

Aug. 29, 1944.

M. G. LEONARD

2,357,210

CIRCUIT BREAKER

Filed Nov. 4, 1942

2 Sheets-Sheet 1

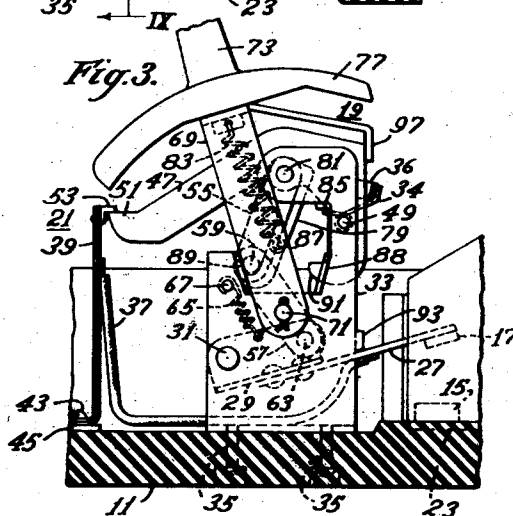
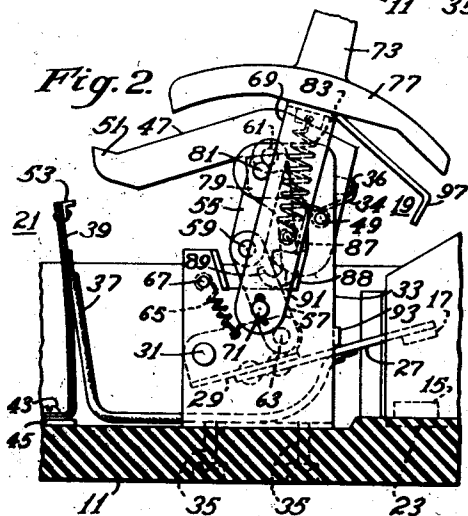
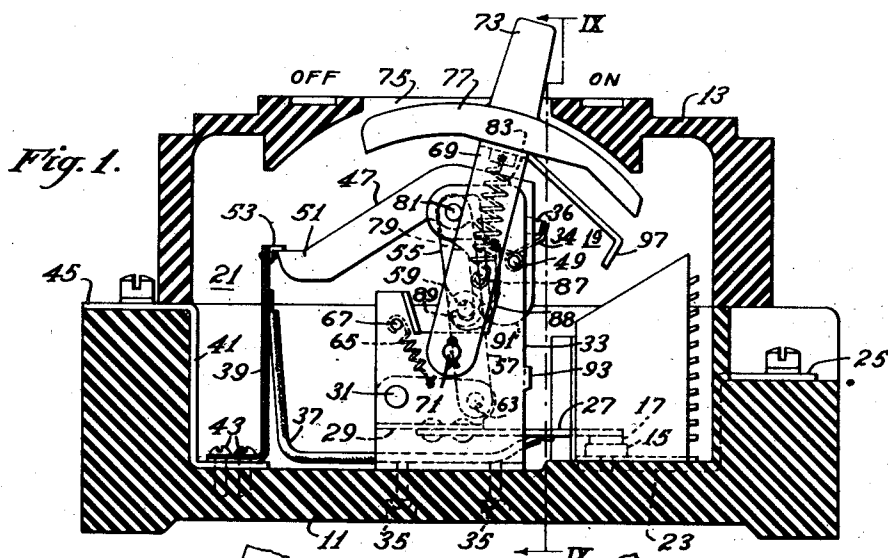
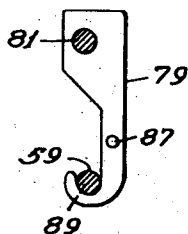


Fig. 5.



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2 Sheets-Sheet 2

Fig. 4.

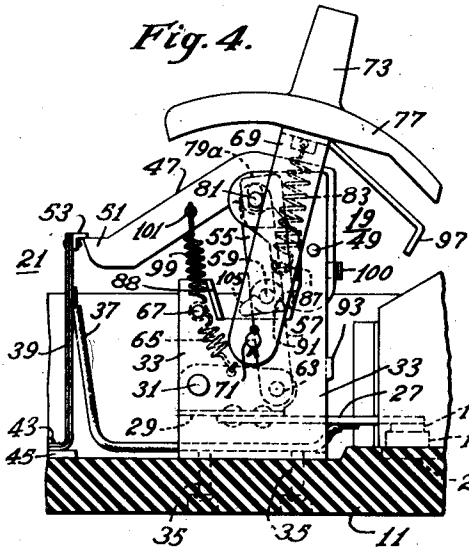


Fig. 7.

