Oct. 25, 1938. D. W. JOHNSON 2,134,613

CIRCUIT BREAKER WITH OVERLOAD TRIP

Filed April 27, 1936 2 Sheets-Sheet 1

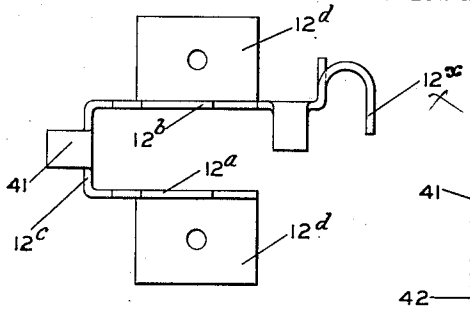


Fig. 8.

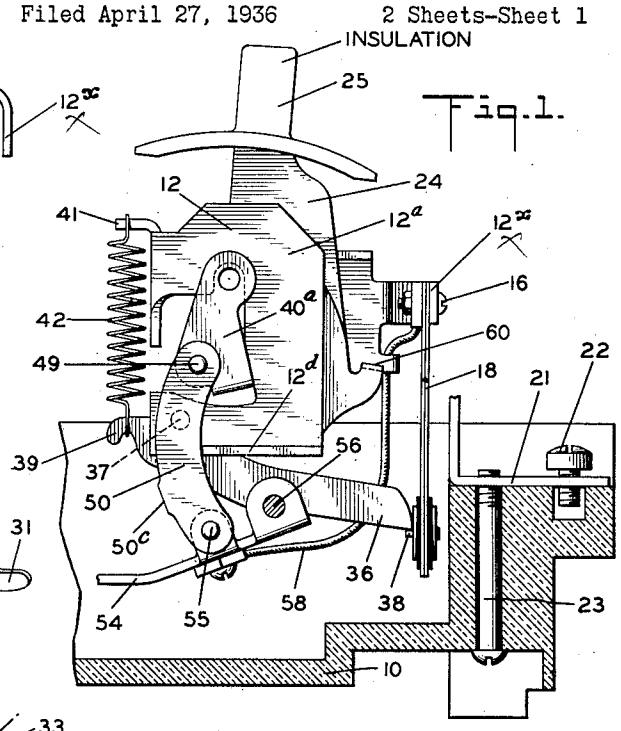


Fig. 1.

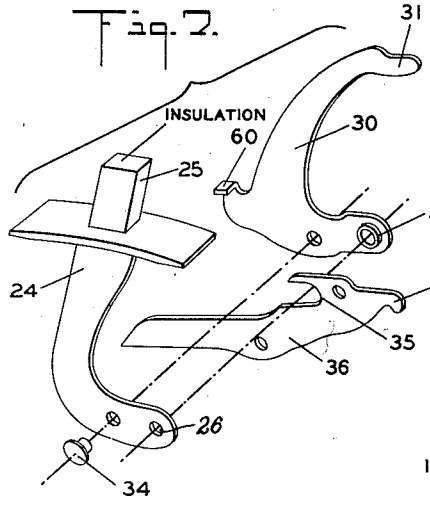


Fig. 2.

Fig. 2.

