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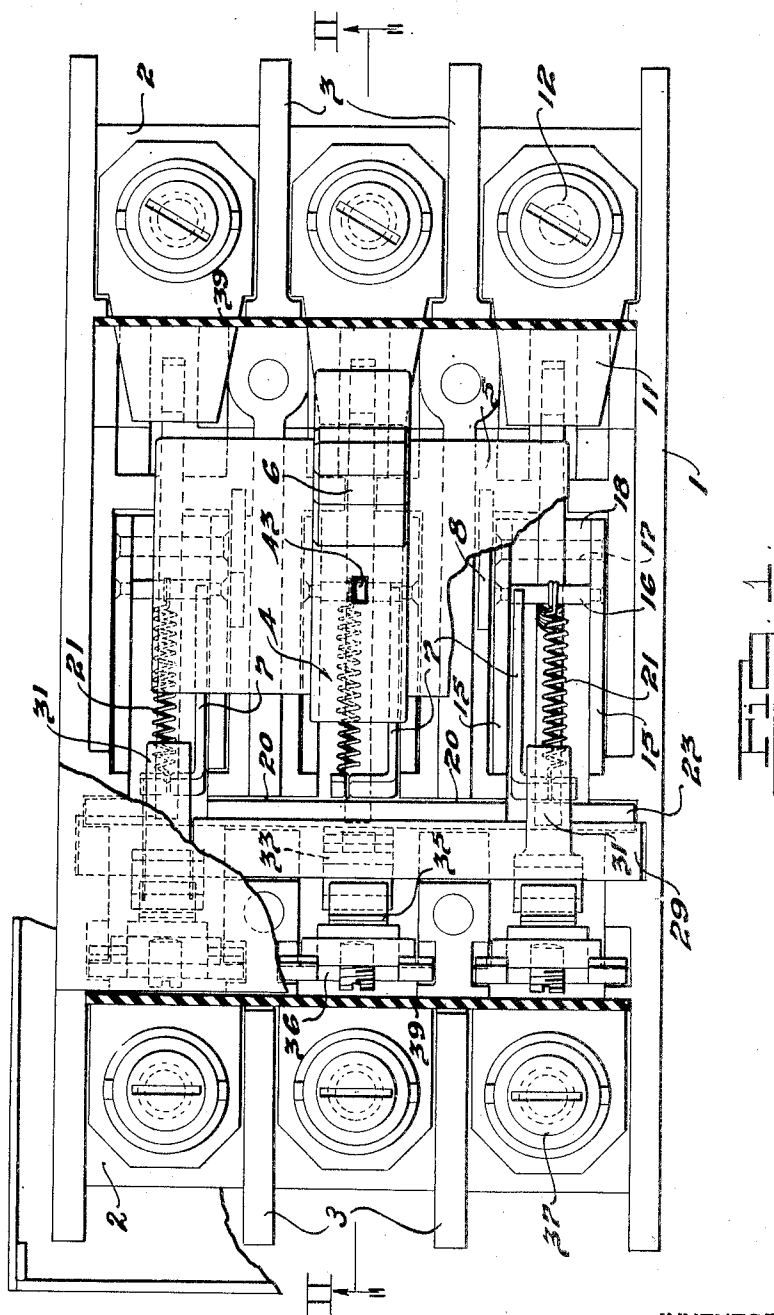
J. G. JACKSON

2,107,246

CIRCUIT BREAKER

Filed June 1, 1936

3 Sheets-Sheet 1



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Feb. 1, 1938.

