Feb. 25, 1936. H. E. COBB 2,032,115

CIRCUIT BREAKER

Filed March 2, 1934

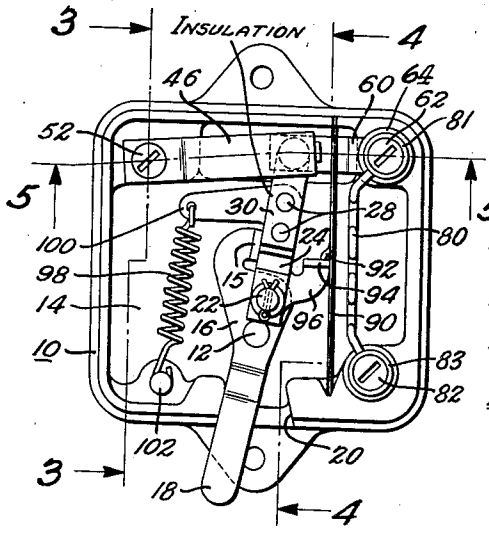


Fig. 1.

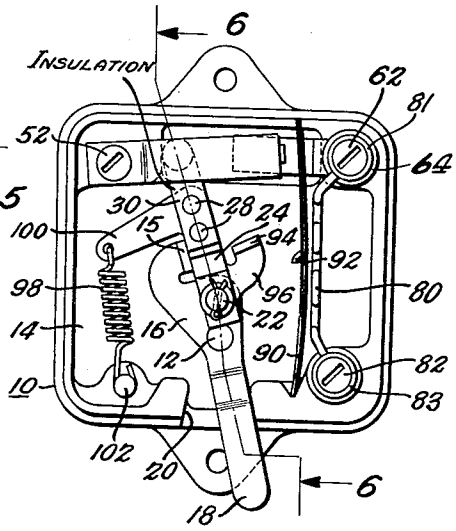


Fig. 2.

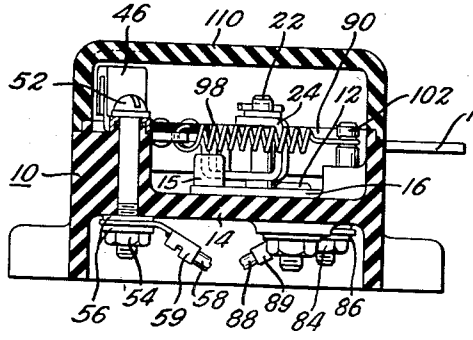


Fig. 3.

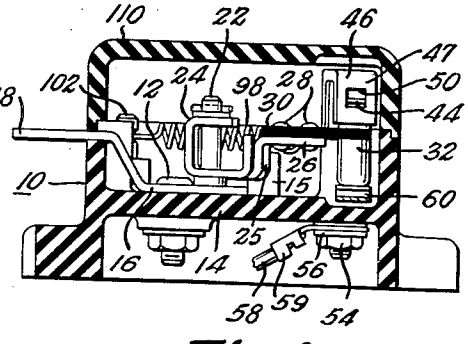


Fig. 4.

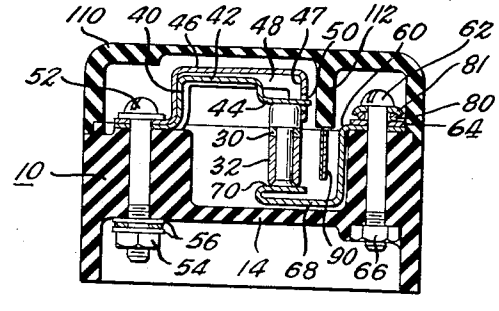


Fig. 5.

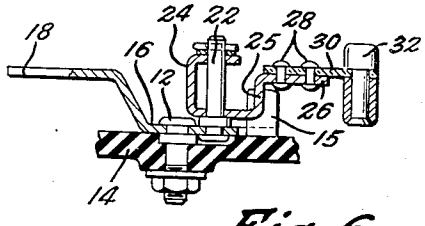


Fig. 6.

INVENTOR
Harold E. Cobb
BY
Spencer Hazelman & Fish
his ATTORNEYS

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CIRCUIT BREAKER

Harold E. Cobb, Montgomery, Ohio, assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

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3 Claims. (Cl. 200—116)

This invention relates to a switch for controlling an electrical circuit, and more particularly to a switch for that purpose having a temperature responsive control thereon.