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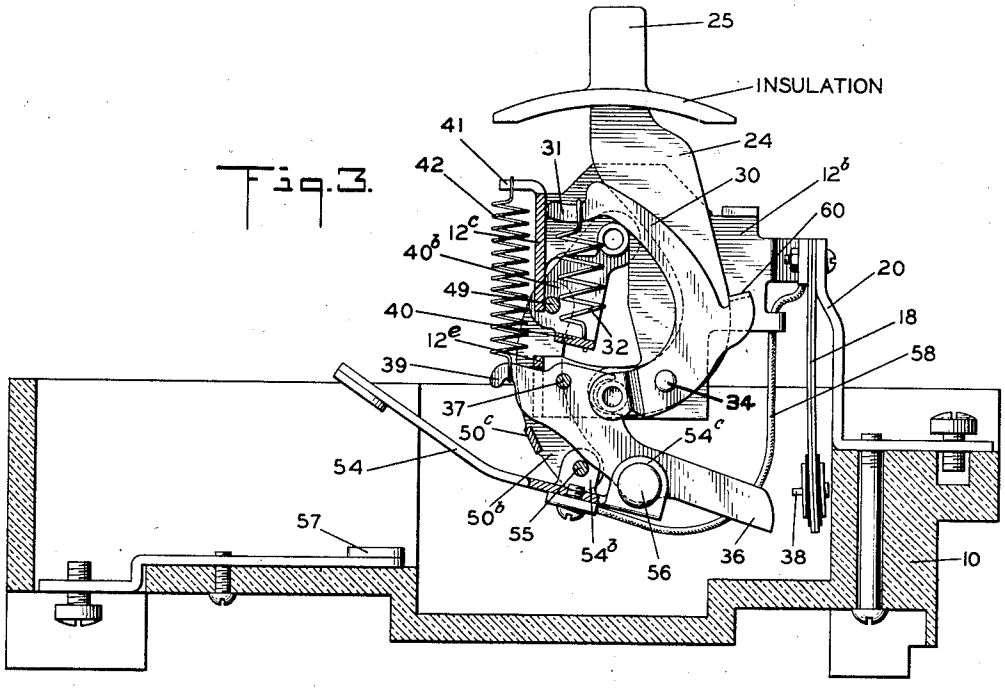
Howson and Howson

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CIRCUIT BREAKER WITH OVERLOAD TRIP

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Fig. 3.



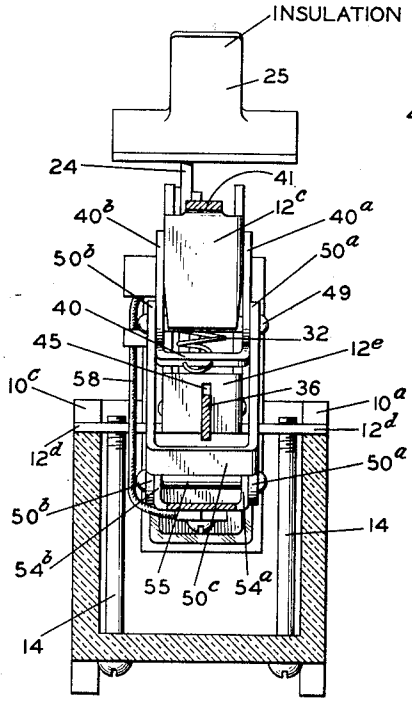


Fig. 4.

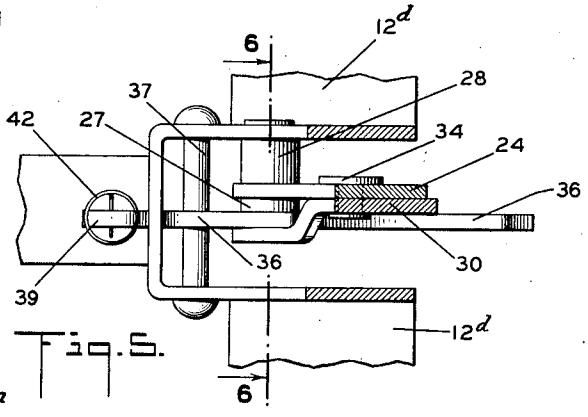


Fig. 5.

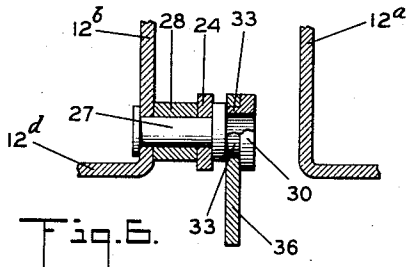


Fig. 6.

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UNITED STATES PATENT OFFICE

2,134,613

CIRCUIT BREAKER WITH OVERLOAD TRIP

David W. Johnson, New Britain, Conn., assignor to The Arrow-Hart & Hegeman Electric Company, Hartford, Conn., a corporation of Connecticut

Application April 27, 1936, Serial No. 76,682

20 Claims. (Cl. 200—116)

This invention relates to electric circuit breakers of the type which may be manually operated at will or will automatically trip open upon the occurrence of an overload current. More particularly this invention relates to circuit breakers which are provided with a thermally operable overload tripping means.

