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ELECTRICAL PUSH BUTTON SWITCH ASSEMBLY

Filed Nov. 8, 1960

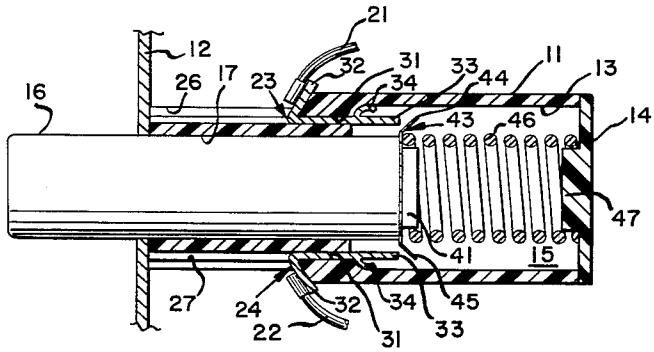


FIG. 1

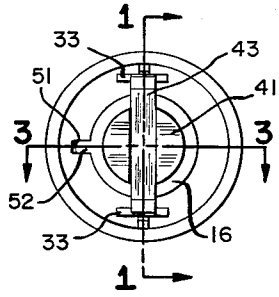


FIG. 2

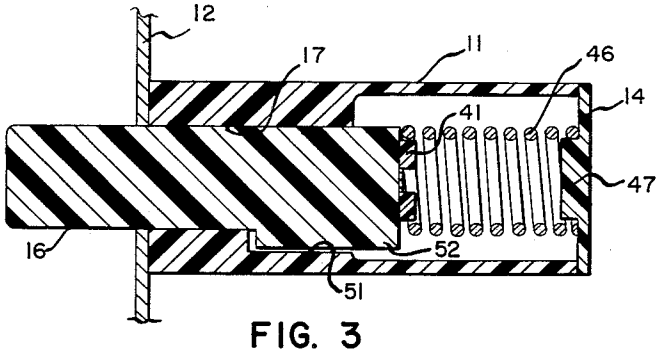


FIG. 3

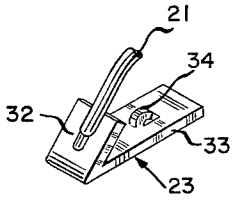


FIG. 5

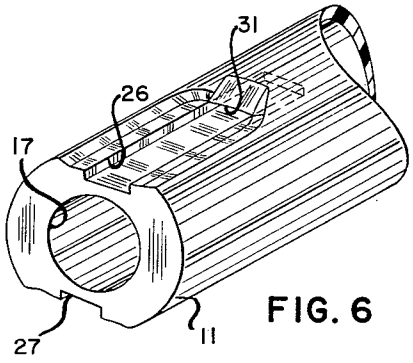


FIG. 6

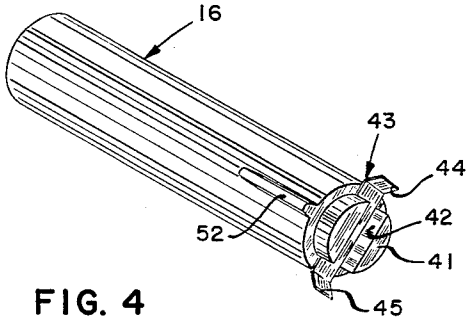


FIG. 4

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ELECTRICAL PUSH BUTTON SWITCH ASSEMBLY

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This invention relates to an electrical switch assembly and more particularly to a normally closed switch assembly, often employed to operate courtesy lights in automotive vehicles, in which the terminals for the electrical leads to the switch are employed as integral switch components.

In the preferred embodiment of the invention, a pair of leads to the switch are each provided with a conducting terminal. The conducting terminals are detachably sesured to the switch body and preferably extend through slots in the body so that they may be contacted by an electrically conductive means also positioned within the body. This results in a switch assembly that employs fewer parts than conventional switches and that may be more readily assembled by mass production techniques, such as those employed in the automotive industry.

An object of the invention is the provision of a switch assembly in which the terminals of electrical leads are employed as switch components.

Another object of the invention is the provision of a switch assembly in which the terminals of electrical leads are also employed as terminals of the switch.

A further object of the invention is to provide a switch assembly that may be readily and advantageously assembled by mass production techniques.

Another object of the invention is the provision of a simple and reliable normally closed switch which may be conveniently employed to switch courtesy lights in an automotive vehicle.

A further object of the invention is the provision of a simple and reliable normally closed switch that may be mounted in a door pillar of an automotive vehicle and that will operate courtesy lights in the vehicle when the door is opened.

Other objects and attendant advantages of the invention will become more readily apparent as the specification is considered in connection with the attached drawings in which:

FIG. 1 is a sectional view of the switch assembly of the present invention taken along the lines 1—1 of FIG. 2;

FIG. 2 is an end elevational view of the switch assembly with the end wall and spring removed;

FIG. 3 is a sectional view of the switch assembly taken along the lines 3—3 of FIG. 2;

FIG. 4 is a perspective view of the plunger and electrical contactor of the present invention;

FIG. 5 is a perspective view of a terminal of the present invention, and,

FIG. 6 is a partial perspective view of the body portion of the switch assembly.

Referring now to the drawings in which like reference numerals designate like parts throughout the several views thereof, there is shown in FIGS. 1 through 3 the switch assembly of the present invention that includes a body **11** that may be constructed of a suitable nonconducting plastic material and may be of cylindrical configuration. The switch body **11** may be mounted on a plate **12** which, in automotive applications, may be one of the door pillars. The nonconducting body **11** has a cavity **13** that forms with an end wall **14** a chamber generally designated by the numeral **15**. The end wall **14** may be affixed to the body **11** by means of any suitable adhesive. A plunger **16** is reciprocably mounted within a bore **17** in the body **11** and extends through the bore into the chamber **15**.

