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[54] **CIRCUIT CONTROL SWITCH WITH CONTACT BRIDGE SPRING BIASED TOWARDS FIXED CONTACT**

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[51] **Int. Cl.** **H01h 1/36**

[58] **Field of Search** .....200/153 LA, 166 R, 200/166 SD, 164 R, 164 A

[56] **References Cited**

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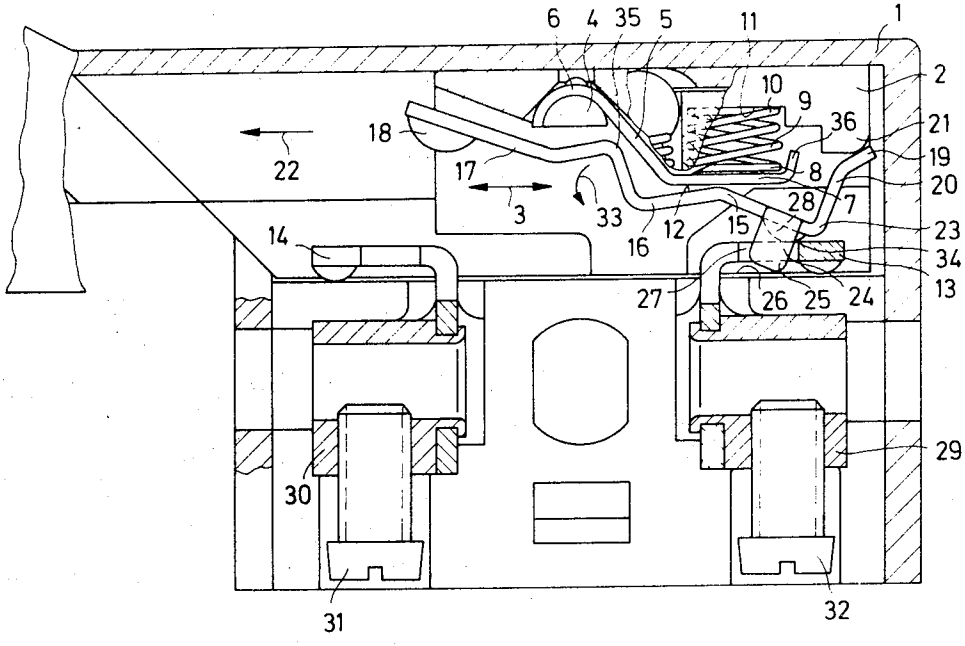
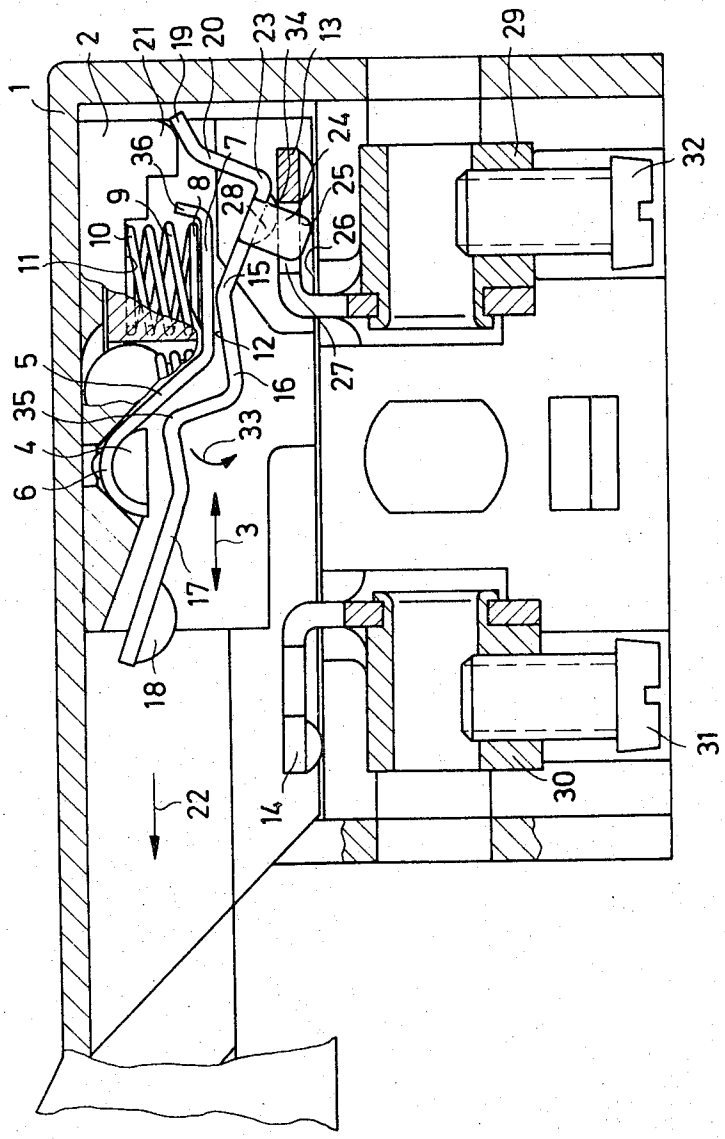
[57] **ABSTRACT**

In an electric switch having at least one movable contact bridge and, associated with each contact bridge and co-operating therewith, two serially-disposed fixed contacts, the contact bridge being of angular construction, one spring-loaded angle arm, in the open switch position, being inclined with respect to a line defined by the contact surfaces, while the other can be coupled to a thrust member, the improvement comprising the contact bridge being provided with one or a plurality of mutually parallel supporting lugs extending opposite to the direction of the other arm and through which the contact bridge particularly in the region of the corner, and being supported on a tilting and sliding plane, and a face or edge of the supporting lug which is directed opposite to the free end of one angle arm being pressed against a fixed abutment.