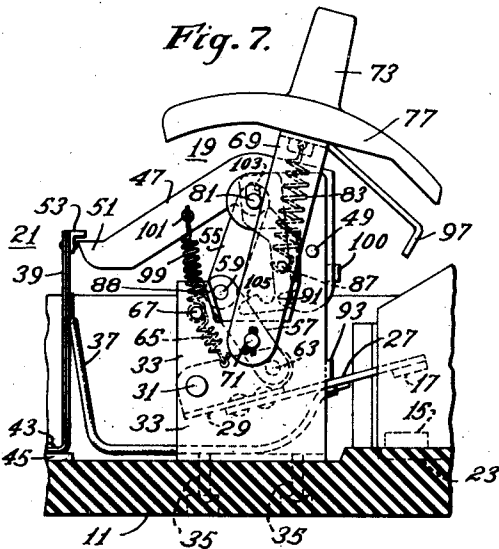


Fig. 9.

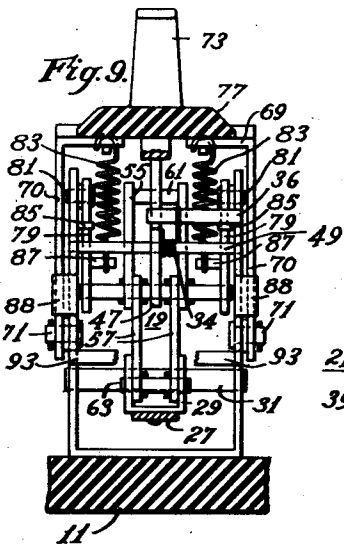


Fig. 6.

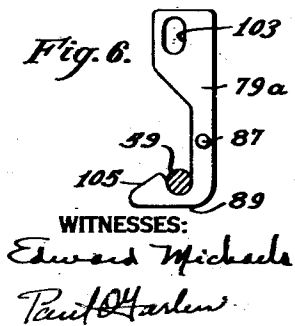
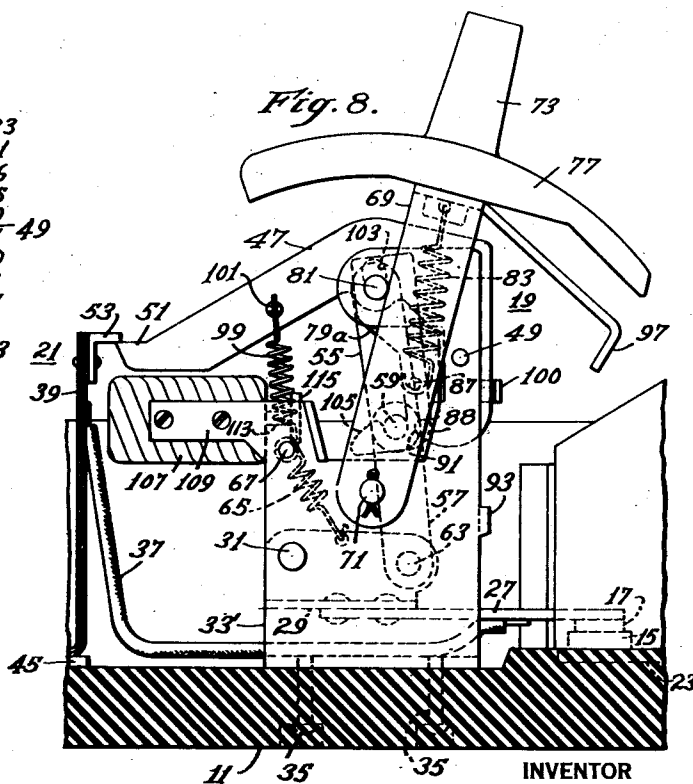


Fig. 8.



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2,357,210

CIRCUIT BREAKER

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Application November 4, 1942, Serial No. 464,441

20 Claims. (Cl. 200—116)

This invention relates to circuit breakers and more particularly to circuit breakers of the type which are tripped open automatically on overloads and which may be manually operated to open and closed positions.

