(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 155 801**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **85301576.6**

(22) Date of filing: **07.03.85**

(51) Int. Cl.⁴: **H 01 H 19/10**

(30) Priority: **13.03.84 GB 8406562**

(43) Date of publication of application:
25.09.85 Bulletin 85/39

(84) Designated Contracting States:
DE FR GB IT

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(54) Rotary switch.

(57) A rotary electric switch has a rotor (1) which can turn relative to a stationary base assembly (3), and which carries a sliding contact member (2) designed to bridge between a stationary feed contact member (6) and a stationary output contact member (4) on rotation of the rotor (1). An auxiliary butting contact member (5) is biased by a spring (7) towards butting engagement with contact members (4, 6) and against a camform (9) on the rotor (1). As rotor (1) turns electrical contact between contact members (4,6) is first made through sliding contact member (2) and then additionally through auxiliary member (5).

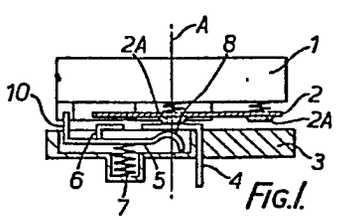

FIG.1.

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ROTARY SWITCH

This invention relates to rotary electric switches, such as those used as ignition switches in motor vehicles. In particular, the invention relates to a rotary electric switch comprising a rotor carrying a sliding contact member which, on rotation of the rotor, moves between a closed position, in which it bridges a stationary feed contact member and a stationary output contact member, and an open position in which such bridging does not occur. Such a switch will be referred to hereinafter as "a rotary switch of the type described". When the switch is a vehicle ignition switch there are usually a number of output contact members which are bridged in turn by the sliding contact member.

Where the rotary switch is to supply an electronic circuit, it is important that the supply should be continuous while the sliding contact member is moving over the stationary contact members. In practice it is found that the supply is interrupted for periods which, although very short, may result in the electronic circuits malfunctioning. An object of the present invention is to avoid or minimise that malfunctioning in a rotary electric switch of the type described.

According to the present invention, an auxiliary butting contact member is arranged to be operated by

rotation of the rotor and to provide a secondary connection, with butting contact, between the stationary contact members. Advantageously, the secondary connection is made and broken respectively after and before the connection through the sliding contact member is made and broken, so that the auxiliary contact member never switches the current; the connection through the auxiliary contact member then ensures that no breaking of the circuit occurs during movement of the sliding contact over the stationary contacts.

Preferably, the auxiliary contact member is spring-biased towards a closed position in which that contact member makes butting engagement with the stationary contact members, and the rotor has a camform, which is operative on the auxiliary contact member, on rotation of the rotor, to cause movement of the auxiliary contact member between a closed position in which said butting engagement occurs and an open position in which it is out of engagement with at least one of the stationary contact members.

The invention will be more readily understood by way of example from the following description of a rotary electric ignition switch in accordance therewith, reference being made to the accompanying drawings, in which

Figures 1 and 2 show the switch in radial section, with the switch contacts closed and open respectively, and

Figures 3 and 4 show the contact members of the switch

in plan view and correspond to Figures 1 and 2 respectively.

The vehicle ignition switch shown in the drawing comprises a rotor 1 carrying a sliding contact member 2, and a base 3 on which the rotor 1 is mounted for rotation about the central axis A. Contact member 2 is made of electrically conducting material and has parts 2A which are pressed out of the metal to engage with the stationary contact as required. A number of stationary output contact members are mounted in the base 3, but only that for the ignition contact member is shown at 4, while the feed stationary contact member is indicated at 6. As the rotor 1 is turned, sliding contact member 2 bridges the feed contact member 6 successively with the stationary contact members. Connection between the feed contact member and the ignition contact member 4 is made over an arc of travel of the rotor 1, so that the ignition circuit is completed between the IGNITION location and the START location.

During the travel of the sliding contact member 2 over the ignition contact member 4, short term interruptions in the connection may occur due to slight imperfections in the feed contact member 6. Those interruptions are so short that the operation of the ignition is unaffected, but they may affect any electronic circuit supplied through the same contact members and may cause the electronic circuit to malfunction. To avoid that possibility, the switch has an auxiliary butting contact member 5, which is designed to

connect between the feed contact member 6 and the ignition contact member 4 in parallel with the sliding contact member 2. Auxiliary contact member 5 is located beneath the feed and ignition contact members and is biased towards them by a spring 7 so that end 8 of the contact member 5 is permanently abutted against the ignition contact member 4 in the IGNITION and START positions. The other end of contact member 5 has an upwardly turned leg 10 which is biased by spring 7 against a camform 9 on the underside of the rotor 1, and which serves to move the auxiliary contact member 5 between the open position shown in Figure 2 and the closed position of Figure 1, in which contact member 5 additionally engages the feed contact member 6. While the rotor 1 is in the OFF position or the ACCESSORY position, cam 9 retains the auxiliary contact member 5 in the OFF position shown in Figure 2. As the rotor is progressively turned to the IGNITION position, the camform allows the contact member 5 to pivot into the closed position of Figure 1, contact with the feed contact member 6 being made at a small angular position beyond that at which the connection to the ignition contact member 4 is made by the sliding contact member 2. The secondary circuit is thus completed by butting contact of auxiliary contact member 5 with contact members 4 and 6.

