL-MOUNTED SWITCH

SUMMARY OF THE INVENTION

A panel-mounted switch housing having an escutcheon type front wall mounted in and closing an opening formed in a wall panel in which the switch is mounted. Movably projecting through the switch housing is a switch actuator by which normal operation of the switch components can be achieved. The switch housing is constructed from complementary casing sections, each of which provide an internal construction by which a variety of switch actuators can be accommodated within the switch with which the actuator affords a different mode of switch operation.

Each casing section of the switch housing provides cooperating grooves and wall abutments for the positioning and retention of the switch components as well as guiding ribs, a spring seat, and a stop finger, all of which cooperate with the various switch actuators for accomplishing the different modes of switch operation.

In switches of this type, the most common modes of operation required are a momentary push button operation, a push-pull type of actuator, and a combination momentary push-pull and holding actuator. The switch housing of this invention will accommodate various switch actuators and their components by which these described switch functions can be achieved.

The switch construction of this invention will be best understood by reference to the accompanying drawings, in which there is shown the preferred form of construction and in which:

FIG. 1 is a perspective view of a panel-mounted switch housing;

FIG. 2 is a side view of the panel-mounted switch with the cover removed;

FIG. 3 is a side view of the switch shown in FIG. 2 in a first actuated position;

FIG. 4 is a side elevational view similar to the switch shown in FIG. 2, but in a second actuated position;

FIG. 5 is a perspective view of the actuator utilized with the switch shown in FIGS. 2, 3 and 4;

FIG. 6 is an end view taken on line 6—6 of FIG. 5;

FIG. 7 is a perspective view of a sleeve insert utilized in the switch shown in FIGS. 2, 3 and 4;

FIG. 8 is an end view taken on line 8—8 of FIG. 7;

FIG. 9 is a side view of a panel-mounted switch similar to that shown in FIG. 2, but having a different switch actuator;

FIG. 10 is a side view of the switch shown in FIG. 9, in an actuated position;

FIG. 11 is a perspective view of the actuator utilized in the switch shown in FIGS. 9 and 10;

FIG. 12 is a side view of a switch similar to that shown in FIGS. 2 and 9, but having a different switch actuator;

FIG. 13 is a side view of the switch shown in FIG. 12, in an actuated position;

FIG. 14 is a perspective view of the switch actuator utilized in the switch shown in FIGS. 12 and 13;

FIG. 15 is a plan view of the switch cover of the type used in switches shown in FIGS. 2, 9 and 12; and

FIG. 16 is a plan view of the switch casing which is complementary to the cover shown in FIG. 15.

In a panel-mounted switch **10**, as shown in FIG. 1, there are employed a number of switch components which include fixed terminals **11** and **12**, as well as a combination terminal **13** and pivot post **14**, to which one end of a switch blade **15** is pivotally connected by a coil spring **16** that extends between the blade **15** and a pivot lever **17** which is also pivoted to the pivot post **14** as shown in the Figures of the drawing heretofore described. These switch components are uniform throughout all of the panel switches hereinafter described, and their mode of operation is the same and is of a type well-known in the art.

To correctly position the switch components hereinbefore identified, the switch **10** is housed within a switch casing **18** (see FIG. **16**) which includes an escutcheon type front wall **19** which provides an opening **20** therein. The side wall **21** of the casing **18** has formed therein two parallelly extending grooves **22** and **23** which extend through the rear wall **24** of the casing **18**. The grooves **22** and **23** will receive one edge portion of the fixed terminals **11** and **12**, respectively. Grooves **25** and **25***a* are provided in the wall **21** of the casing **18** for receiving the side edge portions of the pivot post **14**.

A cover **26** is provided for the casing **18** and it provides parallelly extending grooves **27** and **28** which, when the cover **26** is placed on the casing **18**, will receive the opposite side edges of the fixed terminals **11** and **12** to maintain the same in their prescribed positions. The cover **26** also provides grooves **29** and **29***a* which cooperate with the grooves **25** and **25***a* formed in the casing **18**, to receive and frictionally hold the opposite side edges of the pivot post **14** when the switch is assembled.

Both the casing **18** and the cover **26** provide an inner complementary recess **30** and **31**, respectively. Portions of the recesses **30** and **31** are defined by partially abutting wall sections **32** and **33** formed within the casing **18**, and wall abutments **35** and **36** formed within the confines of the cover **26**, which, when mated, form guides for the switch actuator which is associated with the switch.

