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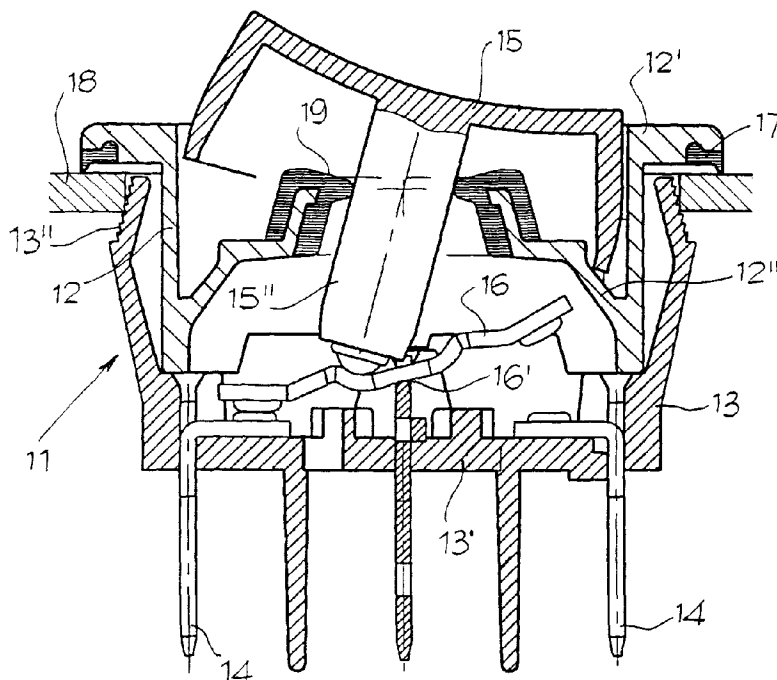
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25121 Brescia (IT)****(54) Switch unit with protection against dust and spray**

(57) An electrical switch unit of a toggle, push-button, or sliding type, with a front part having a panel seal of soft material, molded along with and intended to seal

against the panel to which the switch is attached. The front part has an inner part with a stem seal molded along with and surrounding the stem of the control element of the mobile contact of the switch.

*Fig. 1***EP 0 878 814 A1**

Description

The present invention relates to the field of unipolar or bipolar electrical switches, of various kinds and various sizes, and which are used in electrical and electronic apparatus, as well as in household appliances. More specifically the invention relates to switches intended to operate in environments of high humidity and/or in the presence of liquid.

In order to comply with such safety standards, these electrical switches must have protection against humidity, spraying with water, and environmental dust. For this purpose, it has already been proposed to provide the switches with protection against dust and humidity. According to the known art, such protection consists of elements in the form of outer hoods and/or internal accessories, such as membranes, usually of an elastomers material. Therefore, it involves added elements which need to have certain shapes and means of attachment and which involve production expense, installation time, and labor.

The purpose of the present invention is to furnish an electrical switch protected against dust, humidity, and water spraying with means of protection integrated into the switch unit, more precisely, molded along with the unit properly speaking.

Thus, this switch unit has the advantages of not having to produce and install separate elements; of reducing the production costs; of having free choice in the shapes and in the appearance of the manufactured product; of guaranteeing a degree of tightness and protection comparable, if not even better, than that achieved by the more customary elements with respect to the current standards.

The purpose and the advantages are achieved by a switch unit mounted in a panel, where the switch includes a first or front part with a perimeter flange positionable adjacent the panel and an inner piece defining a central opening. A control element movably mounted on the first part between a first and second position. The control element includes a stem extending into the central opening. A second part is connected to the first part, and the second part includes a plurality of fixed electrical contacts. A mobile contact is connected to the stem of the control element, and the mobile contact element electrically connects and disconnects two or more of the fixed electrical contacts depending on a position of the control element. A panel seal means is positioned on the perimeter flange of the first part and seals a junction between the first part and the panel. The panel seal means includes a soft flexible material molded with the first part. A stern seal means is connected to the first part at the central opening. The stern seal means surrounds the stem of the control means and seals a junction between the inner piece and the stem.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure.

For a better understanding of the invention, its operating advantages and specific objects attained by its uses, reference is made to the accompanying drawings and descriptive matter in which preferred embodiments of the invention are illustrated.

