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⑤④ **Switch mechanism.**

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Description

This invention relates to switch mechanisms and particularly, but not exclusively, to a so-called trip-free switch mechanism, i.e. a switch mechanism, which cannot be permanently closed or reclosed while a fault exists. (See for example Document FR—A—1,139,173).

A first aspect of the invention resides in a switch mechanism having a contact carrier movable between an inoperative position (Figure 1) and a latched operative position (Figure 3) and an actuator for moving the carrier to the operative position where a circuit to a contact on the carrier is completed, characterised in that the actuator, when actuated with the contact carrier in the inoperative position, first moves the contact carrier into the operative position (Figure 3) and then completes a circuit to a contact on the contact carrier.

A switch mechanism, according to a second aspect of the invention, comprises a first contact carrier having a first contact member and movable between an inoperative position and an operative position; a latch mechanism for retaining the first contact carrier in the operative position when moved thereto; first bias means urging the first contact carrier towards the inoperative position; a second contact carrier having a second contact member and movable between first and second positions; second bias means urging the second carrier towards the first position; and an abutment on the second carrier engaged by the first carrier when in its inoperative position; the arrangement being such that movement of the second carrier towards the second position causes the first carrier to be moved into its operative position and the subsequent return of the second carrier towards its first position is accompanied by the engagement of the first and second contact members.

Preferably, the first carrier is a pivoted lever one end of which is located between the abutment and the second contact member and is urged against the abutment by the first bias means.

The latch mechanism may be moved, as by a solenoid, between a latching location and a free location. When the latch mechanism is moved into the free position, resulting for example from the occurrence of a fault, the first carrier is released and is moved into its inoperative position under the action of its bias means. The engagement of the contact members is broken and the second contact member returns to its first position.

The latch mechanism may for example be spring biased into the latching position and be moved into the free position by a solenoid which is energised when a fault occurs in the circuit. After release of the first carrier and opening of the switch, reactivation of the second carrier while the fault persists causes momentary re-engagement of the contact members and consequential operation of the solenoid to open the switch immediately.

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

Figures 1, 2 and 3 show the mechanism in the OFF, INTERMEDIATE and ON position respectively.

As shown in the drawings, the switch mechanism has a first contact carrier in the form of a lever 12, which is pivoted centrally about knife edge 13. Carrier 12 is biased clockwise by a compression spring 14 and carries at one end a contact member 15. A latch mechanism 16 is located adjacent the other end of carrier 12 and is spring biased to the latched position shown in the drawing. Latch mechanism 16 is coupled to a solenoid (not shown), which when energised moves the latch mechanism in the direction D to a free position in which the carrier is released. The solenoid is so connected that it is energised when a fault condition occurs in the circuit.

A second contact carrier 17 is movable against the bias provided by a second compression spring 18 between a first position, shown in Figure 1, and a second position, which is lower than that shown in Figure 2; movement of the second carrier 17 downwardly towards the second position is effected by a push-button 20 and the return of the second carrier, on release of the push-button 20, is performed by spring 18. The second carrier is as shown of C-form with two spaced abutment-forming members 21, 22 between which is located the end of carrier 12 having the contact member 15. Second carrier 17 carries a second contact member 23 which can be connected to the circuit through a flexible connection 24.

Assuming that the switch mechanism is open, as shown in Figure 1, and there is no fault condition so that the latch mechanism 16 is in the latching position, operation of push-button 20 forces carrier 17 downwardly and thereby causes movement of the carrier 12 towards its operative position (Figure 2). In doing so, the right hand end of carrier 12 moves over latch mechanism 16 and is retained in the operative position by shoulder 25; during the downward movement of carrier 17, spring 14 at all times retains the left-hand end of carrier 12 in contact with member 21 and there is no engagement between contact members 15 and 23. On release of push-button 20, carrier 17 is returned upwardly by spring 18 and is brought to rest by the engagement of member 22 with the carrier 12, and with the contact members in engagement. The circuit from connection 24, contacts 23 and 15 and flexible connection 26 is thus made (Figure 3).

If a fault condition should arise in the circuit including the contacts 15 and 23, the solenoid is energised and causes the latch mechanism 16 to move in direction D to the free position. Carrier 12 is then released and moves clockwise to the inoperative position under the action of spring 14, thereby allowing carrier 17 to return to its first

position so that the mechanism reverts to the open position shown in Figure 1.

On opening of the contacts 15 and 23, the solenoid is de-energised and the latch mechanism 16 reverts to the latching position shown in Figure 1. If the push-button 20 is operated while the fault persists, the first carrier 12 is again latched and the contacts momentarily closed to cause the solenoid to be reenergised and the switch to be re-opened.