The casing **18** also provides along its opposite elongated side walls yieldable retaining fingers **37** and **38**. As will be noted in FIG. **16**, these fingers **37** and **38** are connected to the innermost end of the casing **18** and extend toward the escutcheon type front wall **19** and terminate short thereof. The ends of the fingers **37** and **38** that are spaced from the front wall **18** **19** are serrated as at **39** in an arcuate path as shown, such that when the switch is assembled and projected into an opening formed in a panel **40**, the serrations will engage the edge of the wall defining the opening, to mount the panel switch therein.

When the mode of operation of the switch having the general construction hereinbefore described, is desired to be of the momentary actuation type with a manually operated position feature, the actuator such as shown in FIG. **5** is employed. This actuator **41** comprises an elongated hollow tubular body **42**, one end **43** of which is angularly recessed to provide a finger grip portion **44**. The opposite end of the actuator **41** provides laterally extending ribs **45** which are adapted to be positioned in the recesses **30** and **31** formed in the casing **18** and cover **26** and be guided between the facially abutting wall members **32, 33** and **35, 36** (FIGS. **15–16**).

The inner bore of the actuator **41** has formed in its periphery, locating slots **46** which are adapted to receive elongated raised wall members **47** formed on the periphery of a hollow sleeve member **48**. The hollow sleeve member **48** is provided with a base flange **49** which is of a size to fit between the confronting wall portions of the casing **18** and the cover **26** when mated as hereinbefore described.

The actuator **41** adjacent its inner end has a portion of its periphery notched as at **50**, which notch is adapted to receive the curved end portion **51** of the pivot lever **17** of the switch components.

As shown in FIG. **2**, the sleeve member **48** is positioned within the actuator **41**, which in turn is positioned through the opening **20** formed in the front panel **19** of the casing **18** with its ribs **45** positioned between the wall abutments **32, 33** and **35, 36**, respectively. A compression spring **52** has one end positioned in a recess seat **53** formed in the rear wall **24** of the casing **18** and has its other end in facial contact with the inner closed end of the hollow sleeve **48**.

From the foregoing description, the complete assembly of the switch is shown in FIG. **2**. When the actuator is manually pushed inwardly through the opening **20** formed in the wall **19**, the pivot lever **17** will ride out of the notch **50** as shown in FIG. **3**, effecting overcentering of the switch blade **15**, causing the same to pivot between the fixed terminals **11** and **12**. This movement of the actuator **41** will also impart like movement to the sleeve **48** against the compression spring **52**, so that by removal of the external force on the actuator **41**, it will im-

mediately return to its unactuated (mid or neutral) position shown in FIG. 2. However, in the event that the circuit in which the switch is arranged is desired to be tested, the switch may be actuated and maintained in an actuated position by the forcible movement of the actuator **41** in a direction out of the opening **20** formed in the front wall **19**, as seen in FIG. 4.

By such movement, the pivot lever **17** again moves out of the notch **50** to a position where it overcenters the switch blade **15**, and such movement will remain as long as the actuator **41** stays in the withdrawn position. The movement of the actuator **41** in such withdrawn position is independent of the movement of the sleeve **48** which has been arrested by a stop **54** provided within the cavity of the switch casing **18**.

It should be noted that movement of the actuator **41** in either direction is guided by the wall abutments **32, 33** and **35, 36**, cooperating with the ribs **45**, all of which has heretofore been described.

Utilizing the same switch components and exchanging the switch actuator **41** for a switch actuator **55** having the construction shown in FIG. **11**, the mode of operation of the switch is one of just momentary actuation. When such mode of operation is desired, the actuator **55** which provides peripheral guide ribs **56**, is placed within the switch casing **18** and it has its inner end chamferred as at **57** to provide actuating contact with the curved end **51** of the pivot lever **17** of the switch components. A compression spring **58** is utilized which extends into the inner bore of the actuator **55**. Thus, when the actuator **55** is depressed as shown in FIG. **10**, it will actuate the switch components and, upon release thereof, it will assume its inactivated position shown in FIG. **9**.