4 Claims, 1 Drawing Figure

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CIRCUIT CONTROL SWITCH WITH CONTACT BRIDGE SPRING BIASED TOWARDS FIXED CONTACT

BACKGROUND OF THE INVENTION

The invention relates to an electric switch having at least one movable contact bridge and, associated with each contact bridge and co-operating with it, two serially-disposed fixed contacts, the contact bridge being of annular construction and one spring-loaded arm of the angle member being, in the open switch position, inclined with respect to a line defined by the contact surfaces, while the other can be coupled to a thrust member.

The object of the present invention is to provide further improvements to such a switch.

SUMMARY OF THE INVENTION

According to this invention the contact bridge is provided with one or a plurality of mutually parallel supporting lugs extending in the direction of the other angle arm and through which the contact bridge is, particularly in the region of the angle corner, supported on a tilting and sliding plane and a face or edge of the supporting lug which is directed towards the free end of one angle arm is pressed against a fixed abutment. In the same way as in the case of the already proposed construction, the spring of which the point of engagement on the contact bridge is at a distance from its supporting point, exerts a constant moment in the direction of the fixed contact or contacts. At the same time, however, the other angle arm is pressed by the same moment against the thrust member. It cannot perform a pivoting movement until the thrust member is displaced by some external action. In doing so, then, also the movable contact draws close to the fixed contact or contacts. Naturally, also in the case of the present invention, the contact bridge may be tiltably mounted on a fixed contact, so that the electrical connection only has to be established with one contact which is in the same circuit, but yet another form of embodiment is conceivable, whereby the contact bridge particularly one arm thereof, at the end of a pivoting movement strikes the two fixed contacts which belong to the circuit which is to be closed. Instead of two fixed contacts, also a plurality of pairs of contacts may be simultaneously bridged by a correspondingly constructed contact bridge.

A further development of the invention is characterised in that the spring bears on the one hand indirectly through a pivoting member on that side of one angle arm which is remote from the fixed contacts, at a distance from the contact bridge pivoting point, and rests on the other on the thrust member. When the switch is operated, it is as a whole displaced in relation to one arm of the contact bridge, but in all positions of displacement, it exerts constantly and in the same direction torque on the contact bridge and, moreover, in the extreme switched-over position, it ensures the necessary contact pressure.

According to a further feature of the invention, one angle arm, at least at that place thereon which is in contact with the pivoting member, is constructed as a thrust bearing for the pivoting member or as a sliding cam, or is provided with such a means, so that the part of the pivoting member which rests on it is of plate-like construction. When the switch is operated, the plate is moved passed this cam, a relative rotation or pivoting of both parts occurring at the same time.

A further development of the invention is characterised in that, upon the switch-over process, viewed in the direction of displacement of the pivoting member, there is in front of the thrust bearing or one sliding cam on one angle arm of the pivoting member, also a second sliding cam or the like, the plate-shaped part of the pivoting member, in the switched-over position, at least resting on this second cam. Via the latter or via both sliding cams, one angle arm is held down in the extreme switched-over position while the movable contact is pressed by the spring firmly against the fixed contacts which are to be bridged.

The spring is expediently constructed as a thrust spring, particularly a coiled thrust spring, and moreover, it bears on that side of the plane plate-like part of the pivoting member which is remote from the contact bridge, the edge of the plate being at least partly bent over to form a spring retaining strip. The spring retaining strip prevents a lateral movement of the end of the spring or of the entire spring which bears on the plate-like part, where this is not prevented by the casing or the thrust member. Therefore, in order to rule out any misunderstandings, the rim is bent over towards this end of the spring.

A further feature of the invention is characterised in that the articulated end of the pivoting member is of hook-like construction and at least partly comprises a stud, web or the like of the thrust member. Accordingly, it can be easily fitted and removed and, furthermore, manufacture of the switch is at least to this extent very competitively costed.

In order to achieve a certain self-cleaning effect, it is very expedient for the supporting lug or lugs to be slightly displaceable in the direction of thrust member movement. Just a few fractions of a millimetre are sufficient to ensure a good action.