It is an object of this invention to provide an overload snap-acting electric circuit breaker of improved design in which the movable contact will separate from the fixed contact upon actuation of overload tripping means, more quickly than in prior devices of similar design.

Another object of this invention is to provide an overload snap-acting circuit breaker in which the movable and fixed contacts will start moving apart immediately upon actuation of overload tripping mechanism whether or not the mechanism for moving the contacts manually with a snap is maintained in the closed circuit position.

Another object of this invention is to produce an electric circuit breaker which is capable of operation upon overload and which will operate more quickly under overload conditions than prior devices for the same purpose.

Another object of this invention is to provide an overload snap-acting electric circuit breaker which under normal conditions is operable manually, or is operable automatically in response to an overload current, and in which the movable contact is positively urged to open circuit position by the manual snap-acting means and also by separate overload snapping means and which upon actuation of the overload means will immediately start separating movement of the contacts whether or not the overload spring is operative.

Another object of this invention is to provide an electric circuit breaker which is capable of normal manual movement with a snap action into and out of closed circuit position and in which, during overload conditions, the manual snapping mechanism operates to start the movement of the movable contact to open circuit position immediately upon the operation of the overload tripping means without the necessity of waiting for movement of the snapping means through the dead center position.

Another object of this invention is to provide an electric circuit breaker with means for manually moving the contacts into and out of closed circuit position with a snap and means for moving the contacts to open circuit position with a snap upon the occurrence of an overload and each of these means being operable upon the occurrence of an overload to start the movement of the contacts apart directly whether or not the other snapping means operates.

Another object of my invention is to provide a circuit breaker of the above type which will indicate by the position of its handle the fact that it has been tripped by an overload.

Other objects and advantages will become apparent as the invention is described in connection with the accompanying drawings.

This invention is an improvement upon the circuit breaker described and claimed in the Monroe Guett Patent No. 1,911,893. In the circuit breaker described in said patent it is necessary for the spring, which separates the contacts upon overload, to move through a dead center position before it becomes operative to separate the contacts. The present invention is designed to cause separation of the contacts immediately upon actuation of the overload device and without any delay.

In the drawings:

Figure 1 is a side elevation view partly in section of a circuit breaker embodying the principles of my invention. In this figure the parts are in closed circuit position.

Figure 2 is a side elevation view of the circuit breaker illustrated in Figure 1 but with the parts in the position they occupy when the breaker has been manually moved to separate the contacts.

Figure 3 is a side elevation view of a circuit breaker shown in Figure 1 but with the parts in the position they occupy when released upon the occurrence of an overload current.

Figure 4 is a vertical sectional view of my new circuit breaker with the section taken along line 4—4 of Figure 2.

Figure 5 is a fragmentary detail view partly in section taken along line 5—5 of Fig. 2 showing the arrangement and cooperation of certain parts of the circuit breaker with each other and with the frame.

Figure 6 is a vertical section view of the parts shown in Figure 5 with the section taken along line 6—6 of Figure 5.

Figure 7 is an exploded perspective view of the manual operating lever, auxiliary operating lever and overload tripping lever.

Figure 8 is a plan view of the frame of the circuit breaker.

Referring to the drawings it will be noted that the parts are mounted in a casing 10 which may be of any suitable insulating material, the shape of the casing preferably being long and narrow.

Upon the base is supported a frame 12 which carries the movable parts of the breaker.

