

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



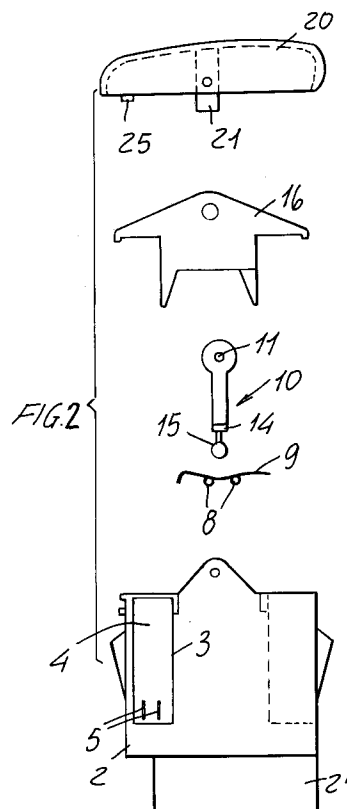
(11) Publication number:

0 568 759 A1

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **92830214.0**(51) Int. Cl.⁵: **H01H 23/16**(22) Date of filing: **08.05.92**(43) Date of publication of application:
10.11.93 Bulletin 93/45(84) Designated Contracting States:
DE ES FR GB(71) Applicant: **CAVIS S.r.l.**
Via Roma, 31
I-15023 Felizzano (Alessandria)(IT)(72) Inventor: **Codrino, Giuseppe, Cavis S.r.l.**
Via Roma, 31
I-15023 Felizzano (Alessandria)(IT)(74) Representative: **Cicogna, Franco**
Ufficio Internazionale Brevetti
Dott.Prof. Franco Cicogna
Via Visconti di Modrone, 14/A
I-20122 Milano (IT)(54) **Improved toggle switch for industrial motor vehicle applications.**

(57) An improved toggle switch for industrial motor vehicle applications comprises a blade or foil element which can swing about its cross axis and is held in a set position by the pressing force of a resilient point element, the blade supporting drum contacts, made of a metal alloy material, and is tilted, on underlaying fixed contacts, by means of a tilting rod element.

**EP 0 568 759 A1**

BACKGROUND OF THE INVENTION

The present invention relates to an improved toggle switch for industrial motor vehicle applications.

As is known, for closing and opening driving electric circuits there are conventionally used switch elements or devices which have a very different construction, depending on the provided use applications.

In particular, in the electric system of a motor vehicle there are advantageously used the so-called "toggle" switches, that is switches in which a driving key supports contact elements provided on an oscillating or swinging movable blade element so as to engage with corresponding fixed contacts arranged at preset positions.

In this connection it should be pointed out that in the mentioned toggle switches, which can be either of the stable or of the unstable type and can include either two or three working positions, the movable contact bearing blade can assume an offset or not proper position, which in turn can cause the generation of sparks with a consequent undesirable oxidation of the contacts.

Moreover, the element provided for causing the blade to swing about its cross axis is usually constituted by a small rod, the sliding of which, along the blade, can be hindered by friction phenomena.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing a toggle switch in which the movable blade element is so designed and arranged as to constantly assure a perfect electrical connection between the movable contacts and fixed contacts.

Within the scope of the above mentioned aim, a main object of the present invention is to provide a toggle switch including a blade element which is not affected by undesired vibrations.

Yet another object of the present invention is to provide such a toggle switch which is very reliable in operation.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by an improved toggle switch, specifically designed to be applied on industrial motor vehicles, characterized in that said toggle switch essentially comprises a blade element which can swing about a cross axis thereof and is held at a set position by a pressing resilient point element, said blade element supporting drum contact elements, made of a metal alloy, a rod element being furthermore provided for tilting said blade element on underlaying fixed contact ele-

ments.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the toggle switch according to the present invention will be come more apparent from the following detailed disclosure of a preferred, though not exclusive, embodiment thereof which is illustrated, by way of an indicative but not limitative example in the figures of the accompanying drawings where:

Figure 1 is a partially broken-away view showing the toggle switch according to the present invention;

Figure 2 is an exploded view illustrating the component elements of the toggle circuit according to the invention;

Figure 3 is a top view of a tilting key included in the toggle switch according to the invention;

Figure 4 is a further top plan view of a box casing including the elements for operating or driving the movable blade element of the toggle switch;

Figure 5 is a further top plan view of a dust cover element;

Figure 6 illustrates a swinging plate element which supports a rod element for driving the mentioned movable blade element; and

Figure 7 illustrates a bottom view of the movable blade element.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the figures of the accompanying drawings, the improved toggle switch according to the present invention, which has been generally indicated at the reference number 1, comprises a box-like body 2 including two longitudinal walls 3 which defines corresponding elongated side compartments 4 and a central compartment 4'.

