

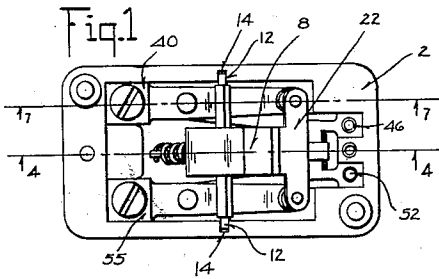
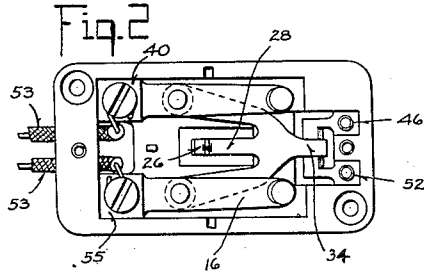
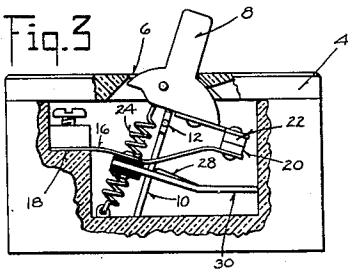
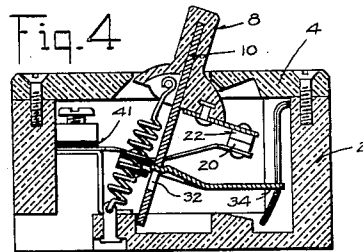
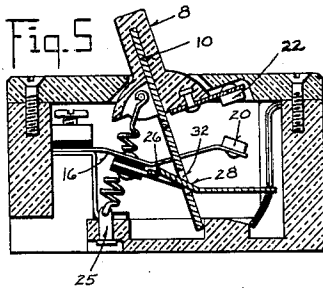
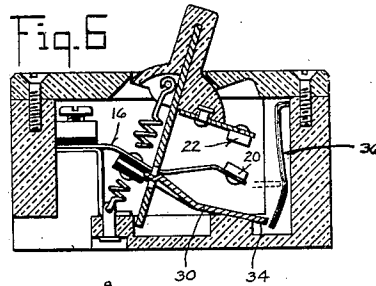
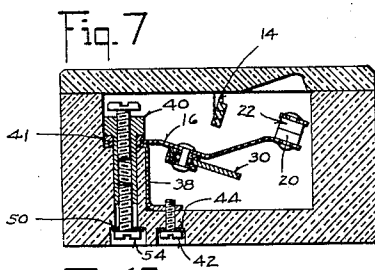
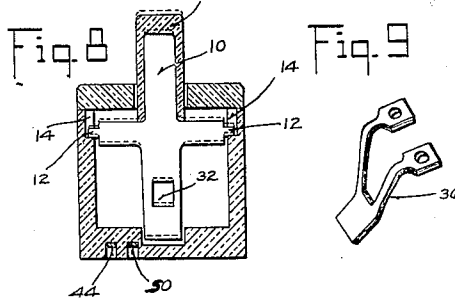
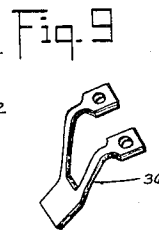
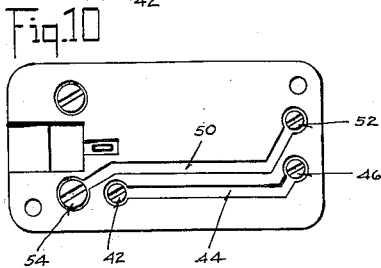
Sept. 8, 1936.

C. M. PETERSEN

2,053,629

CIRCUIT CONTROL DEVICE

Filed Jan. 17, 1935



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CIRCUIT CONTROL DEVICE

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29 Claims. (Cl. 200—116)

My invention relates to circuit control devices and particularly to that class of devices wherein a circuit is made and broken manually, but may be broken automatically upon the occurrence of abnormal current conditions.

Circuit control devices of the type of which my invention relates have heretofore been complicated and expensive and have required resetting after automatic operation thereof.

One of the objects of my invention is to provide a small, simple and inexpensive circuit control device operable manually and automatically to break a circuit.

Another object of my invention is to provide a circuit control device operable automatically to break a circuit upon the occurrence of abnormal current conditions and which does not require re-setting after such operation.

These and other objects and features in my invention will appear from the following descriptions thereof in which reference is made to the accompanying figures of the drawing wherein I have illustrated a preferred embodiment of a typical construction which may be made in accordance therewith.