The frame preferably is a sheet metal stamping comprising irregularly shaped parallel side plates 12a and 12b which are joined by upper and lower web or end portions 12c and 12e at the left end of the plates as viewed in Figures 1, 2 and 3. The spacing of the webs provides room for movement of the parts as will presently be noted. Extending outwardly in opposite directions from the bottom parts of the side plates are supporting feet 12d by means of which the frame is supported upon the side walls 10a and 10c of the casing. These feet 12d may be secured upon the top edges of the side walls by means of securing bolts 14 which pass through the bottom of the casing and take into threaded apertures in the feet. The side plate 12b has an extension 12x at its right end as viewed in Figures 1, 2 and 3 which is bent at right angles to the body of the plate and is provided with a hole through which a small bolt 16 passes and takes into a nut to secure the upper end of one leg of a U-shaped bimetallic member 18. The other leg of this bimetallic member has its upper end secured to a standard 20 extending upwardly from the insulating base and having a horizontal portion 21 lying upon the base at the right end as viewed in Figures 1, 2 and 3 to provide a terminal to which a feed wire may be secured by means of a terminal screw 22 threaded into an aperture in this portion 21. The terminal is secured to the base by a bolt 23 passing through the base from the bottom and taking into a threaded aperture in the terminal. As the current passes through this bimetallic element its lower end is caused to bend or flex to the right as shown in Figure 3 releasing the parts for movement to open circuit position as will hereinafter more clearly appear.

For manually operating the breaker a lever or manual operating member 24 is provided being substantially of hook shape as best illustrated in Figure 7. To the upper end of this manual operating lever there is permanently molded an insulating handle 25 of conventional form. The lower end of the manual operating lever 24 is provided with a circular aperture 26 through which passes pivot pin 27 (see Figure 6) which is rigidly secured in the side plate 12b of the frame adjacent the bottom thereof. A collar 28 may be provided upon the pivot pin 27 between the manual operating lever 24 and the side plate 12b. There is pivotally mounted upon the manual operating lever a crescent shaped auxiliary operating lever 30 as may best be seen in Figure 7. This auxiliary operating lever has a finger or extension 31 at its upper end on which is looped the end of a coiled tension spring 32 for operating the switch as will hereinafter appear. The lower end of the auxiliary operating lever 30 is offset in a direction away from the manual operating lever and has a circular aperture formed therein, the metal around this aperture being extruded out the side of the aperture toward the manual operating member to provide a hollow bearing or pivot 33 as may best be seen in Figure 6. The auxiliary operating member 30 is pivoted to the manual operating member 24 by a pin 34 passing through both of these members at a position spaced along them a short distance from their lower ends.

The auxiliary operating member is compelled during manual operation of the breaker to move as a unit with the manual operating member 24 by reason of the fact that the auxiliary operating member is held against pivoting about the pivot 34 and is compelled to pivot about the axis of the pivot 27 of the manual operating member 24 with which axis the axis of the hollow bearing 33 coincides during manual operation. However, the auxiliary operating member is not pivoted upon the pivot pin 27. As will now be described, the axis of hollow bearing 33 is held in coaxial relation with the axis of pivot 27 by reason of the engagement of bearing 33 with a bearing surface 35 of an overload operating member 36. This overload operating member is a stamped sheet metal lever having a form as best shown in Figure 7. The overload operating member 36 is pivotally mounted between the sides of the frame by a pivot pin 37 which extends through both sides of the frame adjacent the bottom thereof. The right hand end of the overload operating member as viewed in Figures 1, 2 and 3 is positioned to engage with a lip 38 extending at right angles to the transverse portion of the bimetallic element 18 and insulated therefrom in any suitable fashion. The left hand end of the overload tripping member 36 as viewed in Figures 1, 2 and 3 extends through a slot 45 in the frame web 12e and is provided with a finger 39 on which is looped the lower end of a tension spring 42, the upper end of which is looped over a lug 41 which is turned at right angles to the web portion 12c of the switch frame. The tension of this spring urges the overload tripping member in a clockwise direction about its fixed pivot 37 and this urge is restrained by the engagement under normal conditions of the end of the overload tripping member with the bimetallic element 18. This holds the overload tripping member in a fixed position during manual operation of the breaker and establishes a fixed position for the bearing recess 35 in which, as hereinbefore mentioned, is seated the hollow bearing 33 in the end of the auxiliary operating member 30. The parts are so constructed and arranged that while the hollow bearing is thus seated, its axis coincides with the axis of the pivot pin 27 of the manual operating member. Since both the pivot or bearing 33 and the pivot pin 34 are fixed with relation to the manual operating member the auxiliary operating member will move with the manual operating member during manual operation of the breaker.