In the drawings:

Fig. 1 is a lengthwise sectional view of a toggle-type switch according to the invention complete with protection; and

Fig. 2 is a cross section of the switch of Fig. 1.

The switch illustrated comprises a unit 11 of the type comprised of a front part 12 and a rear part 13. The front part 12 is of rigid material and presents a front peripheral flange 12' and an inner piece 12" converging to a center, where it defines an opening.

The rear part 13 of the unit, also rigid, has a bottom wall 13' bearing fixed contacts 14 for at least one electrical circuit and presents two clamping tabs 13" at the two opposite sides.

The front part 12 of the switch unit bears a control key 15, swiveling on an axis defined by pins 15' housed in sockets produced in the sides of the part, as shown in Fig. 2. The key has a stem 15", rigid or with an elastic part, which fits in the opening defined by the inner piece 12" and which extends as far as a mobile contact 16, pivoting on a fulcrum 16'. The mobile contact is controlled by the key to open and close the circuit(s) which lead to fixed contacts 14.

According to the invention, the inner face of the front perimeter flange 12' has a seal 17 made of soft material molded along with the front part of the unit. The seal has a suitable shape to guarantee exclusion of dust and moisture between the front flange 12' and a panel 18 to which the switch is fastened for its use.

Another seal 19, of soft material, is provided around the stem 15" of the key, nearly at the level of the axis of rotation of the key itself. This seal 19 is obtained by molding on the inner piece 12" opposite the opening defined by it.

The seal 19 adheres to the stem 15" of the key without influencing its movements, but rendering inaccessible the inner chamber which is created between the front and rear parts of the unit and protecting the mobile and fixed contacts.

In other words, seals 17 and 19 obtained by molding along with the front part of the switch unit offer good protection against ingress of dust and water from the outside, when the switch is in operation, without adding any other element.

The above description refers to a toggle-type switch, but the protection against dust and spray is likewise applicable and with the same advantages to push-button and sliding-type switches, without departing from the scope of the invention.

While specific embodiments of the invention have been shown and described in detail to illustrate the ap-

plication of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

Claims

1. An electrical switch for mounting in a panel, the switch comprising:

a first part including a perimeter flange and an inner piece defining a central opening;
 a control element movably mounted on said first part between a first and second position, said control element including a stem extending into said central opening;
 a second part connected to said first part, said second part including a plurality of fixed electrical contacts;
 a mobile contact connected to said stem of said control element, said mobile contact element electrically connecting and disconnecting two or more of said fixed electrical contacts depending on a position of said control element;
 a panel seal means positioned on said perimeter flange of said first part and for sealing a junction between said first part and the panel, said panel seal means including a flexible material molded with said first part.

2. A switch in accordance with claim 1, wherein:

said control element is one of a toggle, push-button and slide;
 said first part is a front part and said perimeter flange is positioned adjacent a front of the panel;
 said second part is a rear part;
 said panel seal means is positioned on an inner face of said perimeter flange, said panel seal means blocks moisture.

3. A switch in accordance with claim 1, further comprising:

stem seal means connected to said first part at said central opening, said stem seal means surrounding said stem of said control means and sealing a junction between said inner piece and said stem.

4. A switch in accordance with claim 1, wherein:

said stem seal means includes a flexible material molded with said first part.

5. An electrical switch for mounting in a panel, the switch comprising:

a first part including a perimeter flange and an inner piece defining a central opening;
 a control element movably mounted on said first part between a first and second position, said control element including a stem extending into said central opening;
 a second part connected to said first part, said second part including a plurality of fixed electrical contacts;
 a mobile contact connected to said stem of said control element, said mobile contact element electrically connecting and disconnecting two or more of said fixed electrical contacts depending on a position of said control element;
 stem seal means connected to said first part at said central opening, said stem seal means surrounding said stem of said control means and sealing a junction between said inner piece and said stem.

6. A switch in accordance with claim 5, further comprising:

panel seal means positioned on said perimeter flange of said first part and for sealing a junction between said first part and the panel, said panel seal means including a material molded with said first part.