In the drawing:

Fig. 1 is a plan view of a circuit control device embodying my invention with the cover of the device removed;

Fig. 2 is a plan view similar to Fig. 1 with certain of the parts removed;

Fig. 3 is a view in elevation of the construction illustrated in Fig. 1, a portion of the casing being broken away;

Figs. 4, 5, and 6 are vertical sectional views taken on the line 4—4 of Fig. 1 with the parts shown in various positions which they may assume;

Fig. 7 is a vertical sectional view of the device shown in Fig. 1 taken on the line 7—7 to illustrate certain details of construction;

Fig. 8 is a transverse sectional view of the device shown in Fig. 1 illustrating the construction of the operating means;

Fig. 9 is a perspective of the bi-metallic member shown in the constructions of Figs. 4, 5, and 6, and

Fig. 10 is a plan view of the device illustrated as seen from the bottom thereof.

In that form of my invention chosen for illustration in the drawing, the device embodies a casing 2 having a removable cover 4 provided with an opening 6 thru which an operating handle 8 projects. The handle is secured to a member 10

and is movable therewith on pivots 12 extending into slots 14 in the casing 2.

Movable conducting arms 16 formed of spring metal are secured to support 18 at one end of the casing and provided with contact members 20. A co-operating switch member 22 for bridging the contacts 20 is carried by the handle 8 and movable therewith from a circuit making position as shown in Figs. 3 and 4 to a circuit breaking position as shown in Fig. 5. The handle and switch member 22 are urged toward the left as seen in Figs. 3 and 4 to a circuit breaking position by a spring 24 secured at one end to the handle 8 and connected at the opposite end to a member 25 in the bottom of the casing 2.

In completing the circuit the handle 8 and switch member 22 are moved to the right from the position of Fig. 5 to the position of Figs. 3 and 4 against the action of spring 24 to a circuit making position in which switch member 22 engaged contact members 20. In order to retain the switch member in engagement with the contact members 20 so that the circuit will remain closed, I provide a latch 26 which engages the member 10 below the pivots 12 and prevents movement of the handle and switch member to their circuit breaking position under the action of the spring. As shown the latch is formed by an upward projecting portion on tongue 28 of member 30 which is secured to, but insulated from the arms 16.

The tongue 28 extends into an opening 32 in the member 10 and is held in the raised position of Figs. 3, 4, and 5 so that as the handle 8 and member 10 are moved about the pivots 12 the lower portion of the member 10 is moved to the right from the position of Fig. 5 to that of Figs. 3 and 4. The upper edge of the opening 32 then rides up the inclined surface of the tongue 28 raising the handle slightly against the action of spring 24 as shown in dotted lines in Fig. 8. When the member 10 reaches the latch 26 the handle and member 10 snap downward behind the latch 26 and are held against the action of spring 24. The switch member 22 is then held in engagement with the contact member 20 and the circuit remains closed.

In operating the device manually to break the circuit the handle is moved to the left from the position of Figs. 3 and 4 to the position of Fig. 5. During this movement the handle rises slightly as shown in Fig. 8 in order that the upper edge of the opening 32 may pass over the latch 26. The member 10 and the handle 8 are then free to move under the action of the spring 24 so that

the handle moves back carrying the switch member 22 away from the contact members 20 and the circuit is broken.

During the manual operation of the switch and at all times when normal current is passing thru the device the detent 34 on the right hand end of the member 30 as seen in Figs. 3, 4, and 5, is held in a raised position by a yoke 36 shown in Fig. 9. The detent 34 is urged downward by the spring arms 16 so that when the yoke moves to the position shown in Fig. 6 in which the detent 34 is disengaged, the member 30 moves downwardly from the dotted line position to the full line position shown therein. The contact members 20 carried by the spring arms 16 also move downward away from the switch member 22 due to the resiliency of said arms 16 so that the circuit is broken.

Downward movement of the member 30 also causes the latch 26 to disengage the member 10 so that as soon as the member 30 has moved downward far enough to release the latch the spring 24 throws the handle 8 to the left moving the switch member to its circuit breaking position. The member 10 is moved with the handle about the pivots 12 by the action of spring 24 and the lower end thereof is then moved to the right. However, since the tongue 28 on member 30 is now in the lowered position shown in Fig. 6 movement of the member 10 to the right brings the lower edge of opening 32 into engagement with the lower surface of the tongue 28 raising the member 30 and restoring the detent to its normal position above the yoke. At the same time the contacts 20 are raised again to their normal position shown in Figs. 3, 4, and 5 and the device is reset.