An object of the invention is the provision of a circuit breaker having an improved operating mechanism wherein an actuating member engages a toggle to operate the toggle to open and closed positions, the toggle moving free of the actuating member in response to overload currents.

Another object of the invention is to provide an improved operating mechanism for a circuit breaker comprising a pivoted actuating member normally engaging a toggle to operate said toggle to open and to close the contacts, the toggle being operable to automatically open the contacts without displacing the actuating member.

Another object of the invention is to provide an improved operating mechanism for a circuit breaker wherein the force of the overcenter operating spring is applied to an actuating member which is operable to cause opening and closing of the contacts without applying the force of the overcenter spring to the latch mechanism of the breaker.

Another object of the invention is to provide a circuit breaker with an improved operating mechanism having an operating handle and a snap action overcenter spring that is connected to an intermediate lever to which the contact mechanism is releasably connected in such a manner that the snap action spring does not add to the latch load of the breaker.

Another object of the invention is to provide a circuit breaker with an improved operating mechanism operable to produce quick make and break of the contacts and automatic opening of the contacts trip free of the handle and wherein only a relatively small amount of energy is required to reset the mechanism.

Another object of the invention is to provide a circuit breaker with an improved operating mechanism that is manually and automatically operable to open and reclose the contacts.

Another object of the invention is the provision of an improved operating mechanism wherein the operating toggle is operated by an actuating member to open and close the contacts, the actuating member being operated by an overcenter spring in a manner to permit automatic operation of the toggle and automatic resetting of the trip device.

Another object of the invention is the provi-

sion of an improved operating mechanism for a circuit breaker which is simple, accurate and reliable in operation and inexpensive to manufacture.

5 The novel features that are considered characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to structure and operation, together with additional objects and advantages thereof, will be best understood from the following detailed description of several embodiments thereof when read in conjunction with the accompanying drawings, in which:

15 Figure 1 is a vertical sectional view of a circuit breaker embodying the principles of the invention, the breaker being shown in the closed circuit position;

Fig. 2 is a fragmentary view of the circuit breaker showing the circuit breaker mechanism 20 in the tripped open position;

Fig. 3 is a fragmentary view of the circuit breaker showing the circuit breaker mechanism in the open or reset position;

Fig. 4 is a fragmentary view of a circuit 25 breaker embodying a modification of the invention and showing the circuit breaker mechanism in the closed position;

Fig. 5 is a detail view of the actuator of the embodiment shown in Figs. 1 to 3;

30 Fig. 6 is a detail view of the actuator of the modification shown in Fig. 4;

Fig. 7 is a fragmentary view of a circuit breaker embodying the modification shown in Fig. 4 and showing the breaker in the tripped open position but with the circuit breaker mechanism in the automatically reset position.

Fig. 8 is a fragmentary view of a circuit breaker having a mechanism similar to that of Fig. 4 and also embodying an automatic reclosing means; and

40 Fig. 9 is a vertical sectional view through the circuit breaker shown in Fig. 1 and taken substantially on line IX—IX of Fig. 1.

Referring to Fig. 1 of the drawings, the circuit breaker comprises a base 11 and a cover 13 both of insulating material, a stationary contact 15 and a cooperating movable contact 17, an operating mechanism indicated generally at 19 and a trip device 21.

50 The stationary contact 15 is secured to a conductor 23 having a terminal connector 25. The movable contact 17 is attached to the free end of a resilient contact arm 27 which is secured to a channel-shaped arm 29. The arm 29 is pivotally mounted on a pivot pin 31 supported in a U-

shaped main frame 33 secured by means of screws 35 to the base 11. The resilient contact arm 27 is connected by means of a flexible shunt conductor 37 to the free end of a bimetal element 39 comprising the trip device. The bimetal element 39 is secured to a conductor 41 and to the base 11 by screws 43. The conductor extends out of the breaker housing and forms a terminal connector 45. The circuit of the breaker extends from the terminal 25 through the conductor 23, stationary and movable contacts 15-17, contact arm 27, flexible shunt conductor 37, the bimetal element 39, and the conductor 41 to the terminal 45.