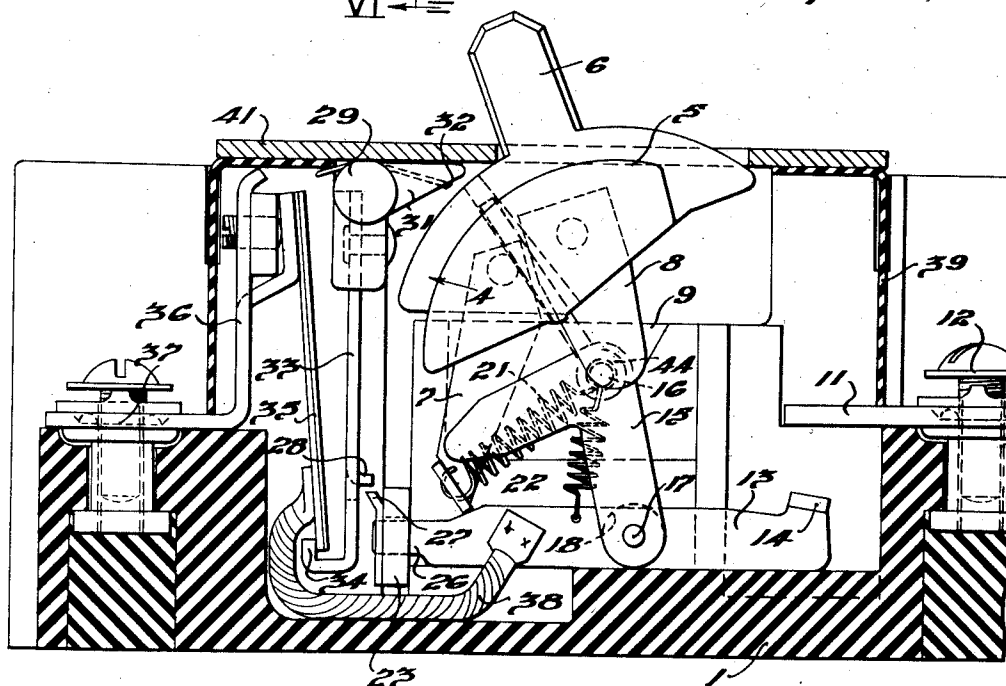
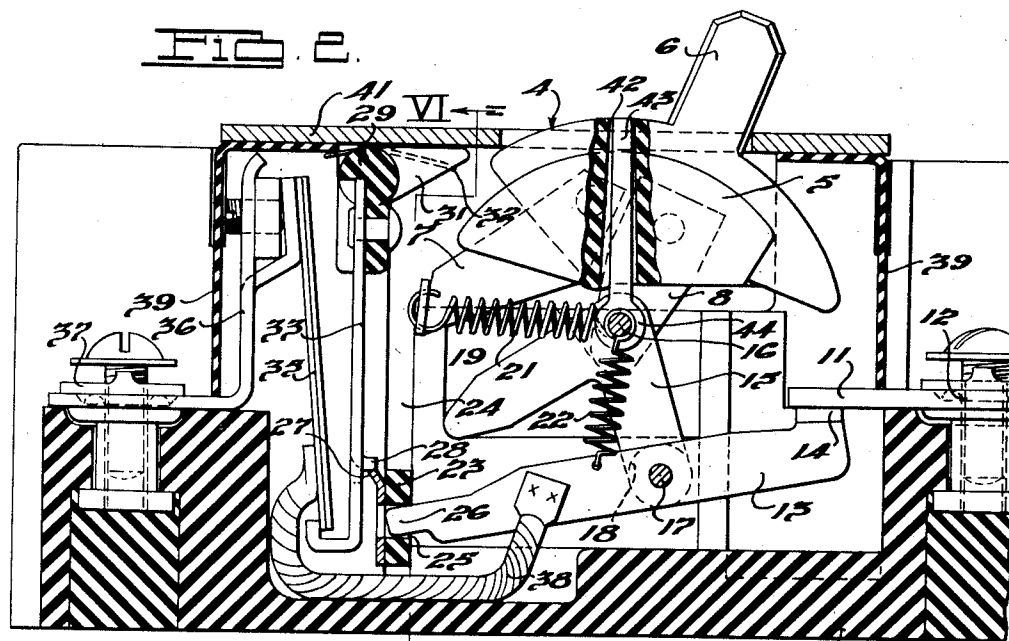
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CIRCUIT BREAKER