BRIEF DESCRIPTION OF THE DRAWING

An example of embodiment of the invention is shown in cross-section in the attached drawing.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Displaceably mounted in the switch housing **1**, in the direction of the double-headed arrow **3**, is a thrust member **2**. An integrally moulded stud or web **4** on the thrust member **2** is, for the rotatable mounting of a pivoting member **5**, enclosed by the hook-shaped end **6** thereof, on the outwardly-directed semi-cylindrical surface. One end **8** of a coil thrust spring **9**, the other end of which is maintained in a recess **11** in the thrust member **2**, bears on the plate-like part **7** of the pivoting member **5**. A first cam **15** of the contact bridge **16** bears on the opposite face **12** of the plate-like part **7** of the pivoting member **5**, the said face **12** being directed towards the fixed contacts **13, 14**.

The contact bridge **16** is of substantially angular form, one arm **17** of the angle carrying the movable contact **18** at its free end and the free outwardly bent-over end **19** of the other angle arm **20** being applied with pressure on the rounded (and in the direction of the switching operation **22**) rear corner of the thrust member **2**.

In the region of the corner **23**, on one arm **17** of the contact bridge **16**, there is a particularly one-piece sup-

porting lug **24** which extends substantially against the direction of the other angle arm **20.** Its corner **25** serves to support the contact bridge on a tilting and sliding plane **26** of the switch. This corner represents a kind of knife-edge bearing. The supporting lug engages in an aperture **27,** the length of which is somewhat larger in the actuating direction **3** than its width in the same direction. Thus, a slight longitudinal displacement of the whole contact bridge in the direction of the double-headed arrow **3** is possible, so that when the switch is operated, the contacts are subject to a self-cleaning action.

Before initiation of the switching operation, one angle arm **17** is at an acute angle to an imaginary line connecting the two fixed contacts **13, 14.** It has a convex contact **28** which bears on the plane surface of the fixed contact **13** which is formed from an angle. The two bushes **29, 30** accommodate the conductor ends which have to be bridged by means of the switch according to the invention. They are gripped by the two screws **31, 32.** The thrust member **2** can be operated by hand or by means of a device or machine. Furthermore, it is conceivable to equip the switch with several contact bridges located parallel with one another, the same then being operated by a single or also by various thrust members. The spring **9** exerts a steady moment in the direction of the arrow **33** on the contact bridge **16.** However, it cannot rotate so long as the thrust member **2** is stationary, since the free end **19** of the other arm **20** of the contact bridge **16** is prevented from rotating by the corner **21** of the thrust member. As soon as this corner **21** moves leftwards in the direction of the arrow **22,** the free end **19** can follow. As this happens, a rotating movement about the corner **34** of the fixed contact **33,** in other words the right-hand edge of the aperture **27,** takes place. There and at the corner **25** of the support lug **24,** the contact bridge **17** is supported, the corner **25** moving to the right during switch-over along the tilting and sliding plane **26.** At the same time, a rotation of the pivoting member **5** about its bearing pin **4** takes place, the spring **9** becoming somewhat relaxed. In the extreme switched-over position of the switch, in other words when the fixed contacts **13** and **14** are bridged, the plate-like part **7** of the pivoting member **5** bears both on the first cam **15** as well as on the second cam **35** of the contact bridge **16,** which, viewed in the direction of actuation **22,** is located in front of the first cam **15.** Both cams are formed by a zig-zag bending of one arm **17** of the contact bridge **16.** The distance between the two cams **15** and **35** is equal to the length of the plate-like part **7** or may be somewhat smaller, so that this part **7** can rest on both at the same time. In special cases, a further movement of the thrust member in the direction of the arrow **22** is conceivable, so that the plate-like part **7** then rests only on the second cam **35.** This is quite sufficient to depress the contact bridge **16.** The tension in the spring **9** provides the necessary contact pressure. In order to prevent the spring breaking out, the right-hand edge of the plate-like part **7** is bent up to form a retaining strip **36.** The spring is otherwise held at right-angles to the plane of the picture.

I claim:

1. In an electric switch the combination comprising a switch housing, two fixed contacts within said housing, a thrust member movable between first and second positions in said housing, a pivoting member pivotably mounted on said thrust member, a spring carried by said thrust member and biassing said pivoting member, and a contact bridge mounted in said housing between said pivoting member and said fixed contacts, said contact bridge comprising a first arm, a first bridge contact carried by said first arm, a second arm engaging said thrust member, a supporting lug extending in the opposite direction to said second arm and engaging a tilting and sliding plane adjacent its end remote from said second arm, and a second bridge contact adjacent said lug, whereby when said thrust member is in one of said positions it holds said second arm in a position against the action of said spring so that said first bridge contact on said first arm cannot engage either of said fixed contacts and when said thrust member is in the other of said positions it allows said spring to urge said first bridge contact into engagement with one of said fixed contacts.

2. The switch as defined in claim **1,** in which said contact bridge includes first and second cams and said pivoting member has an arm in the form of a plate which acts on said first cam when said thrust member is in said one position and acts on said second cam when said thrust member is in said other position.

3. The switch as defined in claim **2,** in which said plate is bent to form a retaining strip for said spring.

4. The switch as defined in claim **8,** in which said supporting lug is displaceable along said tilting and sliding plane parallel to the direction of movement of said thrust member.

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