The operating mechanism 19 includes a carrier lever 47 pivotally mounted on a pivot pin 49 supported in the main frame 33 and biased in a clockwise direction by a spring 34 coiled about the pivot pin 49. One end of the spring 34 is hooked over a stop member 36 formed inwardly from the frame 33 and the other end engages the carrier lever 47. The carrier 47 is provided with a latching end 51 which normally engages a latch 53 secured on the bimetal element 39 near the free end thereof and insulated therefrom. The carrier is operatively connected to the channel arm 29 by means of a toggle comprising toggle links 55 and 57 pivotally connected by means of a knee pivot pin 59. The toggle link 55 is pivotally connected by means of a pivot pin 61 to the carrier 47 and the toggle link 57 is pivotally connected to the channel member 29 by means of a pivot pin 63.

In the closed position of the parts the toggle 55-57 is overcenter to the right of a line through the pins 61-63 and in this position, with the carrier 47 latched up, the toggle holds the contact arm 29-27 in closed position against the bias of a spring 65. The spring 65 has one end anchored in the side of the channel member 29 and the other end hooked over a spring stud 67 supported in the frame 33. The spring 65 at all times biases the contact arm 27-29 in opening direction.

Also forming a part of the operating mechanism is a U-shaped operating lever 69 whose legs 70 (Fig. 9) straddle the frame 33 and are pivotally mounted on pivot pins 71 supported on the opposite sides of the frame 33. Mounted on the outer portion of the operating lever 69 is an operating handle 73 of insulating material which projects outwardly through an opening 75 in the cover 13. A shield 77 also of insulating material and molded integral with the handle 73 serves to cover the opening 75. An actuator comprising a pair of actuating arms or lever arms 79 (Fig. 5) is pivotally mounted on fixed pivots 81 (see Figs. 2 and 9) supported in the sides of the frame 33. In the closed position of the breaker the pivot pin 61 which connects the toggle link 55 to the carrier 47 is in axial alignment with the pivot pins 81 for the actuating arms 79 of the actuator.

With the handle 73 in the "on" position (Fig. 1) the actuator 79 is biased by means of overcenter springs 83, against stops 85 (Figs. 3 and 9) projecting inwardly from the sides of the frame 33. The overcenter springs 83 have their outer ends anchored to the outer portion of the operating lever 69 and their inner ends are attached to the adjacent arms 79 (Fig. 9) of the actuator by means of spring studs 87. The springs 83 also bias the operating lever against a stop 88 formed outwardly from the frame 33.

The free end of the actuator arms 79 are formed into hooks 89 which, in the closed posi-

tion of the breaker, embrace the knee pin 59 of the toggle 55-57 as shown in Figures 1, 3, 5 and 9.

Upon the occurrence of an overload current in the circuit of the breaker the bimetal 39, when heated a predetermined amount thereby will deflect in a direction to release the carrier 47. As soon as the carrier is released, the spring 65 acts to rotate the contact arm 27-29 counterclockwise to open the contacts. As the contact arm rotates, the toggle 55-57 moves upwardly in substantially a straight line without breaking overcenter, and, assisted by the spring 34, rotates the carrier 47 clockwise about its pivot 49, the clockwise movement of the carrier being limited by engagement thereof with the stop member 36. The first part of the upward movement of the toggle carries the knee pin 59 out of the hooks 89 on the actuating arms 79. As the movement continues, a projection 91 on the carrier 47, which is moving in a clockwise direction, engages the knee pin 59 and moves the toggle 55-57 overcenter to the left of the line 61-63. In this position (Fig. 2) the contacts are fully open and the contact arm 27-29 is biased against a stop 93 on the frame 33 and the carrier 47 is biased against the stop 36.

Before the contacts may be closed following an automatic opening operation, it is necessary to first relatch the carrier 47 with the trip device. This is accomplished by manually rotating the operating lever 69 counterclockwise from the "on" position (Fig. 2), in which it remained during the automatic opening operation, to the "off" position (Fig. 3). During this movement of the lever 69, the line of action of the springs 83 pass overcenter to the left of the pivot axis 81 of the actuator 79 whereupon the actuator is rotated clockwise to its Fig. 3 position with a snap action, the arms 79 of the actuator being arrested by engagement with the knee pin 59. Shortly after this occurs a projection 97 on the operating lever 69 engages the carrier 47 and continued movement of the operating lever in resetting direction rotates the carrier in a counterclockwise direction to its latched position (Fig. 3). As the carrier moves to latched or reset position, the toggle 55-57 is moved farther in collapsed direction thrusting the knee pin 59 into the hooks 89 on the actuating arms 79.