It may now be observed that the movement of the manual operating member 24 carrying with it the auxiliary member 30 will cause the upper end of the spring 32 to move as the manual operating member is moved from the position shown in Figure 1 to that shown in Figure 2. The lower end of this spring 32 is secured to the transverse portion 40 of a U-shaped switching member whose legs 40a and 40b lie parallel to and outside of the side plates 12a and 12b of the frame. The side plates of the switch frame are cut away at the left hand sides as viewed in Figures 1, 2 and 3 to provide room for movement of the transverse portion 40 of the switching member as it is caused to oscillate. The movement of this switching member is limited in counter-clockwise direction by engagement of the transverse portion 40 with the side plates of the switch frame, and in clockwise direction by a pin 49 which passes transversely through the central portions of the legs 40a and 40b of the switching member. This pin 49 engages with a depending portion of the web 12c of the frame. The switching member is pivoted to the frame by means of hollow bearings which are formed by punching holes in the ends of the arms 40a and

40b of the switching member and extruding the metal inwardly. These hollow bearings engage with suitable bearing surfaces in the side plates of the switch frame and are held in engagement with these bearing surfaces by means of the spring 32. Obviously, however, pivot pins could be provided in lieu of the hollow bearings as just described.

It will now be apparent that as the manual operating member 24 is moved from the position shown in Figure 1 to that shown in Figure 2, the line of action of the spring 32 will be carried through the pivot point of the switching member and as it passes through this point it will cause the switching member to snap from the position shown in Figure 1 to that shown in Figure 2 and vice versa. In order to transmit this motion to the movable contact a link member designated generally by the numeral 50 is provided. This link member consists of a pair of parallel identical curved side arms, the upper ends of which are pivoted to the switching member by means of the pivot pin 49, the side arms 50a and 50b lying outside the arms 40a and 40b of the switching member. The curved arms 50a and 50b are connected adjacent their lower ends by a narrow transverse web 50c and the lower ends of these curved arms are pivotally connected with a movable contact member 54 by means of a pin 55 extending transversely through the lower ends of the curved members and through a pair of lugs 54a and 54b which are bent up at right angles to the contact member 54. Thus the contact member is linked for movement with the switching member.

The contact member 54 is also pivotally connected to the overload tripping member 36 by means of a pin 56 passing through the overload tripping member and also passing through a lug 54c turned up perpendicularly to the contact member adjacent its end. It will be noted that the pivot pin 56 is located between point of engagement of the overload tripping member 36 with the bimetal member and the pivotal connection 55 of the connecting link 50 with the contact member. It will also be noted that during normal manual operation of the switch, the pivot pin 56 will be stationary and the movable contact will pivot about it, the influence of the manual operating spring 32 being transmitted to the movable contact through the switching member 40 and the connecting member 50.

In closed position of the breaker movable contact 54 has its end in engagement with a fixed contact 57 which is mounted in the bottom of the casing at the left end as viewed in Figures 1, 2 and 3. A flexible conductor 58 serves to conduct current to the movable contact from that leg of the U-shaped bimetal element 18 which is secured to the frame lug 12x.

It may now be observed that upon the occurrence of an overload the bimetallic member 18 will have its lower end moved to the right disengaging the end of the overload tripping member 36, which thereupon under the action of the overload spring 42 will pivot about fixed pivot 37 at once without waiting for any other part to move and will carry the pin 56 in a clockwise direction. This causes the contact 54 to bodily rotate about pivot 49 and, at the same time, to pivot about pivot 55, whether or not there is relative pivotal movement between overload lever 36 and the contact 54 about pivot 56.

It will be observed that the release of the overload tripping member 36 permits the auxiliary operating member 30 to pivot about its pivotal connection 34 with the manual operating member by reason of the fact that the hollow pivot 33 has been permitted to move away from the curved bearing surface 35, but while doing so the hollow bearing 33 has been exerting a downward component of force against the edge of the overload tripping member adjacent the curved bearing surface 35 and thereby tending to move the overload operating member clockwise to open circuit position. This force is additional to and independent of the force exerted by the overload spring 42. Thus the breaker will open whether or not the overload spring 42 is used. At the same time it should be observed that as far as overload operation is concerned it is immaterial whether or not the manual spring 32 operates, for the breaker will open under the influence of the overload spring 42 even though the manual spring may have broken or become jammed or otherwise inoperative.

