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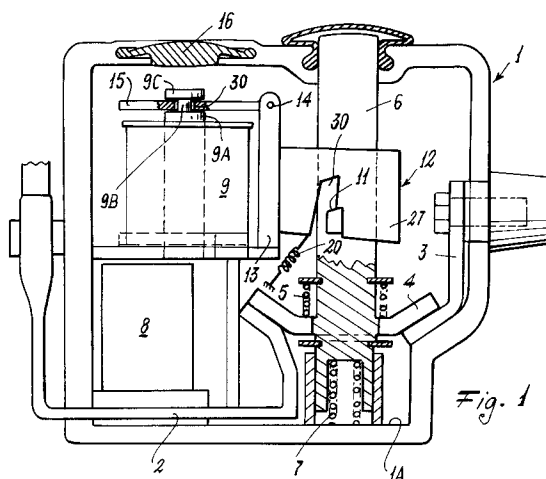
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(54) **An inertia device for interrupting the electrical circuit of a vehicle with an internal combustion engine.**

(57) An inertia device for disconnecting the battery at least from the main power line of an internal combustion engine vehicle, comprising an inertia switch, an electromagnet, and a armature with stop seats for a rod or pushbutton provided with chordal projections and carrying a movable contact (4), in which the armature is in the form of a single piece of ferromagnetic material, and comprises two flanges (27) provided with the seats and positioned on opposite sides of the rod or pushbutton.

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This invention relates to an inertia device for interrupting the electrical circuit of vehicles with internal combustion engines, the device comprising two fixed contacts, a movable contact for connecting these latter together, a spring-loaded rod or pushbutton carrying said movable contact, an armature for halting the rod or pushbutton in two positions, an electromagnet operating on said armature to move the rod or pushbutton from one position in which the movable contact is closed, to the other position in which it is open, and an inertia switch controlling the operation of the electromagnet.

An inertia device is known for interrupting the electrical connection between the battery and the power line of an internal combustion engine vehicle in the case of accidents of a certain gravity in order to reduce the risk of fire.

The known device comprises an electromagnet acting on an armature hinged to the device casing and arranged to break the electrical connection. This armature comprises a metal or tongue part which is pulled by the electromagnet and is rigid with one end of a ring or rod movable against a spring and carrying the movable contact which effectively makes and breaks said electrical connection. Specifically, the pushbutton comprises chordal projections which, depending on the state of the electrical connection, engage against abutment surfaces provided at different axial distances in seats present in said plastics ring. A compression spring operates in an opposite position to the metal tongue in an eccentric part of said ring, and bears against the casing.

This known device has certain drawbacks, as follows:

- a) assembly is relatively difficult as the pushbutton has to be inserted into the plastics ring of the armature and the combination mounted in one of the half-casings of which the casing is formed, against the action of springs acting both on the armature and on the pushbutton these springs being difficult to seat and tending to snap out into the surroundings.
- b) in particular situations the plastics-plastics contact (between diametrical projections on the pushbutton and ring, and the seats with which the projections cooperate) does not sufficiently reliably ensure disengagement between the two, with consequent faulty breaking of the electrical connection.

In the case of fire in the vehicle, the said plastics-plastics combination can lead to jamming of the device.

The aforesaid drawbacks are obviated according to the present invention in that the armature is pivoted to the electromagnet, is entirely of metal, is formed as a tongue against which the electromag-

net exerts its pull when energized, and is integral with flanges provided with stop seats, between which flanges there is located the pushbutton, the chordal projections of which cooperate with said stop seats.

The invention will be more apparent from the detailed description given hereinafter by way of example with reference to the accompanying drawing, in which:

Figure 1 is a schematic illustration of the inertia device of the invention with one of its two half-casings removed; and Figure 2 is a perspective schematic view of the armature.

In the figures the reference numeral 1 indicates one of the two half-casings forming the casing of the inertia interruption device of the invention. The figure shows the fixed input and output contacts 2 and 3 respectively, to be connected together by a movable contact 4 mounted movable (against a spring 5 and with its travel limited by split rings) on a cylindrical plastics rod or pushbutton 6. Against the lower end of the pushbutton there acts a compression spring 7 which bears against the base 1A of the casing.

In the casing there are provided an inertia switch 8 for example of the type manufactured by First Inertia Switch Ltd. and an electromagnet 9, preferably with a movable core 9A.