A pair of electrical leads **21** and **22** that are adapted to be connected to external circuitry, for example, to the courtesy lights and the power supply of an automotive vehicle, are suitably affixed, for example, by welding to electrical conductive terminals **23** and **24** respectively.

The portion of the body **11** positioned adjacent the plate **12** has a pair of opposed grooves **26** and **27** positioned therein. These grooves preferably are formed in a direction parallel to the axes of the body **11** and the plunger **16**. The end walls of each of the grooves has a slot **31** positioned therein so that the grooves are in communication with the chamber **15**. As can best be seen by an inspection of FIGS. 1 and 5, each of the terminals **23** and **24** includes a bent over portion **32** that engages the end wall of the groove and a main body portion **33** that extends through the slot **31** into the chamber **15**. Each of the main body portions **33** is provided with a detent **34** that engages the inner wall of the chamber **15** to detachably secure the terminals **23** and **24** within the chamber **15**.

The plunger **16** includes a reduced end portion **41** that has a diametral slot **42** positioned therein. An electrical conducting means or contactor **43** is positioned within this groove. This contactor may be made of a conductive spring material, such as beryllium-copper, and includes a pair of bent over end portions **44** and **45**. As can best be seen by reference to FIG. 1, a spring means **46**, preferably in the form of a helical spring, is positioned within the chamber **15** and has one end engaging the end wall **14** and is positioned thereon by means of a boss **47**. The other end of the spring **46** is positioned around the reduced portion **41** of the plunger **16** and engages the end of the plunger and the electrical conducting means or contactor **43**.

The spring means **46** biases the plunger **16** leftwardly, as viewed in FIG. 1, so that the electrical conducting means or contactor **43** engages and makes electrical contact with the main body portions **33** of the terminals **23** and **24** thus closing a circuit which may be connected to leads **21** and **22**. For the purposes of clarity the switch assembly has been shown in FIG. 1 just prior to closing, and it is to be understood that the spring **46** has sufficient force to move the electrical conducting means or contactor **43** into engagement with the electrical terminals **23** and **24**. When the plunger moves rightwardly, as viewed in FIG. 1, due to a force being applied thereto, then the contactor or conducting means **43** comes out of electrical contact with the main body portions **33** of the terminals **23** and **24** to open the circuit that may be connected to the leads **21** and **22**.

The body **11** has an inner groove **51** positioned therein to receive a key **52** on the plunger **16**. This prevents relative rotation between the body and the plunger and keeps the electrical contactor **43** properly positioned with respect to the terminals **23** and **24**.

It can be appreciated that the electrical terminals **23** and **24** for the leads **21** and **22** form an integral part of the switch assembly and are detachably secured within the switch body **11**. It can also be appreciated that during assembly operations the whole switch may be assembled with the exception of the terminals **23** and **24** and that these terminals may be then inserted through the slots **31** so that they are positioned for engagement with the conducting means or contactor **43**.

The switch assembly of the present invention is especially adapted to be mounted on a door pillar of an automotive vehicle to operate courtesy lights within the vehicle. When the door is closed the plunger **16** is forced rightwardly, as viewed in FIG. 1, to open the circuit to the courtesy lights. When the door is opened the plunger **16** is permitted to move leftwardly, as viewed in FIG. 1, by means of the force of the spring **45** so that the circuit

to the courtesy lights is closed through the terminals **23** and **24** and conducting means or contactor **43**.

In automotive applications, the switch may be assembled and the wiring for the automobile, including leads **21** and **22** and terminals **23** and **24**, may be assembled in a harness type arrangement and then during final assembly the terminals **23** and **24** need only be forced through the slots **31**.

Thus the present invention purovides a simple and reliable mechanism in which the terminals for the electrical leads to the switch are also employed as switch terminals.

It will be understood that the invention is not to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the appended claim.

I claim:

In a switch assembly, a switch body constructed of a nonconducting material and having a cylindrical side wall having an outer periphery forming a substantially continuous cylinder of uniform diameter, said cylindrical side wall forming a first cylindrical chamber and a second cylindrical chamber with the diameter of said second cylindrical chamber being greater than the diameter of said first cylindrical chamber whereby the thickness of said cylindrical side wall is greater at said first chamber than at said second chamber, a plunger extending through said first cylindrical chamber and into said second cylindrical chamber, a pair of slots positioned in the side wall at said first chamber and extending parallel to the axis of said cylindrical side wall and having a depth less than the thickness of the side wall at said first chamber but

greater than the thickness of the side wall at said second chamber whereby said slots terminate as apertures in said second chamber, a first electrical lead, a first conducting terminal connected to said first electrical lead and slidably engaging one of said slots, said first conducting terminal having a resilient abutment which engages said side wall at the juncture of said first chamber and said second chamber when positioned in one of said slots, a second electrical lead, a second conducting terminal connected to said second electrical lead and slidably engaging the other of said slots, said second conducting terminal having a resilient abutment which engages said side wall at the juncture of said first and said second chambers when positioned in the other of said slots, a resilient electrical contactor carried by said plunger and positioned within said second chamber, and spring means positioned within said chamber and engaging said plunger for urging said resilient electrical contactor into slidable engagement with and betwen said first and said second conducting terminals thereby compressing said resilient electrical contactor.

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