In an alternative arrangement, the solenoid may be normally energised to retain the latch mechanism 16 in the latching position. On a fault being detected, the solenoid is de-energised and causes the latch mechanism to move into the free position with the result that the switch is opened as before.

Claims

1. A switch mechanism having a contact carrier (12) movable between an inoperative position (Figure 1) and a latched operative position (Figure 3) and an actuator (17, 20) for moving the carrier to the operative position where a circuit to a contact (15) on the carrier is completed, characterised in that the actuator, when actuated with the contact carrier (12) in the inoperative position, first moves the contact carrier into the operative position (Figure 3) and then completes a circuit to a contact (15) on the contact carrier (12).

2. A switch mechanism comprising: a first contact carrier (12) having a first contact member (15) and movable between an inoperative position (Figure 1) and an operative position (Figure 2); a latch mechanism (16, 25) for retaining the first contact carrier (12) in the operative position (Figure 3) when moved thereto; first bias means (14) urging the first contact carrier (12) towards the inoperative position; a second contact carrier (17) having a second contact member (23) and movable between first and second positions; second bias means (18) urging the second carrier (17) towards the first position; and an abutment (21) on the second carrier (17) engaged by the first carrier (12) when in the inoperative position; the arrangement being such that movement of the second carrier (17) towards the second position causes the first carrier (12) to be moved into its operative position and the subsequent return of the second carrier (17) towards the first position is accompanied by the engagement of the first and second contact members (15, 23).

3. A switch mechanism as claimed in claim 2, wherein the first carrier (12) is a pivoted lever one end of which is located between the abutment (21) and the second contact member (23) and is urged against the abutment (21) by the first bias means (14).

4. A switch mechanism as claimed in claim 2 or 3, wherein there is means for moving the latch mechanism (16) between a latching location and a free location where the first carrier (12) is released from the operative position and is moved into the inoperative position under the action of the first

bias means (14), whereby engagement of the contact members (15, 23) is broken.

5. A switch mechanism as claimed in claim 4, wherein the means for moving the latch mechanism to the free location is a solenoid which is energised by a fault occurring in the circuit of the switch.

6. A switch mechanism as claimed in one of claims 2 to 5, wherein the latch mechanism is spring biased into the latching position.

7. A switch mechanism as claimed in any one of claims 2 to 6, wherein the first biasing means (14) biases the first contact carrier (12) into engagement with an abutment (25) of the latch mechanism (16) when the first contact carrier (12) is in the operative position.

Patentansprüche

1. Schaltermechanismus mit einem Kontaktträger (12), der zwischen einer Nichtbetriebsposition (Figur 1) und einer eingeklinkten Betriebsposition (Figur 3) beweglich ist, und einem Betätigungsglied (17, 20) zur Bewegung des Trägers in die Betriebsposition, in der ein Stromkreis zu einem Kontakt (15) auf dem Träger hergestellt wird, dadurch gekennzeichnet, daß in der Nichtbetriebsposition des Kontaktträgers (12) das Betätigungsglied bei der Betätigung zuerst den Kontaktträger in die Betriebsposition (Figur 3) bewegt und dann einen Stromkreis zu einem Kontakt (15) auf dem Kontaktträger (12) herstellt.

2. Schaltermechanismus mit einem ersten Kontaktträger (12), der ein erstes Kontaktglied (15) aufweist und zwischen einer Nichtbetriebsposition (Figur 1) und einer Betriebsposition (Figur 2) beweglich ist; einem Klinkmechanismus (16, 25) zum Halten des ersten Kontaktträgers (12) in der Betriebsposition (Figur 3), wenn er in diese bewegt wurde; einer ersten Spanneinrichtung (14), die den ersten Kontaktträger (12) in die Nichtbetriebsposition drückt; einem zweiten Kontaktträger (17), der ein zweites Kontaktglied (23) aufweist und zwischen einer ersten und einer zweiten Position beweglich ist; einer zweiten Spanneinrichtung (18), die den zweiten Träger (17) in die erste Position drückt; und einem auf dem zweiten Träger (17) befindlichen Widerlager (21), dem der erste Träger (12) in der Nichtbetriebsposition anliegt, wobei die Anordnung derart ist, daß die Bewegung des zweiten Trägers (17) in die zweite Position die Bewegung des ersten Trägers (12) in seine Betriebsposition veranlaßt und die anschließende Rückkehr des zweiten Trägers (17) in die erste Position bei gegenseitiger Anlage des ersten und zweiten Kontaktgliedes (15, 23) erfolgt.