If a positive on-off actuation is required, the switch of this invention may include a switch actuator **59** which is similar to the actuator **55** shown in FIG. **11**, except that its free exposed end is provided with an annular recess **60** so that the same may be conventionally gripped by the fingers of the operator. As shown in FIGS. **12** and **13**, there is employed no spring, so that the actuator **59** will remain in any position into which it is moved. Thus, in FIG. **12**, it is in an actuated position with the curved end **51** of the pivot lever **17** riding on the tapered edge **61**, while in FIG. **13**, when the actuator **59** has been manually pushed inwardly of the switch, the switch is actuated in the manner hereinbefore described. This switch will remain in its actuated position until the actuator **59** is manually withdrawn and returned to the position shown in FIG. **12**.

It should be noted that in all of the actuator constructions hereinbefore described, the outward movement of each actuator is determined by the engagement of the external peripheral guide ribs formed thereon which will engage the wall surface which defines the opening **20** formed in the front wall **19** of the casing **18**. This prevents any of the actuators from being completely withdrawn from the switch housing. As these guide ribs also travel between the cooperating abutting wall sections **32, 33** and **35, 36**, they are prevented from having axial rotation. Thus, the notched actuating areas **50** and **61** of the actuators are at all times maintained in contact with the curved end **51** of the switch components.

From the foregoing, it is apparent that I have disclosed a panel-mounted switch housing which includes a minimum number of switch components that will perform their desired functions resulting in different modes of operation of the switch achieved through the employment of different types of actuators, all of which are readily operatively associated with the switch components and within the switch housing.

While I have illustrated and described the preferred form of construction for carrying our invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail ourselves of such variations and modifications as come within the scope of the appended claims.

Having thus described our invention, what I claim as new and desire to protect by Letters Patent is:

1. A panel-mounted switch having a housing for the switch components including an open-sided casing provided with an escutcheonlike front plate having an opening through which an actuator plunger projects, and a side cover for closing the casing, and yieldable fingers provided by the casing and extending in the direction of and terminating short of the front wall thereof by which the housing is mounted on a panel, wherein the improvement comprises

a. an elongated hollow actuator plunger having an inner end portion of a length less than the depth of the housing so as to be reciprocally movable axially therethrough,

b. a sleeve having a closed end freely journalled in said plunger and an enlarged base flange seated against the open inner end of said plunger within the housing,

c. a coil spring having one end seated within the housing and projecting longitudinally into said sleeve to bear said base flange thereof against said plunger to maintain said plunger in one position within the housing and for yieldably resisting movement of said plunger in one direction therethrough,

d. means provided by said casing in contact with said one side of said flange of said sleeve for preventing movement of said sleeve with said plunger when the latter is moved axially in another direction through the housing,

e. said plunger providing on the periphery of said inner end portion a relieved surface positioned to receive a movable end of one of the switch components when the plunger is in said one position relative thereto and for moving the same to actuate the switch upon axial movement of said plunger into other positions responsive to the direction of its movement through the housing,

f. means provided by the casing and side cover extending parallel and to either side of said plunger for guiding the same during its reciprocal axial movement in either direction within the housing,

g. and means provided by said plunger on its inner end portion for cooperating with said guiding means for guiding said plunger during its axial movement through the housing and for preventing rotation thereof about its axis during its axial movement so as to maintain said relieved portion in position to receive the movable end of one of the switch components when said plunger is in said one position within the housing.

2. A panel-mounted switch as defined by claim **1** and including means provided by said sleeve for maintaining axial alignment of said sleeve within said plunger when said plunger is moved in another direction through the housing and said sleeve is prevented from moving therewith by said means provided by said casing in contact with said flange of said sleeve.

3. A panel-mounted switch as defined by claim **1** wherein said means provided by the casing and said side cover for guiding the plunger, comprises spaced wall abutments extending parallelly to the axis of the opening provided by the front plate of the casing and parallel to the longitudinal axis of said plunger, with said wall abutments being spaced apart to receive therebetween the means provided by said plunger that cooperate with said wall abutments for guiding said plunger in its axial movement.

4. A panel-mounted switch as defined by claim **1** wherein said means provided by said plunger cooperating with said guiding means, comprise longitudinally extending ribs laterally projecting from the periphery of said plunger to either side of said means that is provided by said plunger for operatively actuating the switch components, with said ribs being of a width to pass between said guiding means provided by the casing and said side cover, so as to guide the plunger and prevent axial rotation thereof during its axial movement relative to the switch components.

* * * * *