An object of this invention is to provide a switch that can be manually operated to two positions, and automatically operated from one of said positions to the other of said positions in response to a temperature change.

Another object of this invention is to provide a manually operable switch for controlling an electrical circuit, said switch being provided with means for effecting automatic control in response to the heating effect of the current in said circuit.

Another object of this invention is to provide a rugged switch for controlling an electrical circuit and having few operating parts, which switch establishes and breaks the circuit with a snap action and has thermostatic latch means for controlling the switch in response to temperature.

In the drawing:

Fig. 1 is a plan view of the switch with the cover removed and showing the various elements of the switch in circuit closing position.

Fig. 2 is a view similar to Fig. 1 except that the switch elements are shown in circuit opening position.

Fig. 3 is a cross sectional view taken substantially along the line 3—3 of Fig. 1, showing the switch with the cover on.

Fig. 4 is a cross sectional view taken substantially along the line 4—4 of Fig. 1, also showing the switch with cover on.

Fig. 5 is a cross sectional view taken substantially along the line 5—5 of Fig. 1, and also showing the switch with the cover on.

Fig. 6 is a fragmentary sectional view taken substantially along the line 6—6 of Fig. 2.

In the present embodiment of this invention, a base 10 of insulating material such as "Bakelite" and preferably molded, provides a mounting for the elements of the switch. Pivoted upon a stud 12 which is secured to a bottom wall 14 of the base 10, is an operating member 16. The member 16 has a handle portion 18 extending through a recess 20 in the base 10, for manually actuating the switch. Mounted on the member 16 on the opposite side of the pivot stud 12 from the lever portion 18, is a stud 22. A contact carrying member or bracket 24, preferably formed substantially as shown in Figs. 1 and 4, is pivotally supported on the stud 22. Attached to an extending arm portion 26 of the contact carrying member 24 by rivets 28 or other suitable fastening means, is a strip of insulating material 30 which carries a movable circuit closing member 32.

A stationary contacting member 40, having an extended portion 42 resiliently supporting an integral contacting portion 44 formed on its end, is mounted within a covering or reinforcing element 46 having dropped or flanged edges 48. In order to guide the contacting portion 44 and retain it in correct position, its free end is extended through a slot 50 in a dropped end portion 47 of the covering element 46. The other end of the covering element 46 and the corresponding end of the contacting member 40 are secured to the base 10 by means of a bolt 52 and cooperating nut 54 and washers 56 or other suitable fastening means. The bolt 52 and its cooperating nut 54 and washers 56 also serve as a binding post or terminal for a lead 58 of the circuit to be controlled by the switch which lead 58 is preferably provided with a lug 59 that is secured by the nut 54 between the washers 56. Another stationary contacting member 60, secured to the base 10 by bolt 62 and cooperating washer 64 and nut 66 or other suitable means, has a resilient portion 68 which supports contacting portion 70 that is preferably integrally formed with the portion 68. As shown in Fig. 5, the contacting portions 44 and 70 of the stationary contacting members 40 and 60 respectively, are in opposed spaced relation to each other and normally biased so that when the movable contacting member 32 is moved between them to close the circuit, it is yieldingly engaged between the members 40 and 60 so that good contact is made therewith.

A heating element 80 mounted within the casing 10, as shown in Figs. 1 and 2, has one end electrically connected to the stationary contacting member 60 by the bolt 62 and a cooperating retaining washer 81. The other end of the heating element 80 is supported by a bolt 82 and a cooperating retaining washer 83. The bolt 82 which has a cooperating nut 84 and washers 86 also serves as a binding post or terminal for electrically connecting the heating element 80 with a lead such as 88 of the circuit to be controlled by the switch which lead is preferably provided with a connecting lug 89.

Mounted between opposite walls of the casing 10 and adjacent the heating element 80, so as to be in heat receiving relation therewith, as shown in Figs. 1 and 2, is a bimetallic strip or thermostatic element 90. The thermostatic ele-

ment 90 has a catch 92, preferably struck therefrom, and designed to engage a latch portion 94 that is preferably formed on an extending arm 96 of the carrying member 24. When the switch is in the circuit closing position as shown in Fig. 1, the latch portion 94 is urged against the catch 92 by a spring or resilient member 98 which has one end secured to an extending arm 100 that is preferably formed on the carrying member 24. The other end of the spring 98 is anchored to a post 102 within the base 10. The switch is thus held in circuit closing position against the tension of the spring 98.