The side compartments are provided with contact elements 5 and include therein corresponding lamp-holder elements 6, of the withdrawing type, whereas the central compartment is provided, at the bottom thereof, with a pair of fixed contacts 7 which are advantageously co-molded with the bottom of the box-like body and consist of pads preferably made of a metal Ag/Ni alloy.

The box-like body is extended downwardly by a bottom element 2', which supports reduced-pitch terminals and defines a seat adapted to snap receive a wiring terminal block.

With the above mentioned fixed contacts 7, further contacts 8 cooperate, which consist of half-cylindrical or drum pads, made of an Ag/Ni alloy,

restrained on a movable blade element 9, which is suitably contoured, said contacts 8 being adapted to hold the blade element properly oriented during the tilting movement thereof.

The movable blade element, in particular, is driven, with a partial turning movement, about its cross axis, by a swinging plate element 10 which, at the top thereof, is provided with a throughgoing longitudinal hole 11 and a central slot 12 which, in turn, extends with a throughgoing hole open at the bottom.

More specifically, in the above mentioned hole opened at the bottom thereof, there is housed, against the biasing of a spring, a point element 13, whereas in a side blind hole, formed in the small plate, there is engaged, against the biasing of resilient means, a rod element 14, the free end of which is fork-shaped, so as to rotatably restrain a roller 15 made preferably of a metal material.

This point element, in particular, is provided to operate as a position marking element, so as to eliminate possible clearances and vibrations of the blade element; the roller 15, in turn, is specifically designed for reducing the sliding friction of the rod, so as to improve the performance thereof.

On the top of the box-like body there is restrained, by means of restraining lugs, a dirt cover element 16 which is provided with side openings 17 therethrough the light beams of underlying lamps 14 can pass, and being moreover provided with a central opening 19 which is formed at the slot 12 of said swinging plate.

On the dirt cover element, moreover, there is fitted a driving key 20, having a hollow construction, which is provided with a downwardly directed central lug 21 and adapted to engage in that same slot of said plate.

It should be moreover pointed out that the driving key is restrained to the box-like body, as well as to the swinging plate, by means of a pin 22 and that the key is provided, at one end thereof, with an ideogram 23 and, at the other end thereof, with a transparent or translucent portion 24, adapted to signal the closure condition of the switch.

Thus, in actual practice, the mentioned key will be substantially disengaged from the tilting system, and, accordingly, it can be easily replaced by another key or push-button, of different construction, depending on requirements, without the need of modifying the elements of the tilting system.

On the key or button 20, moreover, perimetrical lugs 25 can be provided for abutting against corresponding lugs 26 of the box-like body in order to limit the rotaty movement of the latter.

From the above disclosure and the figures of the accompanying drawings it should be apparent that the invention fully achieves the intended aim and objects.

While the invention has been disclosed and illustrated with reference to a preferred embodiment thereof, it should be apparent that the disclosed embodiment is susceptible to several modifications and variations all of which will come within the spirit and scope of the appended claims.

Claims

1. An improved toggle switch, specifically designed to be applied on industrial motor vehicles, characterized in that said toggle switch essentially comprises a blade element which can swing about a cross axis thereof and is held at a set position by a pressing resilient point element, said blade element supporting drum contact elements, made of a metal alloy, a rod element being furthermore provided for tilting said blade element on underlying fixed contact elements.
2. A switch according to Claim 1, characterized in that said switch comprises a box-like body including two longitudinal walls which define corresponding elongated side compartments and a central compartment, said side compartments including contact elements and operating for housing withdrawing lamp holder elements, said central compartment supporting, at a bottom portion thereof, said fixed contacts, which are co-molded with a bottom portion of said box-like body and comprise pads made of an Ag/Ni alloy material.
3. A switch according to Claim 2, characterized in that said box-like body comprises a bottom element downwardly extending which supports reduced pitch terminal elements and provides a seat for snap engaging wiring terminal block means.
4. A switch according to Claim 1, characterized in that said fixed contacts cooperate with further contact elements comprising half-cylindrical pads, or drum-pads, made of an Ag/Ni alloy material and restrained on said blade element.
5. A switch according to Claim 1, characterized in that said movable blade element is partially rotatively driven about a cross axis thereof by a swinging plate which is provided, at a top portion thereof, with a longitudinal throughgoing hole and a central slot which is extended by a throughgoing hole opened at a bottom portion thereof.
6. A switch according to Claim 5, characterized in that in said hole opened at a bottom portion

thereof of said plate there is housed, against a biasing of a helical spring, a point element, whereas in a blind side hole formed in said plate there is engaged, against the biasing of further resilient means, a rod having a free end of fork shape and rotatably restraining a metal roller. 5

