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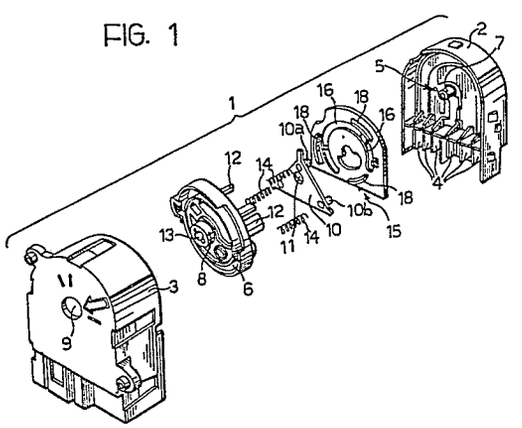
(54) **An ignition switch for motor vehicles.**

(57) The switch comprises, according to a known solution, a containment casing (2, 3) in which electrical contacts 4) are mounted in contact with a flat wall (5) of the casing for cooperation with a rotatable contact element (10) which is moved, usually through a transmission, by the ignition key of the vehicle. The electrical contacts (4) are sandwiched between the flat wall of the casing and an intermediate insulating body (15) on which projecting formations (tripping formations) (18) are provided for selectively causing the rotatable element (10) to move towards and away from the electrical contacts as a result of the rotation imparted thereto.

FIG. 1



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Description

An ignition switch for motor vehicles

The present invention relates to ignition switches for motor vehicles and particularly concerns switches comprising:
- a containment casing with at least one generally flat wall,
- a set of electrical contacts mounted on the flat wall,
- at least one further electrical contact element mounted rotatably in the casing for cooperation with the electrical contacts of the set, and
-a set of projecting formations which surround the electrical contacts of the set and can cooperate with the further contact element selectively to cause it to move towards and away from the electrical contacts of the set as a result of its rotation.

Ignition switches of the aforementioned type are known in the art. Generally, the further rotatable contact element is supported (usually with the interposition of resilient elements such as springs) by a disc which is rotatably mounted within the casing and can be rotated by the ignition key of the motor vehicle through a transmission element.

In known ignition switches, the projecting formations (tripping formations) - the dimensions and shape of which determine the spatial sequence of connection of the various electrical contacts of the switch - are formed as appendages of the flat wall on which the electrical contacts are mounted. This conventional solution makes the production of the casing (which in fact involves the production of a moulded component of fairly elaborate shape with problems of wastage of material, etc.) and the assembly of the ignition switch as a whole generally complex.

The object of the present invention is to produce a switch of the type specified above, in which the above problems are completely eliminated, providing further advantages as regards the ease and flexibility of production of tne switch.

According to the present invention, this object is achieved by virtue of an ignition switch of the type specified above, characterised in that an intermediate insulating body is provided which is interposed between the set of electrical contacts and the further contact element, and in that the formations are provided on the intermediate body.

The electrical contacts of the set are preferably mounted in a generally sandwich-like arrangement between the at least one flat wall of the casing and the intermediate body. The latter is preferably fixed to the generally flat wall (by gluing or ultrasonic welding) and is provided with openings for the contact between the rotatable contact element and the electrical contacts of the set. If it is fixed by ultrasonic welding, it is envisaged that the surface of the intermediate body which is intended to face towards the flat wall of the casing is provided with projecting formations which are intended to be fused during the ultrasonic welding so as to produce a more intimate connection between the intermediate body itself and the flat wall of the casing.

The invention will now be described, purely by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 is an exploded perspective view of an ignition switch for motor vehicles, produced according to the invention,

Figures 2 and 3 are two diametrally opposite views of one of the elements of the ignition switch illustrated in Figure 1, and

Figure 4 is a section taken on the line IV-IV of Figure 2.

In the drawings, an ignition switch for motor vehicles, for example motor cars is generally indicated 1.

According to a known solution, the switch 1 comprises:
- a containment casing constituted by two half-shells 2, 3 having complementary shapes and provided with engagement formations for their snap-interconnection,
-a set of electrical contacts 4 mounted within the casing jointly defined by the half-shells 2 and 3, in correspondence with a flat end wall 5 of the half-shell 2,
-a rotatable disc-shaped element 6 which is fitted onto a pin 7 projecting from the end wall 5 of the half-shell 2 and is in turn provided with a further centring and guiding pin 8 rotatable within a hole 9 provided in the half-shell 3, and
- a further electrical contact (plate) 10 which is provided with a central hole 11 for its rotatable mounting on the pin 7 and which is surrounded by a set of fingers projecting from the disc element so as to be drawn in rotation about the pin 7 as a result of the rotation imparted to the disc element 6.

The body 6 is rotated by the ignition key of the vehicle through a transmission element (not illustrated) which is intended to engage a shaped central cavity 13 of the pin 8 of the disc element 6 by form coupling.

Resilient elements, usually constituted by helical springs 14, are interposed between the disc element 6 and the rotatable contact 10, and have the function of thrusting the rotatable contact 10 towards the electrical contacts 4 situated on the flat end wall 5 of the half-shell 2.