When the switch is connected in a circuit to be controlled, the current will flow through the bolt 52, stationary contact 40, circuit closing element 32, stationary contact 60, heating element 80, and bolt 82. With the heating element 80 so connected, it is obvious that any abnormal or excessive current flow thru the heating element 80 will cause it to heat the bimetallic strip 90 and flex the bimetallic strip as shown in Fig. 2. Such flexing or warping of the bimetallic strip 90 will effect disengagement of the catch 92 and the latch 94 to allow the entire movable switch assembly to be moved by the spring 98 about the pivot stud 12 in a counter-clockwise direction as viewed in Figs. 1 and 2, and with a snap action, to the circuit open or off position. A preferably integral arm and lug portion 15 of the operating member 16, which rests against a portion 25 of the contact carrying member 24 between the stud 22 and the arm 26, and on the side of the portion 25 opposite the latch 94, provides a one-way driving connection between the contact carrying member and the operating member 16. It is obvious that without the arm and lug portion 15 the contact carrying member 24 would pivot about the stud 22 instead of the pivot stud 12 and the manual operating lever 18 would not be shifted to the off position when the latch 94 is released by the catch 92.

To reset the switch to the circuit closing position, the actuating lever 18 is moved to the left, as viewed in Figs. 1 and 2, about the pivot stud 12 causing the lug 15 to urge the contact carrying member 24 to the right against the tension of the spring 98 until the latch 94 engages the catch 92. It will be understood, of course, that the latch 94 will not engage the catch 92 unless the bimetallic strip 90 is cool and in its normal position.

When it is desired to manually open the circuit, the actuating lever 18 is moved to the right as viewed in Fig. 2. This causes the stud 22, which pivotally supports the carrying member 24, to be shifted to the left. By so shifting the contact carrying member, the latch 94 is disengaged from the catch 92 to permit the spring 98 to disengage the circuit closing element 32 from the stationary contacts 44 and 70 with a snap action.

The base 10 is shown as having a suitable cover 110 fitted or otherwise secured to the base, and cooperating with the base 10 to enclose the switch mechanism. A traverse wall 112, as shown in Fig. 5, extends between the opposite walls of the cover 110, and adjacent the bimetallic strip 90 to form a partial enclosure for the heating element 80. By enclosing the heating element 80 in this manner, the heat emitted by it is confined more closely to the bimetallic strip and will more readily affect the bimetallic strip 90, thus increasing the efficiency of the switch.

While the present embodiment of this invention, as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A thermal responsive switch comprising, in combination, cooperating contacts, a movable contact carrying member supporting one of said contacts and adapted to effect engagement and disengagement of said contacts, a movable pivotal support for said contact carrying member, an operat ng member for effecting movement of the contact carrying member in one direction, a spring for effecting movement of the contact carrying member in the other direction, a latch portion on one of said members, and a thermostatic member for latchingly engaging said latch port on to hold the contact carrying member in the position to which it is operated by the operating member, said operating member effecting movement of said movable pivotal support to effect manual disengagement of the latching portion from the thermostatic member.

2. A thermal responsive sw.tch comprising, in combination, cooperating contacts, a movable contact carrying member supporting one of said contacts and adapted to effect engagement and disengagement of said contacts, a pivotally mounted operating member for actuating the contact carrying member in one direction, a spr.ng for effecting movement of the contact carrying member in the other direction, a pivotal support for the contact carrying member secured to the operating member, and moved thereby, a latch portion on said contact carrying member, and a thermostatic member for latchingly engaging the latch portion to hold the contact carrying member in the position to which it is moved by the operating member, said operating member effecting movement of said movable pivotal support for manually disengaging the latching portion from the thermostatic member.

3. A thermal responsive switch comprising, in combination, cooperating contacts, a movable contact carrying member supporting one of said contacts and adapted to effect engagement and disengagement of said contacts, a pivotally mounted operating member for actuating the contact carrying member in one direction, a spring for effecting movement of the contact carrying member in the other direction, a pivotal support for the contact carrying member secured to the operating member in such a position that the principal component of movement of said pivotal support is transverse to the axis of said contact carrying member, a latch portion on said contact carrying member, and a thermostatic member for latchingly engaging the latch portion to hold the contact carrying member in the position to which it is moved by the operating member, said operating member effecting movement of said movable pivotal support for manually disengaging the latching portion from the thermostatic member.

HAROLD E. COBB.