7. A switch according to Claim 2, characterized in that said box-like body supports on a top portion thereof a dirt cover element including side openings therethrough light beams can pass, as well as a central opening formed at said slot provided in said swinging plate. 10

8. A switch according to Claim 7, characterized in that on said dirt cover element there is fitted a driving key, of hollow construction, having a central lug downwardly directed and adapted to be engaged in said slot. 15 20

9. A switch according to Claim 8, characterized in that said key is restrained to said box-like body and to said plate by means of a pin element and in that said key is provided, at an end portion thereof, with an ideogram and, at another end portion thereof, with a transparent portion for signalling a closure condition of said switch. 25

10. A switch according to Claim 8, characterized in that on said key there are provided perimetrical lugs provided for abutting against lug elements of said box-like body in order to limit a rotary movement of said box-like body. 30 35

40

45

50

55

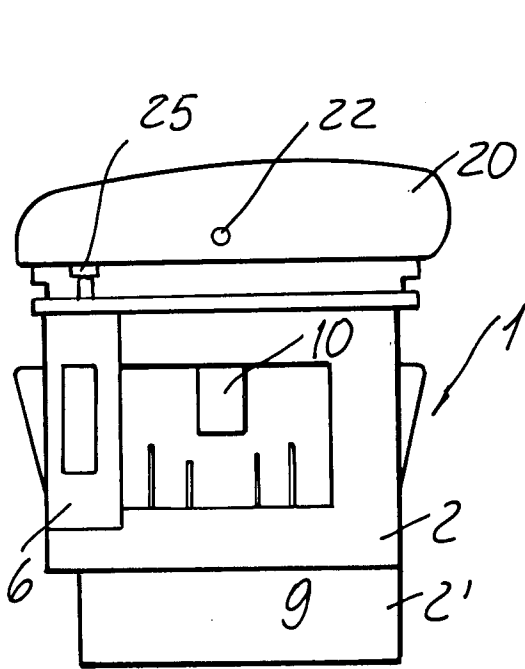


FIG. 1

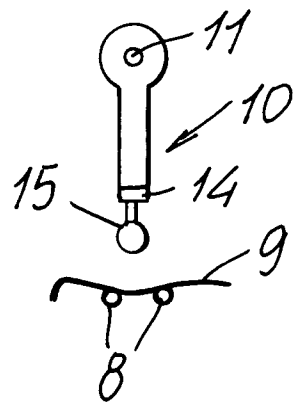
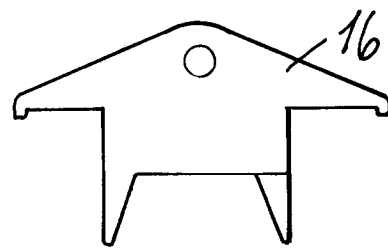
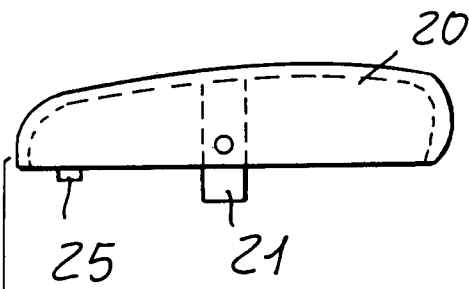


FIG. 2

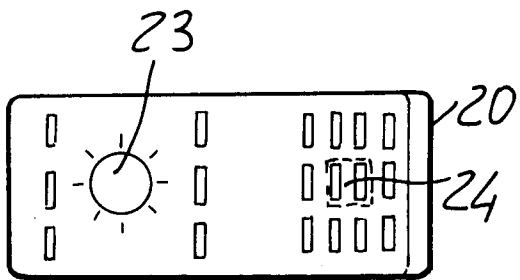
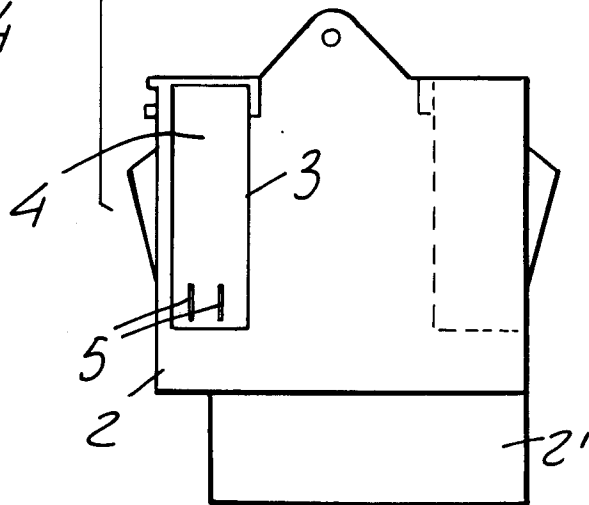