During subsequent movement of the rotor towards the START position and the return to the IGNITION position, auxiliary contact member 5 remains stationary with the

circuit through it uninterrupted. Thus, the supply to the ignition contact member 4 is maintained, regardless of short term interruptions in the connection through the sliding contact member 2. Further, as the connection through the auxiliary contact member is made after that through the sliding contact member 2, and similarly the connection through the former is broken before that through sliding contact member 2 is broken, the auxiliary contact member 5 never switches the current. Should the connection through the sliding contact member 2 fail for any reason, while the auxiliary contact member is closed, and welding of the latter occurs, the camform 9 on the rotor 1 will break the weld on the rotor being returned to the ACCESSORY position.

CLAIMS

1. A rotary electric switch comprising a rotor (1) carrying a sliding contact member (2) which, on rotation of the rotor, moves between a closed position (Figure 1), in which it bridges a stationary feed contact member (6) and a stationary output contact member (4); and an open position (Figure 2), in which such bridging does not occur; characterised in an auxiliary butting contact member (5) which is arranged to be operated by rotation of the rotor (1) and to provide a secondary connection, with butting contact, between the two stationary contact members (4, 6).

2. A rotary electric switch according to claim 1, in which the secondary connection is made and broken respectively after and before the connection through the sliding contact member (2) is made and broken, so that the auxiliary contact member (5) never switches the current to the output contact member (4).

3. A rotary electric switch according to claim 2, in which the auxiliary contact member (5) is spring-biased towards a closed position in which that contact member (5) makes butting engagement with the stationary contact members (4, 6), and the rotor (1) has a camform (9), which is operative on the auxiliary contact member (5), on rotation of the

rotor, to cause movement of the auxiliary contact member (5) between a closed position in which said butting engagement occurs and an open position in which it is out of engagement with at least one of the stationary contact members (4, 6).

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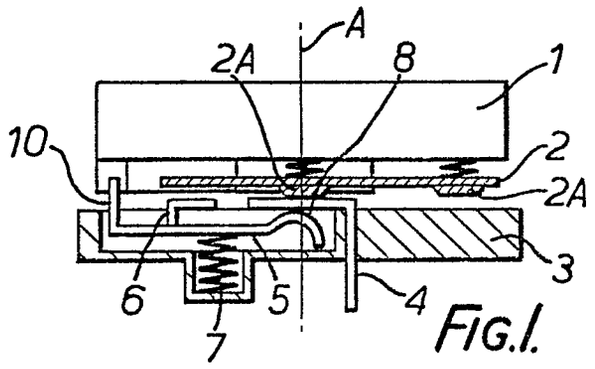

FIG.1.

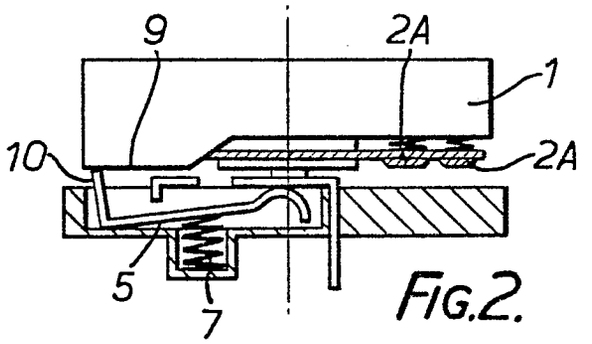

FIG.2.

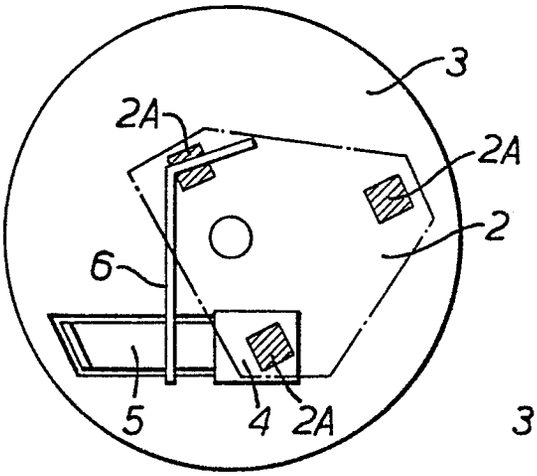

FIG.3.

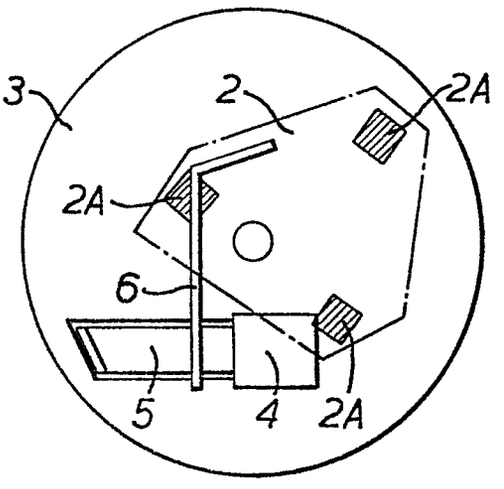

FIG.4.