Half way along its length the rod or pushbutton 6 comprises two projections 10 situated on a chord (and not on a diameter) of the rod 6 and delimited upperly (with reference to Figure 1) by an upwardly inclined surface or face 11, to give a partly wedge-shaped appearance to the projections in question.

All this is known, as is the electrical schematic diagram of the device (see for example Italian utility model 198,205 filed on 30.5.84).

Also known is the fact that said projections 10 assume two different levels within seats or apertures 30 provided in the armature of the electromagnet, according to whether the movable contact 4 is closed or open, but it is also known that the traditional armatures described at the beginning of this text suffer from drawbacks, which are eliminated by the armature with the improved and innovative form of the present invention.

The armature of the invention, indicated overall by 12, is entirely metallic, is of ferromagnetic sheet metal and is supported - via its lateral projections 14 bent for example to form a tube - in supports 13 (only one is visible partly in Figure 2) fixed for example by screws to the electromagnet, for example to its lower flange. The armature 12 comprises a part 15 lying above the electromagnet and provided with a profiled aperture 30 in which there is positioned a reduced cross-section part 9B of the movable core 9A, which is followed by a head 9C to be able to pull the armature downwards. Above

the head 9C there is an elastic pushbutton 16 by which the armature can be pushed towards the electromagnet.

The armature comprises a downwardly bent part 17, from which there branch mutually parallel, substantially flat right angled flanges 22 comprising identical stop seats arranged symmetrically about the central plane A-A and having the shape and function of those of the said conventional devices, ie to halt the projections 10 (with which they cooperate) in two positions at different levels, corresponding to closure and opening of the movable contact 4.

A tension spring 20 positioned between the armature 12 and, for example, the electromagnet applies a moment to the electromagnet.

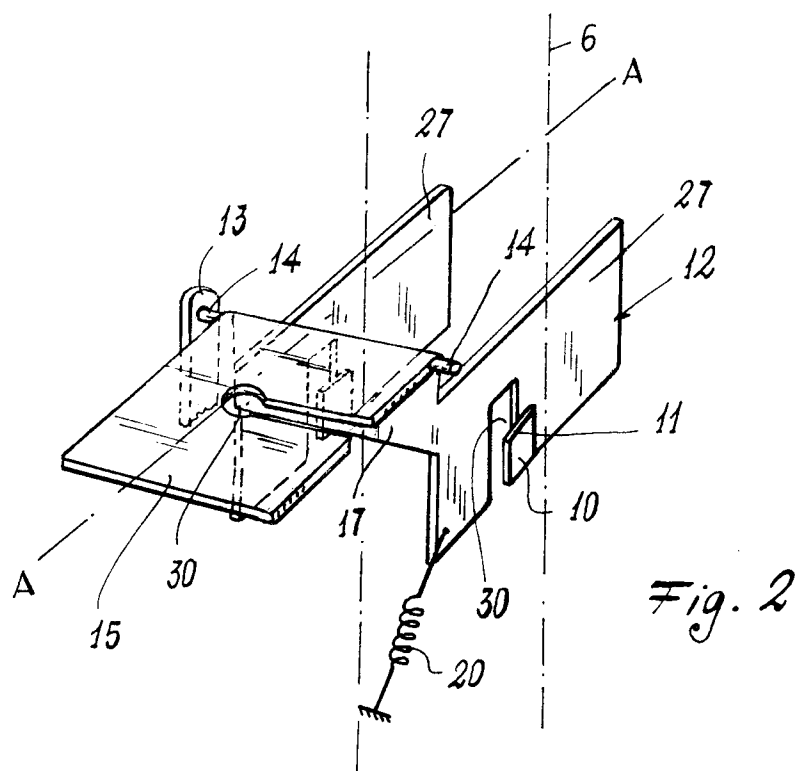
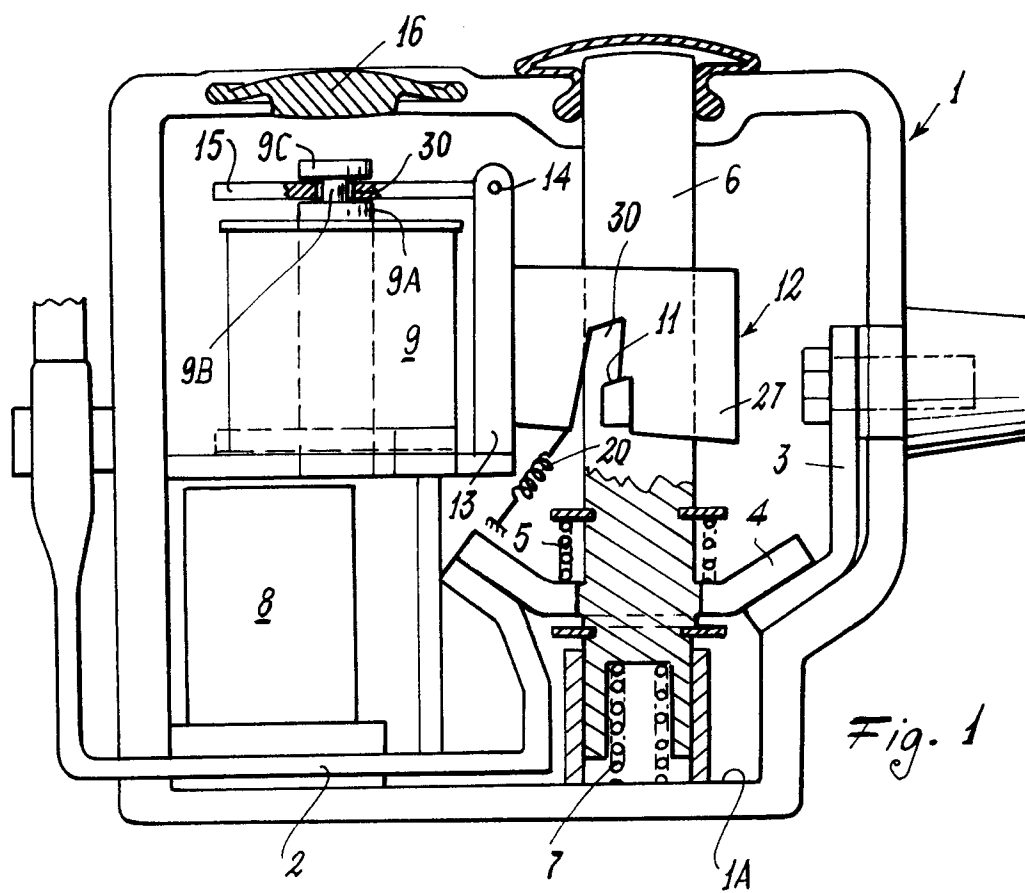
The described arrangement considerably facilitates assembly in that the rod is simply interposed between the two flanges or cheeks 17 of the armature, the armature is of metal in a single piece, and is supported directly or possibly indirectly by the electromagnet, to ensure reliable operation when the inertia device is effectively required to operate.