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3 Sheets-Sheet 2



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CIRCUIT BREAKER

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3 Sheets-Sheet 3

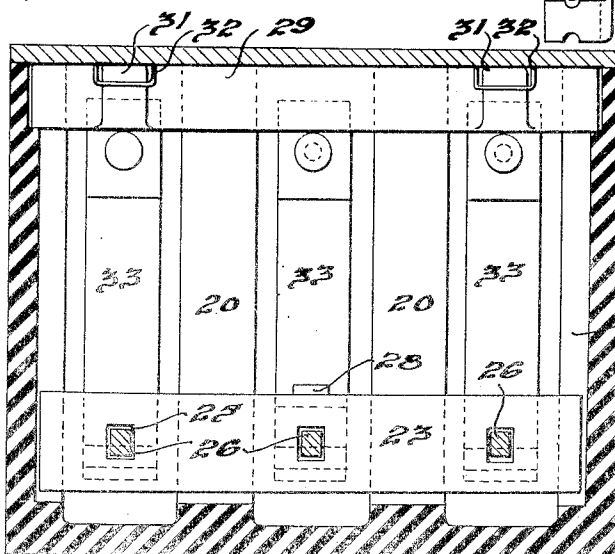
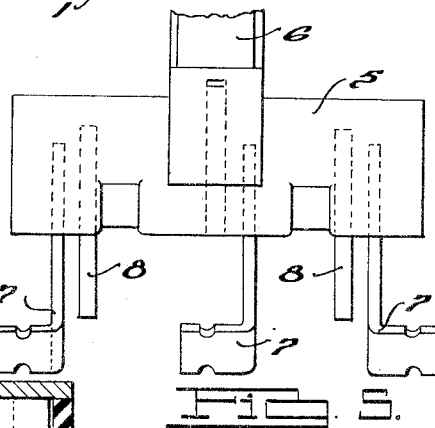
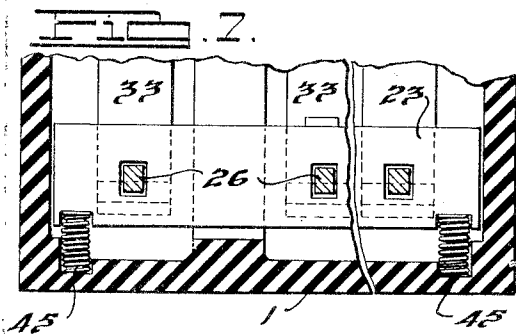
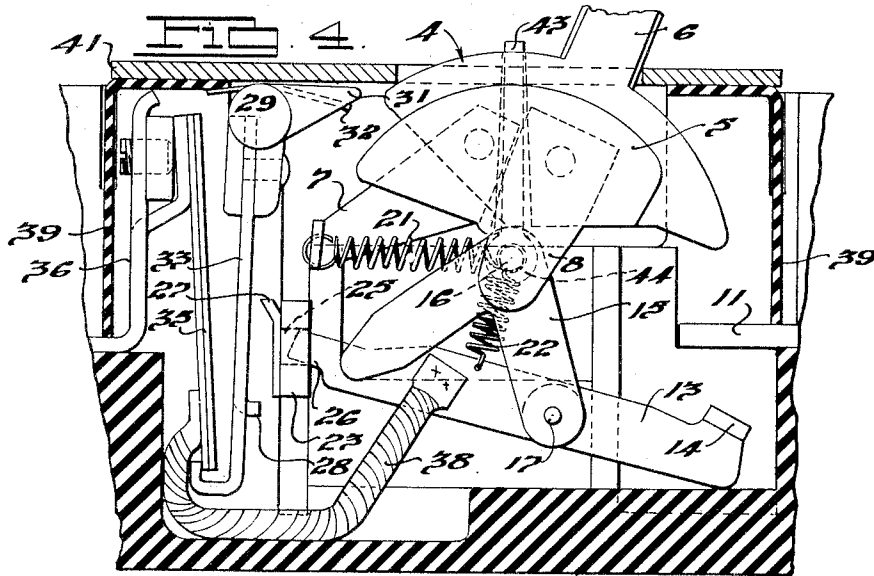


FIG. 5.

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CIRCUIT BREAKER

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Application June 1, 1936, Serial No. 82,709

19 Claims. (Cl. 200—116)

This invention relates to apparatus for making and breaking electrical circuits and more particularly to circuit breakers automatically operable in response to current overloads.

One object of the present invention is to provide an improved form of quick make and break electric circuit breaker.

Another object of the present invention is to provide an improved latching means for a multipole circuit breaker.

Another object of the present invention is to provide an improved form of snap acting multipole circuit breaker.