Thus there are two individually operative springs or forces working upon the overload operating member 36 each of which tends to move the movable contact directly to open circuit position without the necessity of either spring or any part controlled by it first moving through a dead center position.

As previously described, the movement of the overload operating member clockwise to open-circuit position at first causes the movable contact to move about its pivotal connections 55 and 49 with the connecting member 50 and the switching member 40. This movement continues until the overload operating member had moved far enough to permit the hollow bearing 33 of the auxiliary member 30 to move a sufficient distance away from the curved bearing surface 35 and to free the lower end of the auxiliary member 30 and to allow the upper end of the auxiliary member 30 to carry the line of action of the spring 32 across the axis of the pivot of the switching member. As the spring crosses this axis the switching member will be moved to open-circuit position as shown in Figures 2 and 3. This will result in normal movement of pivot 49 to its open-circuit position. At the same time the shift of the pivot 56, in conjunction with this normal movement of pivot 49 will cause the movable contact to separate from the stationary contact by a greater distance upon overload operation than upon manual operation. (Compare Figure 2 with Figure 3.)

Upon overload operation the manual switch operating member 24 and handle 25 will be moved automatically to a mid-position as illustrated in Figure 3 by reason of the fact that an extension 60 is formed upon the convex back of the auxiliary operating member 30 and turned at right angles to the plane thereof so as to engage the convex back edge of the manual operating member 24 and to move the manual operating member to said mid-position as the auxiliary operating member moves in the tripped position. This position of the handle 25 is a position of equilibrium since the extension 60 holds the manual operating member on the back side, i. e., moves it counter-clockwise, and the tension of the switch spring 32, transmitted through the auxiliary operating lever 30, is exerted upon the manual operating lever at the pivot point 34 and tends normally to rotate the manual operating member clockwise about its fixed pivot 27. Thus the circuit-breaker is self-indicating of overload operation.

To reset, after overload operation of the device, the handle **25** will be grasped and moved counter-clockwise from the position of Fig. 3 to the position of Fig. 2. In so moving, the manual operating lever **24** pivots counter-clockwise about its pivot pin **27** rotating about it, the pivot pin **34**. This rotation of pivot pin **34** moves that pin slightly in a substantially vertical direction and also moves the auxiliary operating member **30** whose upper end **31** is in abutment with the frame web **12c**, in a like manner. This vertical movement is accompanied by like vertical movement of the bearing **33** causing that bearing to enter into the bearing recess **35** and exert a counter-clockwise force and turning movement on and of the overload operating member **36**. This ultimately causes reengagement of the overload operating member **36** with the lip **38** of the bimetallic member **18**. The breaker is then ready for normal manual circuit closing operation by the handle **25**.

It will thus be apparent that I have invented a circuit breaker which has a snapping mechanism for moving the contacts between open and closed-circuit positions during manual operation and that the snapping mechanism also tends to move the movable contact directly into open-circuit position upon the occurrence of an overload. It will furthermore be apparent that my circuit breaker has a separate spring for overload operation and this spring will move the movable contact directly into open-circuit position whether or not the manual operating spring functions or is inoperative. It will also be apparent that the manual operating spring will suffice to operate the breaker into full open circuit position on overload whether or not an overload spring is employed. Finally it will be apparent that in addition to the foregoing features and advantages my circuit breaker, by movement of the handle, automatically indicates at once the fact that the breaker has been tripped by an overload.

Many modifications, within the scope of my invention will occur to those skilled in the art therefore I do not limit the inventon to the specific embodiment of the invention as illustrated and described.

I claim—

1. In a circuit breaker, a fixed contact and a movable contact engaged therewith, a manual operating lever, contact actuating means including an over-center spring movable by said lever to operate said movable contact with a snap, in combination with an auxiliary lever pivotally mounted on said manually operable lever, an overload operating lever having a fixed pivotal mounting and having a pivotal connection with said movable contact and providing a pivotal support for said auxiliary lever during manual operation of the breaker, said pivotal support being withdrawn upon release of said overload lever upon overload operation of the breaker, and current responsive means holding said overload lever during normal current conditions.