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Claims

1. An inertia device for disconnecting the battery at least from the main power line of an internal combustion engine vehicle, comprising an inertia switch (8), an electromagnet (9), and an armature (Figure 2) with stop seats (30) for a rod or pushbutton (6) provided with chordal projections (10, 11) and carrying a movable contact (4), characterised in that the armature (Figure 2) is pivoted directly or indirectly to the electromagnet, is in the form of a single piece of ferromagnetic material, and comprises two flanges (27) provided with the seats (30A) and positioned on opposite sides of the rod or pushbutton (6).
2. A device as claimed in claim 1, characterised in that a tension spring (20) acts on the armature (Figure 2) in correspondence with at least one of its two flanges (27).
3. A device as claimed in claim 1, characterised in that the armature comprises on one side of its axis a seat (30) for engagement by the core of the electromagnet (9), and on the other side of said axis (13, 14) the two substantially flat, mutually parallel flanges (27).

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EUROPEAN SEARCH REPORT

Application Number
EP 94 10 7688

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)
Y	US-A-3 430 164 (GENERAL ELECTRIC COMPANY) * column 4, line 62 - column 5, line 5 * ---	1-3	H01H35/14 H01H73/44
Y	FR-A-1 509 119 (DAMIANO) * page 1, right column, paragraph 5-6 * * figure 1 * ---	1-3	
A	AU-D-6 325 865 (BRYCE JOHN MARKS) * page 8, paragraph 3 - page 9, paragraph 1 * ---	1-3	
A	DE-A-14 65 179 (A.C.B. CORPORATION) * claim 1 * ---	1-3	
A	FR-A-2 613 869 (SALAUN RAYMOND) * abstract * -----	1-3	
			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 5 September 1994	Examiner Libberecht, L
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