The contacts can now be closed by moving the lever 69 clockwise from the "off" position (Fig. 3) to the "on" position (Fig. 1). During this movement of the operating lever, the springs 83 pass to the right of the pivot axis 81 for the actuator 79 whereupon the springs 83 bias the actuator in a counterclockwise direction, and, since the knee pin 59 of the toggle 55-57 is now engaged with the hook 89, the toggle is biased to its overcenter position. Continued clockwise movement of the operating lever 69 increases the spring bias on the toggle until a point is reached when the bias of the springs 83 overcomes the tension of the weaker contact spring 65 and moves the actuator 79 and thereby moves the toggle 55-57 overcenter to its Fig. 1 position to close the contacts with a snap action.

The breaker is manually operated to the open position by moving the handle 73 counterclockwise from the "on" position (Fig. 1) to the "off" position (Fig. 3). During this movement of the handle the line of action of the overcenter springs 83 passes to the left of the pivot axis 81 of the actuator 79, and biases the actuator in a clockwise direction. Continued counterclockwise

movement of the handle increases the biasing force until a point is reached when the springs 83 rotate the actuator 79 clockwise about the pivot axis 81. The actuator 79 carries the knee of the toggle 55—57 therewith, and, as soon as the toggle has moved overcenter, the springs 83 assisted by the contact spring 65 complete the movement and open the contacts with a snap action. During the manual opening movement the actuator 79 and the upper toggle link 55 move as a unit, since their respective pivots are in axial alignment, and the knee pin 59 remains in engagement with the hooks 89 of the actuator.

The contacts can be closed, following a manual opening operation, in the previously described manner by moving the handle 73 to the "on" position.

According to the modification of the invention shown in Figs. 4 and 7, the carrier 47 is automatically reset to latched position as soon as the contacts have opened. Since the mechanism shown in Fig. 4 is substantially the same as that shown in Figs. 1, 2 and 3, like reference characters have been given to like parts.

Referring to Fig. 4, the spring 34 (Fig. 1) which biases the carrier in a clockwise direction is omitted and the carrier 47 is biased to reset position by a relatively weak spring 99 tensioned between the spring stud 67 on the frame 33 and a spring stud 101 on the carrier. The spring 99 is substantially weaker than the contact opening spring 65 and therefore does not materially retard opening movement of the contacts. Upon release of the carrier 47, in response to an overload current, the spring 65 rotates the contact arm 27—29 counterclockwise thrusting the toggle 55—57 upwardly and rotating the carrier 47 clockwise. This moves the knee pin 59 out of the hooked end of the actuator 79a and at this time the projection 91 on the carrier 47 engages the knee pin 59 and moves the toggle 55—57 overcenter to cause its collapse. When the contact arm 27—29 reaches its fully open position (Fig. 2) against the stop 93 the spring 65 no longer biases the carrier. As soon as the toggle 55—57 collapses the spring 99 reacts to reset the carrier 47 counterclockwise from its operated position to its relatched position, the counterclockwise movement of the carrier being limited by a stop 100 projecting inwardly from the frame 33. At this time, the carrier 47, the toggle 55—57 and the contact arm 27—29 are in the position shown in Fig. 3 but the operating lever 69 and the actuator 79a are in the position shown in Fig. 4.

In order to close the contacts, it is first necessary to move the operating lever 69 counterclockwise from its Fig. 4 position to the "off" position in order to reengage the actuator 79a with the knee pin 59 of the toggle. If the arm 79 (Fig. 5) were used in the Fig. 4 modification, the hooks 89 would strike the knee pin 59 but would fail to properly engage the knee pin since the carrier 47 has already been automatically reset and the knee pin 59 moved to its Fig. 4 position. In order to ensure the proper engagement of the actuator 79a with the knee pin, the modified actuator comprising a pair of actuating arms 79a shown in detail in Fig. 6 is provided. With the carrier 47 and the toggle 55—57 in the reset position such as shown in Fig. 3, the operating lever 69 is rotated counterclockwise to its "off" position. During this movement the springs 83 pass overcenter to the left of the pivot 81 of the actuator 79a, causing this member to rotate