FIG. 3



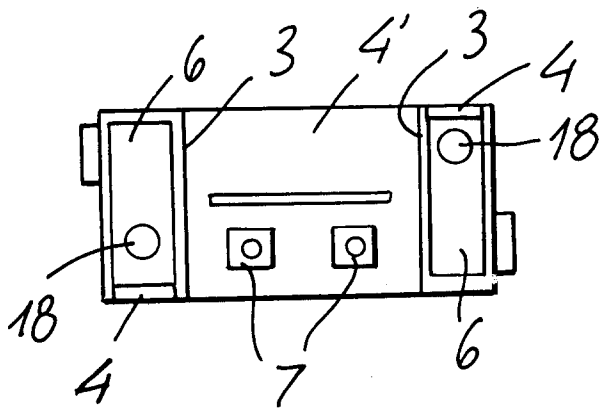


FIG. 4

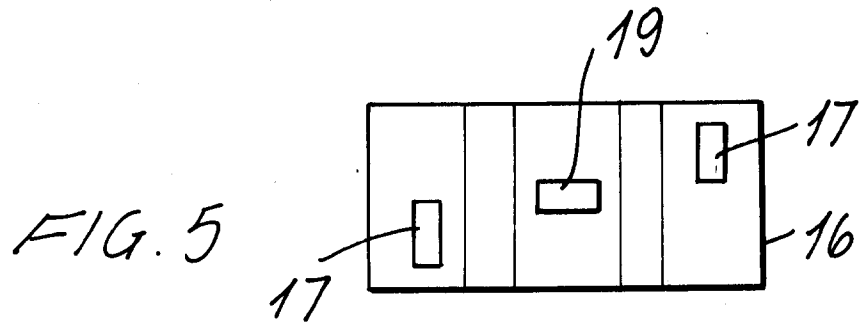


FIG. 5

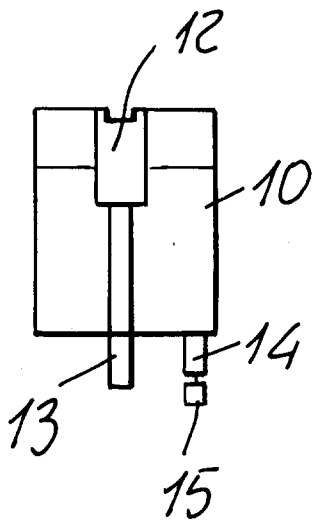


FIG. 6

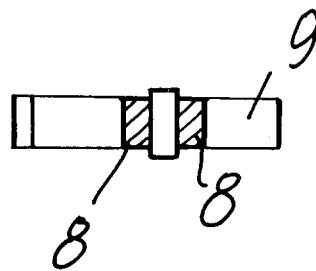


FIG. 7



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 83 0214

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.5)
X	DE-A-2 756 264 (SWANN, DAVID ALLEN) * page 7, paragraph 2; figure 2 *	1,5,6	H01H23/16
Y	---	2-4,7-10	
Y	DE-A-3 024 510 (SWF-SPECIALFABRIK FÜR AUTOZUBEHÖR GUSTAV RAU GMBH.) * the whole document *	2,3,7-10	
Y	---		
Y	US-A-3 989 915 (KIKUYOSHI NISHIKAWA.) * column 3, line 7 - column 4, line 2 *	4	
X	---		
X	US-A-3 524 952 (W.H. ANDERSON) * column 4, line 60; figures 1,2,7,9,11 *	1,5	
A	---		
A	US-A-2 832 852 (T.A. ANDREW) * the whole document *	1-6	
A	---		
A	US-A-5 045 654 (EATON CORPORATION) * column 4, line 9 - line 59; figure 7 *	1-6	
A	---		
A	DE-A-4 022 514 (HELAG ELECTRONIC GMBH.) * figures 1,2 *	1-4,7-10	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
	-----		H01H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 DECEMBER 1992	Examiner OVERDIJK J.
CATEGORY OF CITED DOCUMENTS 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 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			