An intermediate body of electrically insulating material, generally indicated 15, is mounted within the casing 2, 3 between the contacts 4 and the rotatable contact 10.

More precisely, the body 15, whose structure and characteristics are shown in greater detail in Figures 2 to 4, is fitted to the wall 5 of the half-shell 2 (by gluing or by ultrasonic welding) so as to achieve a sandwich-like mounting of the contacts 4.

As can be better seen in Figures 2 to 4, the intermediate body 15 is provided with a set of windows or apertures (openings) 16, 17 whose function is to enable the contact appendages 10a with which the plate 10 is provided to come into sliding contact with the contacts 4 which are sandwiched between the wall 5 and the body 15.

The contacts 4 extend along generally arcuate paths centred on the pin 7: the apertures or openings 16, 17 are of exactly the same shape. In particular, the aperture or window 17 which is situated centrally of the element 15 usually comprises a central zone for passage of the pin 7, as well as an outer arcuate portion.

First projecting formations of the body 15, indicated 18, project from the face of the body which is intended to face towards the rotatable contact 10.

The formations 18 also extend along arcuate paths so as to border the windows 16 and 17 for respective portions of their angular development.

The projecting formations 18 (tripping formations) are intended to cooperate with the rotatable element 10 to cause it to move away from the contacts 4 against the thrust exerted by the springs 14.

Thus, the dimensions and shape of the projecting formations 18 univocally determine the angular positions at which the rotatable contact 10 is moved away from the contacts 4 to interrupt the electrical contact therewith.

In other words, when the rotatable contact 10 is oriented so that it is disengaged from the tripping formations 18, the contact 10 is urged against the contacts 4 by the springs 14 and thus acts as a "bridge" for electrical connection between the latter. However, when the rotatable contact 10 is brought, by the rotation of the disc element 6, into angular positions in which it cooperates with the tripping formations 18, it is moved away from the contacts 4 which are thus separated from each other again.

The contact 10 is usually mounted on the disc element 6 wth the interposition of at least three springs 14 so that, as well as a general movement towards and away from the contacts 4, the contact can also be inclined to the axis of rotation defined by the pin 7, whereby only some of its contact appendages 10a (and not all of these appendages) may be in sliding contact with the contacts 4.

Further projecting formations, indicated 19, are provided on the opposite face of the element 15, that is, the face which is intended to face towards the end wall 5 of the half-shell 2 on which the contacts 4 are mounted.

In general, the use of the further projecting formations 19 is envisaged when the intermediate body 15 is intended to be fitted to the end wall 5 of the body 2 by means of ultrasonic welding.

The projecting formations 19 are in fact intended to be fused under the action of the field of high-frequency vibrations generated by the sonotrode of the ultrasonic welding device. The latter is moved along the opposite face of the body 15 in correspondence with the formations 19. The material of these formations (which, like the formations 18, constitute integral appendages of the body 15 produced by the moulding of an insulating plastics material) is intended to constitute the weld material. It is thus possible to achieve a firm connection, whilst avoiding any dribbling towards the windows 16, 17 in which the contact appendages 10a must move.

Claims

1. An ignition switch for motor vehicles, comprising:
a containment casing (2, 3) with at least one generally flat wall (5),
a set of electrical contacts (4) mounted on the flat wall (5),
at least one further electrical contact element (10) mounted rotatably (6 to 9) in the casing (2, 3) for cooperation with the electrical contacts (4) of the set, and
a set of projecting formations (7) which surround the electrical contacts (4) of the set and can cooperate with the further contact element (10) selectively to cause it to move towards and away from the electrical contacts (4) of the set as a result of its rotation, characterised in that an intermediate insulating body (15) is provided which is interposed between the set of electrical contacts (4) and the further contact element (10), and in that the projecting formations (18) are provided on the intermediate body (15).

2. An ignition switch according to Claim 1, characterised in that the electrical contacts (4) in the set are mounted in a generally sandwich-like arrangement between the at least one flat wall (5) and the intermediate body (15).

3. An ignition switch according to Claim 1 or Claim 2, characterised in that the intermediate body (15) is fixed to the flat wall and has openings (16, 17) to enable the further contact element (10) to cooperate with the electrical contacts (4) of the set.

4. An ignition switch according to any one of Claims 1 to 3, characterised in that the intermediate body (15) is fixed to the containment casing (2) by gluing.

5. An ignition switch according to any one of Claims 1 to 3, characterised in that the intermediate body (15) is fixed to the containment casing (2) by means of ultrasonic welding.

6. An ignition switch according to Claim 5, characterised in that the intermediate body (15) is provided with further projecting formations (19) which are intended to face towards the casing (15) to form the welding material for the fixing of the intermediate body (15) to the containment casing (2) by ultrasonic welding.