clockwise with a snap action. Each of the arms of the actuator 79a (Fig. 6) is provided with an elongated slot 103 through which the pivot pin 81 passes, and a cam face 105 for engaging the knee pin 59. When, during the clockwise movement of the actuator 79a, the cam face 105 strikes the knee pin 59, the actuator 79a is moved bodily downwardly until the hook passes the knee pin whereupon the springs 83 move the arms 79a upwardly engaging the hook with the knee pin. The operating lever 69 is then manually rotated to its "on" position and the springs 83, as they pass overcenter to the right of the pivot axis 81, cause counterclockwise rotation of the actuator 79a to straighten the toggle and close the contacts with a snap action in the previously described manner.

Figure 8 illustrates a further modification of the invention embodying an automatic reclosing means. This means comprises a solenoid 107 suitably mounted on but insulated from a projection 109 of the frame 33' of the automatic resetting breaker shown in Figs. 4 and 7. The solenoid 107 comprises a winding (not shown) and a movable core member 113 which at its right hand end (Fig. 8) carries a cross member 115 adapted to engage the toggle 55—57 at or near its knee. The winding of the solenoid 107 may be connected in a control circuit (not shown) and energized from any suitable source under the control of a manually or automatically operable switch (not shown).

After the breaker has been tripped open by operation of the trip device 21 in response to an overload current and after the carrier 47 has been automatically reset to latched position, the energizing winding of the solenoid 107 is energized operating the movable core member 113 toward the right (Fig. 8). During this movement the member 115 on the end of the core member 113 engages the knee of the toggle 55—57 and moves the toggle to its overcenter position. Since the carrier 47 was automatically reset and relatched by the spring 99 shortly after the breaker was tripped open, the outer end of the toggle is held against opening movement and the action of the solenoid to straighten the toggle 55—57 results in rotating the movable switch member 27—29 in a clockwise direction to close the contacts.

As the toggle 55—57 approaches its overcenter position during the closing movement, the knee pin 59 engages the surfaces 105 (see also Fig. 6) and cause the actuator 79a downwardly in order to reengage the hooked ends thereof with the knee pin.

It will be obvious that the circuit breaker shown in Fig. 8 may be manually operated to open and to close the contacts in the manner previously described for manual operation of the Figure 4 modification. Except for the closing solenoid the structure and parts of the breaker shown in Fig. 8 are the same as the corresponding parts of the Fig. 4 embodiment and have been indicated by the same reference characters.

In conventional circuit breakers of the general type disclosed herein, the overcenter operating springs are usually connected directly to the knee of the toggle and through the toggle and the carrier apply the heavy spring load to the latch, thus creating an undesirably heavy latch load. It will, therefore, be seen that by the present invention the latch load has been greatly reduced by removing the tension of the overcenter spring 83 from the toggle to the actuator 79 and by the

provision of the substantially weaker contact operating spring 65. In accordance with the modification of the invention there has been provided a simple automatic resetting means for the mechanism which permits the use of a very simple automatic reclosing means.

It will be noted that the operating handle does not move from the "on" position when the breaker is automatically operated to the open position. This feature of the invention is an advantage in certain applications of the breaker. With the present invention the extent of travel of the handle is not critical. This is an advantage over many prior art breakers since in many conventional breaker mechanisms, if the closing movement of the handle is restricted too much the contacts may not close, and if the handle over-travels slightly the toggle may lock in and the contacts fail to open. Another advantage of the present invention is that because of the small amount of stretching of the overcenter springs involved during resetting less energy is required to reset the mechanism by manual or automatic control than is required by many conventional breakers when the overcenter springs must be stretched a considerable amount in resetting the breaker.

Having described preferred embodiments of the invention in accordance with the Patent Statutes, it is to be understood that various changes and modifications may be made in the structural details thereof without departing from some of the essential features of the invention. It is desired, therefore, that the language of the appended claims be given as reasonably broad interpretation as the prior art permits.