2. In a circuit breaker, a fixed contact and a movable contact engaged therewith, a manual operating lever, contact actuating means including an over-center spring movable by said lever to operate said movable contact with a snap, in combination with an auxiliary lever pivotally mounted on said manually operable lever, an overload operating lever having a fixed pivotal mounting and having a pivotal connection with said movable contact and providing a pivotal support for said auxiliary lever during manual operation of the breaker, said pivotal support being withdrawn upon release of said overload lever upon overload operation of the breaker, current responsive means holding said overload lever during normal current conditions and spring means independent of said over-center spring for moving said overload lever and movable contact upon the occurrence of an overload.

3. In a circuit breaker, a fixed contact and a movable contact member engaged therewith, a manual operating lever, pivotal contact actuating means including an over-center spring movable by said lever to operate said movable contact with a snap, in combination with an overload lever having a direct pivotal connection with said movable contact member and biased to open circuit position, current responsive means holding said overload lever against said bias, and a spring providing said bias of said overload lever and causing said overload lever and movable contact member to move to open circuit position on the occurrence of an overload without the necessity of movement of said over-center spring.

4. In a circuit breaker, a fixed contact and a movable contact member engaged therewith, a manual operating lever, pivotal contact actuating means including an over-center spring movable by said lever to operate said movable contact member with a snap, in combination with an overload lever having a direct pivotal connection with said movable contact member and biased to open circuit position, current responsive means holding said overload lever against said bias, said overload lever starting open-circuit movement of said movable contact member simultaneously with its own open circuit movement upon release by said current-responsive means.

5. In a circuit breaker, a fixed contact and a movable contact member engaged therewith, a manual operating lever, pivotal contact actuating means including an over-center spring movable by said lever to operate said movable contact member with a snap, in combination with an overload lever mounted on a fixed pivot and having a direct movable pivotal connection with said movable contact, a second spring biasing said overload lever to open circuit position and causing said lever and movable contact member to move to open circuit position upon the occurrence of an overload without the necessity of movement of said over-center spring, and current-responsive means holding said overload lever against said bias.

6. In a circuit breaker, a fixed contact and a movable contact member engaged therewith, a manual operating lever, pivotal contact actuating means including an over-center spring movable by said lever to operate said movable contact member with a snap, in combination with an overload lever biased to open circuit position and mounted on a fixed pivot and having a direct movable pivotal connection with said movable contact which is separate from said pivotal contact actuating means, said overload lever starting open circuit movement of said movable contact member simultaneously with its own open circuit movement, and current-responsive means holding said overload lever against said bias.

7. In a circuit breaker, fixed and movable contact members, manual operating means for moving said movable contact member to open circuit position with a snap, overload operating means separate from said manual means for moving

said movable contact member to open circuit position with a snap on overload, said overload means including a lever pivoted about a fixed pivot and having a direct movable pivotal connection with said movable contact member, and means biasing said overload lever to open circuit position.

8. In a circuit breaker, fixed and movable contact members, manual operating means for moving said movable contact member to open circuit position with a snap, overload operating means separate from said manual means for moving said movable contact member to open circuit position with a snap on overload, said overload means including a lever pivoted about a fixed pivot and having a direct movable pivotal connection with said movable contact member, means biasing said overload lever to open circuit position independently of said manual operating means.

9. In a circuit breaker, fixed and movable contacts, manual operating means for moving said movable contact to open circuit position with a snap, overload operating means separate from said manual means for moving said movable contact to open circuit position with a snap on overload, said overload means including a lever pivoted about a fixed pivot and having a movable pivotal connection with said movable contact, means biasing said overload lever to open circuit position, said movable contact pivoting about its pivotal connection with said overload lever during manual operation of the breaker.

10. In a circuit breaker, fixed and movable contacts, manual operating means for moving said movable contact to open circuit position with a snap, overload operating means separate from said manual means for moving said movable contact to open circuit position with a snap on overload, said overload means including a lever pivoted about a fixed pivot and having a movable pivotal connection with said movable contact, means biasing said overload lever to open circuit position independently of said manual operating means, said movable contact pivoting about its pivotal connection with said overload lever during manual operation of the breaker.