3. Schaltermechanismus nach Anspruch 2, bei dem der erste Träger (12) ein Schwenkhebel ist, dessen ein Ende zwischen dem Widerlager (21) und dem zweiten Kontaktglied (23) angeordnet ist und durch die erste Spanneinrichtung (14) gegen das Widerlager (21) gedrückt wird.

4. Schaltermechanismus nach Anspruch 2 oder 3, bei dem Mittel zur Bewegung des Klinkenmechanismus (16) zwischen einer Einklinkstellung

und einer freien Stellung vorgesehen sind, in der der erste Träger (12) aus der Betriebsposition freigegeben wird und sich unter Wirkung der ersten Spanneinrichtung (14) in die Nichtbetriebsposition bewegt, wodurch die gegenseitige Anlage der Kontaktglieder (15, 23) unterbrochen wird.

5. Schaltermechanismus nach Anspruch 4, bei dem das Mittel zur Bewegung des Klinkenmechanismus in die freie Stellung ein Solenoid ist, das durch eine in dem Schalterstromkreis auftretende Störung erregt wird.

6. Schaltermechanismus nach einem der Ansprüche 2 bis 5, bei dem der Klinkenmechanismus durch Federspannung in die Einlinkstellung gedrückt wird.

7. Schaltermechanismus nach einem der Ansprüche 2 bis 6, bei dem die erste Spanneinrichtung (14) dem ersten Kontaktträger (12) eine in Eingriff mit einem Widerlager (25) des Klinkenmechanismus (16) gerichtete Spannung verleiht, wenn sich der erste Kontaktträger (12) in der Betriebsposition befindet.

Revendications

1. Mécanisme d'interrupteur qui comprend un porte-contact ou support (12) pouvant se déplacer entre une position inactive (figure 1) et une position active de verrouillage (figure 3) et un actionneur (17, 20) pour déplacer ledit support à sa position active dans laquelle un circuit vers un élément de contact (15) du support est complété, caractérisé en ce que l'actionneur, quand il est actionné alors que le support (12) est dans la position inactive, déplace d'abord le support à la position active (figure 3) puis complète un circuit vers un contact (15) du support (12).

2. Mécanisme d'interrupteur qui comprend un premier support de contact (12) comportant un premier élément de contact (15) et pouvant se déplacer entre une position inactive (figure 1) et une position active (figure 2); un mécanisme de verrouillage (16, 25) pour retenir le premier support de contact (12) dans la position active (figure 3) quand il a été déplacé à celle-ci; des premiers moyens (14) pour solliciter le premier support de

contact (12) vers sa position inactive; un second support de contact (17) comportant un second élément de contact (23) et pouvant se déplacer entre une première et une seconde positions; des seconds moyens (18) qui sollicitent le second support (17) vers la première position; et une butée (21) située sur le second support et venant au contact du premier support (12) dans la position inactive, la disposition étant telle que le mouvement du second support (17) vers la seconde position fait que le premier support (12) se déplace à sa position active et que le retour subséquent du second support (17) vers sa première position s'accompagne de la rencontre du premier et du second éléments de contact (15, 23).

3. Mécanisme selon la revendication 2, caractérisé en ce que le premier support (12) est un levier pivotant dont l'une des extrémités est placée entre la butée (21) et le second élément de contact (23) et qui est sollicité contre la butée (23) par les premiers moyens (14).

4. Mécanisme selon la revendication 2 ou 3, caractérisé par des moyens pour déplacer le mécanisme de verrouillage (16) entre une position de verrouillage et une position libre, dans laquelle le premier support (12) est libéré de la position active et est transféré à la position inactive par l'action des premiers moyens de sollicitation (14), ce qui fait que le contact entre les éléments de contact (15, 23) est rompu.

5. Mécanisme selon la revendication 4, caractérisé en ce que les moyens pour déplacer le mécanisme de verrouillage à la position libre comprennent un électroaimant qui est excité lorsqu'un défaut survient dans le circuit.

6. Mécanisme selon l'une quelconque des revendications 2 à 5, caractérisé en ce que le mécanisme de verrouillage est sollicité à la position de verrouillage par un ressort.

7. Mécanisme selon l'une quelconque des revendications 2 à 6, caractérisé en ce que les premiers moyens de sollicitation (14) sollicitent le premier support de contact (12) à s'appliquer contre une butée (25) du mécanisme de verrouillage (16) quand le premier support de contact (12) est dans la position active.