FIG. 1

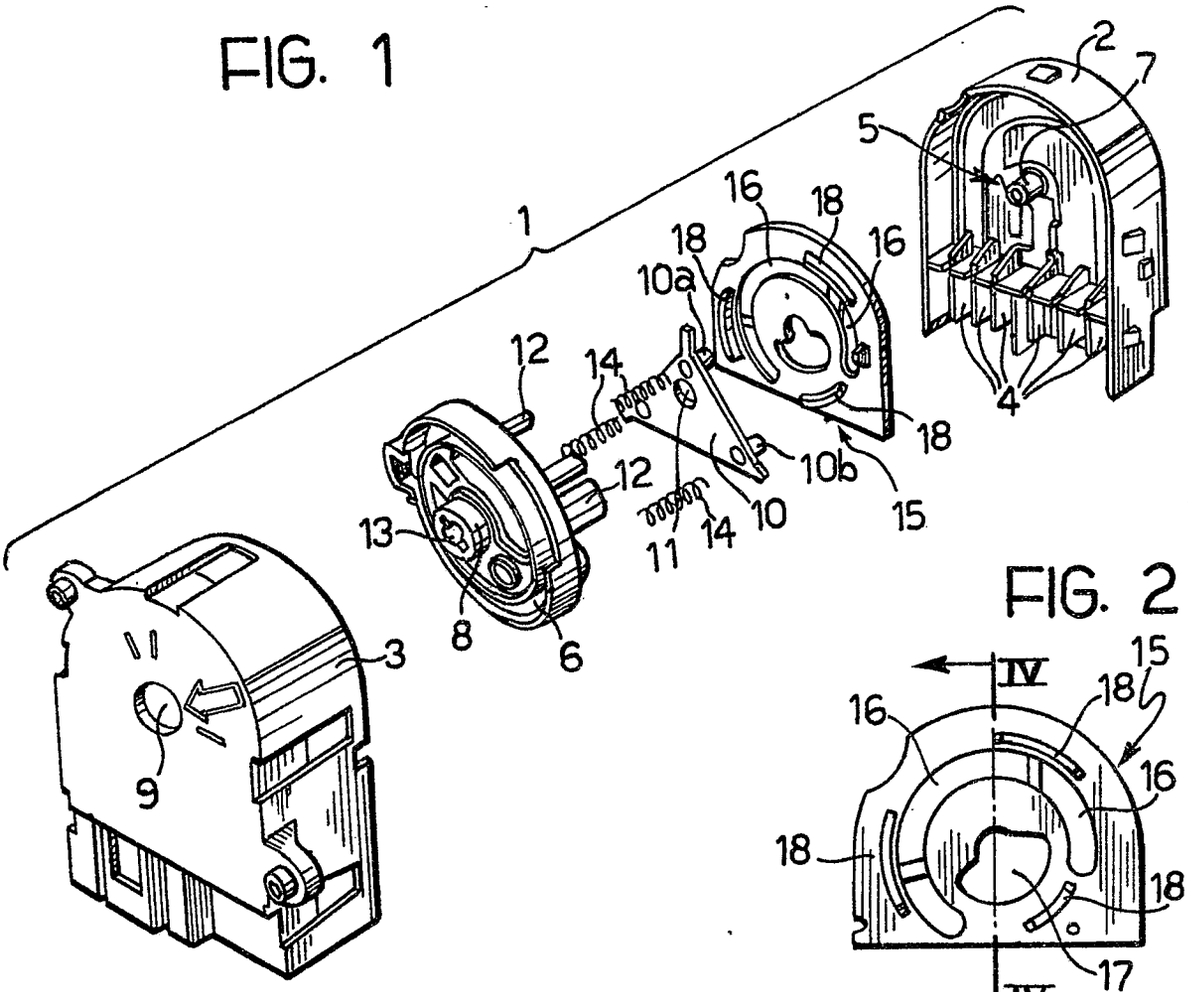


FIG. 2

FIG. 3

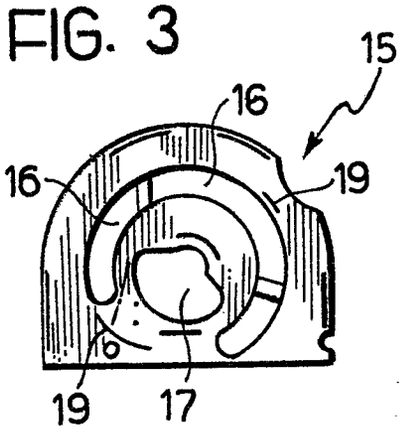
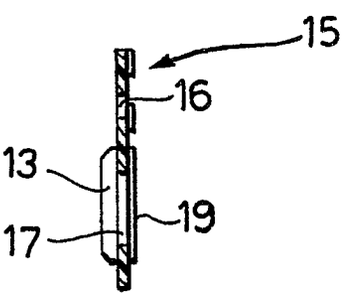


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number

EP 88 83 0533

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.4)
Y	DE-A-3135866 (KIRSTEN) * page 13, paragraph 3; claim 1 *	1-3, 7	H01H19/56 H01H27/06
Y	US-A-1622706 (DOUGLAS) * page 2, line 19 - line 86 *	1, 7	
Y	DE-C-941255 (MAGNETI MARELLI) * page 2, line 64 - line 73 *	2, 3, 7	
A	DE-A-3150217 (HARTMANN) * the whole document *	1	
A	DE-A-3315994 (MERTEN) * claim 1; figures 1-4 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			H01H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20 FEBRUARY 1989	DESMET W.H.G.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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