Movement of the yoke to release the detent and actuate the device automatically may be effected under abnormal current conditions by forming the yoke 36 of bimetallic material included in the circuit controlled by the device. As shown this is effected by connecting the line wires 53 of the circuit to be controlled to the binding posts 46 and 55. When the circuit is closed, current will then flow from the binding post 55 through conducting spring arm 16 connected thereto to the contact member 20 carried thereby. Since the switch member 22 engages both contact members 20 current will pass through the switch member 22 to the other contact member 20 and the other spring arm 16 to the strip 38 which is located adjacent binding post 40 but separated therefrom by insulating material 41. Thereafter current flows through the screw 42, strip 44, and screw 46 to one side of the yoke 36, and from the opposite side of the yoke through screw 52 and strip 50 to the screw 54 connected to binding post 40.

During the persistence of normal current conditions the yoke assumes the position shown in Figs. 4 and 5 and the contact members 20 are held in their normal raised position. However, upon the occurrence of abnormal current conditions such as an overload the bi-metallic strip is heated and moves to the position shown in Fig. 6 in which the detent 34 is released and the member 30 and contact members 20 move downward breaking the circuit automatically. This movement of member 30 releases the latch 26 from the member 10 and the spring 24 then operates to move the handle 8 to the left. The detent is thus raised into position to be again engaged and held in raised position by the yoke 36. In this way the device is automatically reset. However,

if the handle should again be moved to close the circuit before the yoke 36 has been restored to the projected position shown in Figs. 4 and 5, the member 10 will engage the tongue 28 and depress the member 30 moving the contacts 20 downward so that the circuit cannot be closed. In this way the device serves to prevent closing of the circuit until the yoke has again assumed its normal position.

While I have described the current responsive means as a bi-metallic yoke it will be evident that other suitable current responsive means may be employed, if desired. Similarly, the form and arrangement of the switch member and contact member may be varied as desired to adapt the principle of my invention to other constructions. In view thereof, it should be understood that the embodiment of my invention herein shown and described is intended to be illustrative of a typical form thereof and is not intended to limit the scope of the invention.

I claim:

1. A circuit control device having an operating member, a switch member actuated by said operating member and movable to circuit making and circuit breaking positions, a contact member engaged by said switch member when in its circuit making position and means rendered operative upon the occurrence of an abnormal current condition for moving said contact member out of engagement with said switch member and for moving said switch member to its circuit breaking position.
2. A circuit control device having an operating member, a switch member actuated by said operating member and movable to circuit making and circuit breaking positions, a contact member engaged by said switch member when in its circuit making position, means retaining said contact member in engagement with said switch member during persistence of normal current conditions and operable upon overload of said circuit to release said contact member and spring means for moving said contact member away from said switch member and for moving said switch member to its circuit breaking position upon release of said contact member.
3. A circuit control device having an operating member, a switch member actuated by said operating member and movable to circuit making and circuit breaking positions, a contact member engaged by said switch member when in its circuit making position, means for moving said contact member out of engagement with said switch member upon the occurrence of an abnormal current conditions, and spring actuated means for restoring said contact member to position to be engaged by said switch member.
4. A circuit control device comprising manually operable means, an oscillating switch member actuated by said means and movable in opposite directions between circuit making and circuit breaking positions, a contact member also movable to circuit making and circuit breaking positions, detents retaining said members in their circuit making positions, means urging said members to their circuit breaking positions and current responsive means for releasing said detents to permit movement of said members to their circuit breaking positions.
5. A circuit control device comprising manually operable means, an oscillating switch member actuated by said means and movable in opposite directions between circuit making and circuit breaking positions, a contact member also mov-

able to circuit making and circuit breaking positions, spring means and an element actuated thereby operatively connected to said contact member for moving the same from its circuit breaking to its circuit making position upon movement of said switch member from its circuit making to its circuit breaking position.

6. A circuit control device comprising an operating member, a switch member actuated by said operating member and movable from a circuit making to a circuit breaking position, a movable contact member normally retained in position to be engaged by said switch member when in its circuit making position, means operable upon the occurrence of abnormal current conditions to move said contact member to an abnormal position in which the circuit is broken, and means released for operation by movement of said contact member for restoring said contact member to its normal position.

7. A circuit control device comprising an operating member, a switch member actuated by said operating member and movable from a circuit making to a circuit breaking position, a movable contact member normally retained in position to be engaged by said switch member when in its circuit making position, means operable upon the occurrence of abnormal current conditions to move said contact member to an abnormal position in which the circuit is broken, and means for moving both said contact member and said switch member away from their engaging position.

8. A circuit control device having an operating member, a switch member actuated by said operating member to circuit making and circuit breaking positions, a contact member movable to circuit making and circuit breaking positions, means retaining said switch member and contact member in engagement when in their circuit making positions and spring means for moving both said members to their circuit breaking positions.