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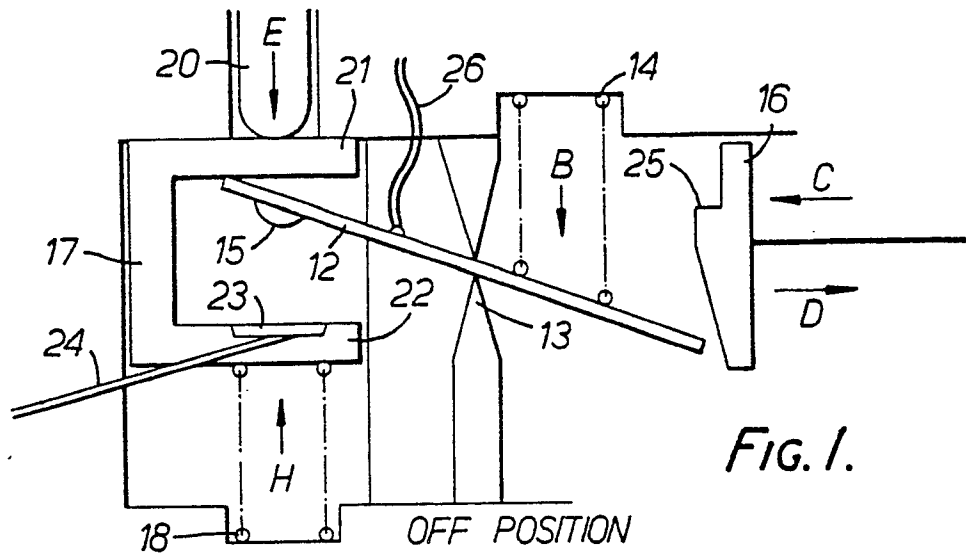


FIG. 1.

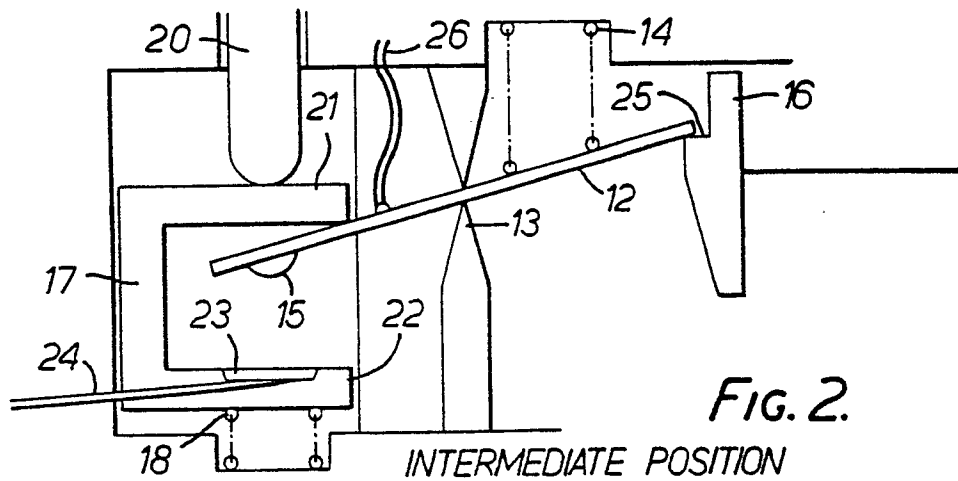


FIG. 2.

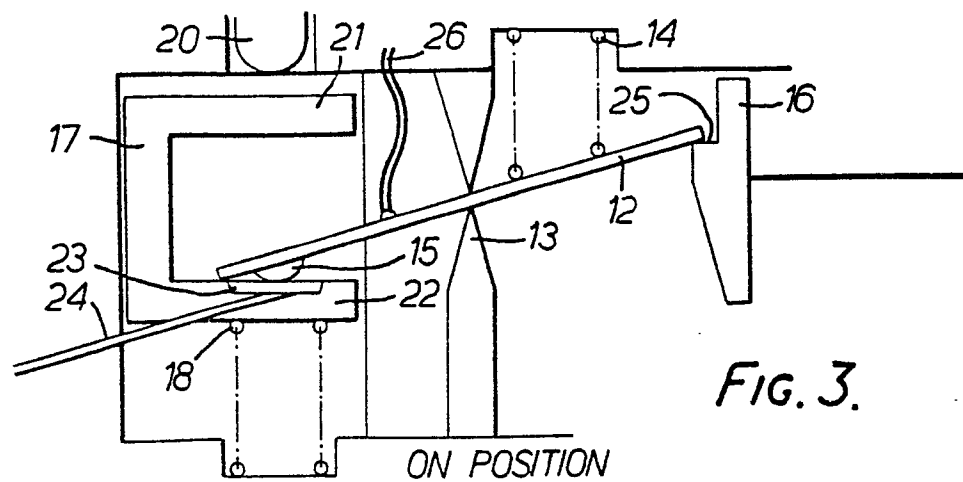


FIG. 3.