11. In a circuit breaker, fixed and movable contacts, manual operating means including an over-center spring and a contact actuating yoke controlled by said spring for moving said movable contact with a snap, overload operating means for moving said movable contact to open circuit position on overload, said overload means including a lever, and means causing said over-center spring to bias said lever to open circuit position and to cause movement of said contact to open circuit position on overload even if said yoke be held stationary.

12. In a circuit breaker, fixed and movable contacts, manual operating means for moving said movable contact into open circuit position with a snap, overload operating means for moving said movable contact to open circuit position with a snap independent of said manual operating means, said manual and overload operating means having separate springs urging said contacts apart, said manual and said overload operating means having separate pivotal connections with said movable contact, said movable contact pivoting about its connection with said overload operating means during manual operation of the breaker.

13. In a circuit breaker, fixed and movable contacts, manual operating means for moving said movable contact into open circuit position with a snap, overload operating means for moving said movable contact to open circuit position with a snap independent of said manual operating means, said manual and overload operating means having separate springs urging said contacts apart, said overload operating means including a lever having a pivotal connection with said movable contact, said movable contact having a separate pivotal connection with said manual operating means, said movable contact pivoting about its connection with said overload lever during manual operation of the breaker.

14. A circuit breaker as claimed in claim 1 further characterized by means associated with the auxiliary lever for moving the manual operating lever to a tripped position distinct from the normal open and closed positions, to indicate the condition of the breaker.

15. In a circuit breaker, fixed and movable contacts, manual operating means including an operating lever for moving said movable contact with a snap, overload operating means for separating said movable contacts with a snap, an auxiliary operating member having a pivotal connection with said manual and said overload operating means, one of said pivotal connections being moved upon overload operation of the breaker freeing said auxiliary member for independent action and causing said operating lever to take a tripped position distinct from the normal open and closed positions of said manual lever to indicate the condition of the breaker.

16. In a circuit breaker, fixed and movable contacts, manual operating means for moving said movable contact between open and closed circuit positions, overload operating means separate from said manual means for moving said movable contact to open circuit position with a snap on overload, said overload means including a lever pivoted about a fixed pivot and having a movable connection with said movable contact, means biasing said overload lever to open circuit position, said movable contact pivoting about its pivotal connection with said overload lever during manual operation of the breaker.

17. In a circuit breaker, fixed and movable contacts, manual operating means for moving said movable contact between open and closed circuit positions, overload operating means separate from said manual means for moving said movable contact to open circuit position with a snap on overload, said overload means including a lever pivoted about a fixed pivot and having a movable connection with said movable contact, means biasing said overload lever to open circuit position independently of said manual operating means, said movable contact pivoting about its pivotal connection with said overload lever during manual operation of the breaker.

18. In a circuit breaker, fixed and movable contacts, manual operating means for operating said movable contact, overload operating means operable without the necessity of movement of said manual operating means and causing movement of said movable contact to open-circuit position with a snap on overload, said overload means including a lever pivoted about a fixed pivot and having a movable connection with said movable contact, means biasing said overload lever to open-circuit position independently of said manual operating means.

19. In a circuit breaker, fixed and movable contacts, manual operating means for operating said movable contact, overload operating means

operable without the necessity of movement of said manual operating means and causing movement of said movable contact to open-circuit position with a snap on overload, said overload means including a lever pivoted about a fixed pivot and having a movable connection with said movable contact, means biasing said overload lever to open circuit position, said movable contact pivoting about its pivotal connection with said overload lever during manual operation of the breaker.

20. In a circuit breaker, fixed and movable contacts, manual operating means for operating said movable contact, overload operating means operable without the necessity of movement of said manual operating means and causing movement of said movable contact to open circuit position with a snap on overload, said overload means including a lever pivoted about a fixed pivot and having a movable connection with said movable contact, means biasing said overload lever to open circuit position independently of said manual operating means, said movable contact pivoting about its pivotal connection with said overload lever during manual operation of the breaker.

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