I claim as my invention:

1. A circuit breaker comprising relatively movable contacts, operating mechanism for said contacts including a toggle operatively related to said contacts, an actuating member separably engaging said toggle, said actuating member being operable to operate the toggle to open and close the contacts, current responsive means operable to effect opening movement of said toggle and contacts irrespective of the position of said actuating member, and means for resetting said mechanism and for effecting reengagement of said actuating member with the toggle.
2. A circuit breaker comprising relatively movable contacts, operating mechanism for said contacts including a toggle operable to permit opening of said contacts, an actuating member separably engaging said toggle and operable to operate the toggle to open and close the contacts with a snap action, an element operable in response to overload currents to effect opening operation of said toggle and contacts irrespective of the position of said actuating member, and an overcenter spring for operating said actuating member to reengage said actuating member with the toggle and for operating said toggle to close the contacts with a snap action.
3. A circuit breaker comprising relatively movable contacts, operating mechanism for said contacts including an operating handle, an actuating member, an overcenter spring operable by said handle to operate the actuating member, a toggle normally engaging the actuating member and operable thereby to open and close the contacts with a snap action, and means operable upon the occurrence of predetermined conditions to effect opening operation of said toggle and contacts irrespective of the position of said handle and said actuating member, said toggle disengaging the actuating member upon automatic operation of said toggle.
4. A circuit breaker comprising relatively movable contacts, a switch member operable to open and close said contacts, means for releasably restraining the switch member in closed position, means connecting said switch member to said restraining means and operable upon release of said restraining means to permit opening movement of said switch member, an actuating member separably engageable with the connecting means for moving said switch member to closed position, operating means for said actuating member including an overcenter spring for operating said actuating member to close the contacts with a snap action.
5. A circuit breaker comprising relatively movable contacts, operating mechanism for said contacts including a toggle for restraining said contacts in closed position and operable to effect opening of said contacts, an actuating member normally engaging said toggle, means including an overcenter spring for operating said actuating member to open and closed positions to effect opening and closing of the contacts, current responsive means for effecting opening operation of said toggle and contacts irrespective of the position of said actuating member, said toggle being disengaged from said actuating member upon automatic opening movement of said toggle, and said overcenter spring being operable to effect reengagement of the actuating member and toggle.
6. A circuit breaker comprising relatively movable contacts, a switch member movable to open and close said contacts, operating mechanism for said switch member including an operating lever, a releasable member, a toggle connecting said releasable member to said switch member, said toggle being operable upon release of said releasable member to effect opening movement of the switch member, an actuating member separably engageable with said toggle for operating said toggle to close the contacts, and an overcenter spring operable by said operating lever for operating said actuating member.
7. A circuit breaker comprising separable contacts, a switch member movable to open and close said contacts, operating mechanism for said switch member including an operating handle operable to effect opening and closing of said contacts, a releasable member for releasably restraining said switch member in closed position, a toggle operatively connecting said releasable member to said switch member, an actuating member normally engaging said toggle, said toggle being separable from said actuating member upon release of said releasable member to open the contacts, and an overcenter spring operable by said operating handle to reengage said actuating member with said toggle.
8. A circuit breaker comprising relatively movable contacts, a switch member movable to open and closed positions to open and close said contacts, operating mechanism for said switch member including an actuating member, an overcenter spring for operating said actuating member, a member releasably restraining said switch member in closed position and operable to effect movement of said switch member to open position, a toggle connecting said switch member to said releasable member, said toggle being normally engaged with said actuating member, current responsive means for releasing said releasable member to effect opening movement of said

switch member, said toggle disengaging the actuating member during opening movement of said switch member, and means for operating said overcenter spring to effect reengagement of said actuating member with said toggle and for operating said toggle to effect movement of the switch member to closed position.

9. A circuit breaker comprising relatively movable contacts, operating mechanism for said contacts including a toggle, a pivoted actuating member separably engaging said toggle for operating the toggle to open and close said contacts, means including an overcenter spring for operating said actuating member, a bimetal element operable when heated in response to overload currents to effect operation of said toggle to open said contacts irrespective of the position of said actuating member, said actuating member being operable to reengage the toggle.

10. A circuit breaker comprising relatively movable contacts, operating mechanism for said contacts including a toggle operable to open and close said contacts, an actuating member co-operating with said toggle and operable to open and closed positions for operating said toggle, means including an overcenter spring for operating said actuating member, a trip device including an element operable when energized a predetermined amount to effect an opening operation of said toggle irrespective of the position of said actuating member, and means for automatically resetting said trip device following an automatic opening operation.