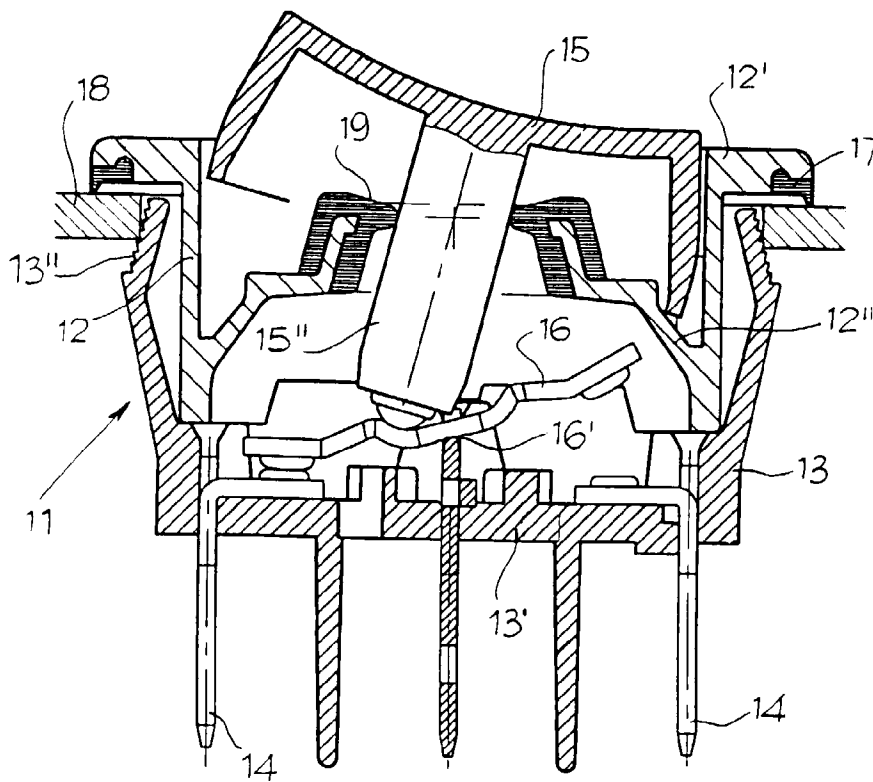


Fig. 1

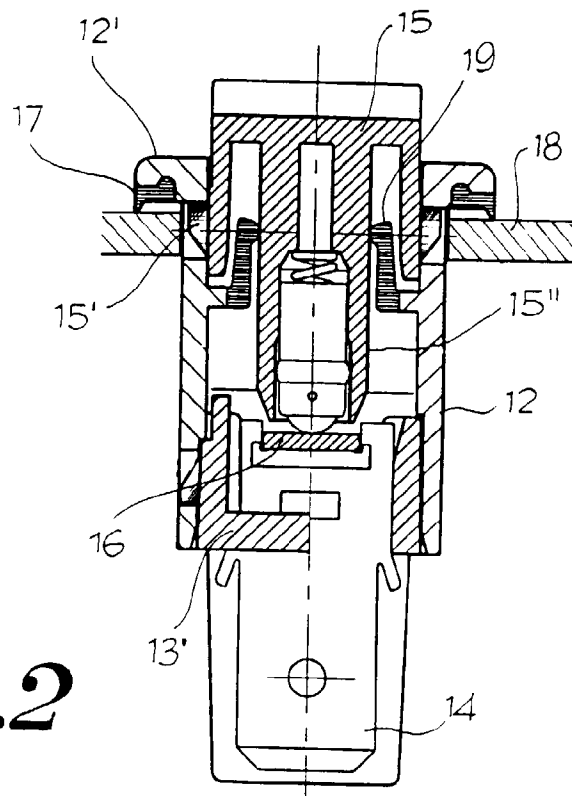


Fig. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0243

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 5 053 591 A (THEURER WALTER C) 1 October 1991 * claim 1; figures 1,2 *	1-6	H01H23/06
X	WO 96 08024 A (PDL HOLDINGS LTD ;COOK DAVID LANGMAN (NZ)) 14 March 1996 * page 5, line 29 - page 6, line 2; figure 2 *	1-6	
A	DE 38 06 773 A (SIEMENS AG) 14 September 1989 * claim 1; figure 1 *	1-6	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H01H
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 3 August 1998	Examiner Mausser, T
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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