9. A circuit control device having an operating member, a switch member actuated by said operating member to circuit making and circuit breaking positions, a movable contact member normally positioned to be engaged by said switch member when in its circuit making position, spring means for moving said contact member away from its normal position and other spring means for restoring said contact member to its normal position.

10. A circuit control device comprising a switch member, movable to a circuit making and a circuit breaking position, a contact member also movable to a circuit making and a circuit breaking position, a latch retaining said switch member in its circuit making position, a detent retaining said contact member in its circuit making position and an operative connection between said latch and detent to cause release of one to effect release of the other.

11. A circuit control device having an oscillating switch member movable back and forth between circuit making and circuit breaking positions, an oscillating handle for actuating said switch member, a contact member cooperating with said switch member and movable between circuit making and circuit breaking positions, current responsive means operatively connected to said contact member to effect movement thereof from its circuit making to its circuit breaking position upon overload and means released for operation upon movement thereof for restoring said contact member to its circuit making position.

12. A circuit control device comprising a manually operable member, a switch member movable to circuit making and circuit breaking positions, and actuated by said manually operable member, a movable contact member normally retained in position to complete a circuit through said switch member, current responsive means operable upon overload of said circuit to release said contact member, means biasing said contact member away from said normal position and spring means urging said switch member to its circuit breaking position, rendered operative by movement of said contact member to restore said contact member to its normal position.

13. A circuit control device comprising a manually operable member, a switch member movable to circuit making and circuit breaking positions, and actuated by said manually operable member, a movable contact member normally retained in position to complete a circuit through said switch member, current responsive means operable upon overload of said circuit to release said contact member, means biasing said contact member away from said normal position, means for moving said switch member to a circuit breaking position upon release of said contact member and means actuated upon movement of said switch member to its circuit breaking position to restore said contact member to its normal position.

14. A circuit control device comprising a manually operable member, a switch member movable to circuit making and circuit breaking positions, and actuated by said manually operable member, a movable contact normally positioned to be engaged by said switch member when said switch member is in its circuit making position, spring means urging said contact away from said switch member and urging said switch member away from said contact and a detent controlled by current traversing the switch for retaining said contact and switch member in engagement during the persistence of normal current conditions and operable upon abnormal current condition to release said contact member for movement under the influence of said spring means to break said circuit and restore said switch member to its circuit breaking position.

15. A circuit control device comprising a manually operable member, a switch member movable to circuit making and circuit breaking positions, and actuated by said manually operable member, a movable contact normally positioned to be engaged by said switch member when said switch member is in its circuit making position, spring means urging said contact away from said switch member, a detent controlled by current traversing the switch retaining said contact in said normal position during the persistence of normal current conditions and operable upon abnormal current condition to release said contact member for movement under the influence of said spring to break said circuit and means actuated by said spring upon movement of said switch member to its circuit breaking position to restore said contact member to its normal position.

16. A circuit control device comprising a manually operable member having a circuit making and a circuit breaking movement, a switch member actuated by said manually operable member to circuit making and to circuit breaking positions, a contact movable into and out of engaging position with said switch member, means depending upon the circuit breaking movement of

said manually operable member for moving said contact into engaging position, means biasing said contact away from said engaging position and means for imparting circuit breaking movement to said manually operable member a detent controlled by current traversing the switch normally retaining said contact in said engaging position and releasable upon abnormal current condition to permit movement of said contact to circuit breaking position.

17. A circuit control device having a manually operable member, a switch member actuated by said manually operable member to circuit making and circuit breaking positions, means continuously urging said switch member toward its circuit breaking position, a retaining element for holding said switch member in its circuit making position and a detent controlled by a current responsive device operable upon overload to release said retaining element and permit said switch member to be moved to its circuit breaking position.

18. A circuit control device having a switch member movable to circuit making and circuit breaking positions, a contact member also movable to circuit making and circuit breaking positions, manually operable means for moving said switch member from one position to another,

spring means for moving both members to their circuit breaking positions and means operable independently of said manually operable means for rendering said spring means operative.

19. A circuit control device having a switch member movable in opposite directions between circuit making and circuit breaking positions, a contact member also movable in opposite directions between circuit making and circuit breaking positions, said members being in electrical contact when in their circuit making positions, manually operable means for moving one of said members to each of said positions and spring means operable to move the other of said members to each of said positions.

20. A circuit control device having a switch member movable in opposite directions between circuit making and circuit breaking positions, a contact member also movable in opposite directions between circuit making and circuit breaking positions, said members being in electrical contact when in their circuit making positions, manually operable means for moving one of said members to each of said positions and means operable upon the occurrence of abnormal current conditions for rendering said spring means operable.

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