11. A circuit breaker comprising relatively movable contacts, operating mechanism for said contacts including a toggle operable to open and close said contacts, an actuator separably engageable with said toggle for operating said toggle to open and close the contacts, means including an overcenter spring for operating said actuator to open and closed positions with a snap action, a trip device operable in response to overload currents for effecting operation of the toggle to open position irrespective of the position of said actuator, means for automatically resetting said trip device following an automatic operation of the breaker, said actuator being operable to reengage the toggle after said trip device is reset.

12. In a circuit breaker the combination of relatively movable contacts, operating mechanism therefor including a link operatively related to said contacts, an actuating member releasably engaging said link and operable to open and close the contacts with a snap action, current responsive means operable in response to overload currents to cause release of said link from said actuating member and opening operation of said link and the contacts irrespective of the position of the actuating member, and an overcenter spring for operating the actuating member.

13. In a circuit breaker the combination of relatively movable contacts, operating mechanism for said contacts including a member releasable to cause opening of the contacts, an actuating member normally engaging said releasable member and operable to operate the releasable member to open and close the contacts, current responsive means operable in response to overload currents to effect opening operation of the releasable member irrespective of the position of the actuating member, and an over-

center spring for operating the actuating member to operate said contacts with a snap action.

14. In a circuit breaker the combination of relatively movable contacts, operating mechanism for said contacts including a toggle for restraining said contacts in closed position and operable to effect opening of said contacts, an actuating member normally engaging said toggle, an operating handle for operating said actuating member to open and closed positions to effect opening and closing of the contacts, current responsive means for effecting automatic opening operation of said toggle and said contacts irrespective of the position of said actuating member, said toggle being disengaged from said actuating member upon automatic opening movement of said toggle, and said handle being operable to effect reengagement of the actuating member and the toggle.

15. In a circuit breaker the combination of relatively movable contacts, operating mechanism for said contacts including an operating lever, releasable means including a member operable upon release of said releasable means to effect opening of said contacts, an actuating member separably engageable with said releasable member for operating said releasable member to close the contacts, and an overcenter spring operable by said operating lever for operating said actuating member.

16. In a circuit breaker, the combination of relatively movable contacts, operating mechanism for said contacts including an operating handle, a releasable member, a toggle operatively associated with said releasable member and said contacts and operable upon release of said releasable member to effect opening of said contacts, an actuating member normally engaging said toggle, said toggle being separable from said actuating member upon release of said releasable member, and said handle being operable to reset said releasable member and to reengage the actuating member with the toggle.

17. In a circuit breaker, the combination of relatively movable contacts, operating mechanism for said contacts including an operating handle, a releasable member, a toggle operatively associated with said releasable member and the movable contact and operable upon release of said releasable member to effect opening of the contacts, an actuating member normally engaging said toggle, said toggle being separable from said actuating member upon release of the releasable member, and means for automatically resetting said releasable member following an automatic opening operation, said handle being operable to effect reengagement of the actuating member and the toggle.

18. In a circuit breaker, the combination of relatively movable contacts, operating mechanism for said contacts including an operating handle, a releasable member, a toggle operatively associated with said releasable member and said contacts, said toggle being operable upon release of said releasable member to effect opening of the contacts, an actuator normally engaging said toggle, said toggle being separable from said actuator upon release of the releasable member, means for automatically resetting said releasable member following an automatic opening operation, said handle being operable to effect reengagement of the actuator and said toggle, and electroresponsive means for operating said toggle to reclose said contacts.

19. In a circuit breaker, the combination of relatively movable contacts, operating mechanism for said contacts including a releasable member, a toggle operatively associated with said releasable member and said contacts, said member when released causing opening of said contacts, an actuating member operable to move said toggle to open and close the contacts, current responsive means operable in response to overload currents to release said releasable member and effect operation of said toggle irrespective of the position of said actuating member, means for automatically resetting said releasable member following an automatic opening operation, and electroresponsive means engageable with the toggle for operating said toggle to close the contacts.

20. A circuit breaker having relatively movable contacts, operating mechanism therefor comprising a support member releasable to cause automatic opening of said contacts, a member movably supported on said support member and connected to the movable contact, an actuating element disengageably related with said movable member for moving said movable member to open and close the contacts, an operating handle and an overcenter spring connecting said handle with said actuating element for moving said actuating element to manually open and close said contacts, said support member when released causing disengagement of said movable member from said actuating element and opening of said contacts.

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