Another object of the present invention is to provide an improved means for indicating the automatic tripped condition of the circuit breaker.

Other objects and features of the invention will be readily apparent to those skilled in the art from the following specification and appended drawings illustrating certain preferred embodiments of the invention in which:

Figure 1 is a top plan view of the circuit breaker according to the present invention with parts cut away to show internal mechanism.

Figure 2 is a vertical sectional view taken on the line II—II of Figure 1.

Figure 3 is a view similar to Figure 2 but showing the parts in manual "off" position.

Figure 4 is a view similar to Figure 2 but showing the parts in automatic stripped position.

Figure 5 is a detailed view of the manual operator.

Figure 6 is a sectional view taken on the line VI—VI of Figure 2.

Figure 7 is a partial sectional view similar to Figure 6 but showing a slightly modified construction.

The circuit breaker as shown comprises a generally cup-shaped insulating base 1 having end ledges 2 and barrier walls 3 extending generally through the base separating the poles in the breaker. The central portions of the walls 3 are cut out to receive the manual operator 4. This operator includes an insulating shield portion 5 having a manual handle 6 integral therewith. Rigid with the insulating portion 5 are operating arms 7 and supporting legs 8. The legs 8 are received within generally V-shaped notches 9 in the walls of the base to provide for rotary movement of the manual operator to effect operation of the breaker mechanism.

Stationary contacts 11 are rigidly supported on the ledge 2 at one end of the exterior of the breaker by means of the connector assembly 12 and cooperating with each of these stationary

contacts is a floating contact bar 13 carrying contact surface 14 at one end. The bars 13 are mounted on pairs of spaced generally L or V-shaped lever members 15 spaced apart at their apex by spacing rivets 16 and having one pair of legs pivotally connected to the bar 13 by rivet 17 and the pair of spacers 18. The ends of the other legs of the levers 15 are pivotally engaged with the enlarged notched portions 19 in the walls of the base.

Over-center operating springs 21 interconnect the ends of the operating arms 7 and the rivets 16. Springs 22 interconnect the rivets 16 and the bars 13 on the latching side of rivet 17, thus serving to bias the bars 13 for rotation about rivets 17.

The barrier walls 3 are notched to the bottom of the base as at 20 remote from the stationary contacts 11 to receive a bar 23 disposed in grooves 24 in the opposite interior side walls of the base. This bar has openings 25 loosely and slidably receiving reduced end portions 26 at the ends of the bars 13. The bar 23 is provided with a generally central latching portion 27 adapted to cooperate with a latching portion 28 upon a movable latching member which has a common shaft 29 pivoted in the opposite side walls of the base and having projecting portions 31 biased by springs 32 against the interior of the cover of the breaker. Rigidly secured to the common shaft 29 are depending portions 33 having return bent portions 34 adapted to be engaged by bimetallic elements 35 adjustably supported on connectors 36 leading to the exterior of the breaker where they are supported upon the end ledge by connector assemblies 37. Flexible leads 38 interconnect the free ends of the bimetallic members 35 and the bars 13. Fibre sheets 39 seal the opposite ends of the circuit breaker enclosure and a cover 41 may be riveted or otherwise sealably secured to the base.

The central portion of the insulating shield 5 is provided with an opening 42 through which extends an indicating pin 43. This pin has an eye 44 at its interior end which is received upon the central rivet 16. The opening 42 widens toward the interior of the shield to provide for slight angular movement of the pin 43 with respect to the shield.

The parts as shown in Figure 2 are in their normal operating position. To move the circuit breaker to the "off" position the external handle is moved in a counterclockwise direction, thus carrying springs 21 below the pivotal mountings of the levers 15, whereupon the levers 15 will be rotated in a clockwise direction about their

pivotal engagement with the base and will move the contacts 14 away from the stationary contacts 11 into the position shown in Figure 3. To again place the parts in normal operating position the handle 6 is moved in the reverse direction and the supporting levers 15 will be snapped in a counterclockwise direction to move the contacts 14 against the stationary contacts 11. With the parts in their normal operating position, should an overload occur through any pole of the breaker the corresponding bimetallic member 35 will be flexed toward the left, thus rotating the latching portion 28 in a clockwise direction and releasing the bar 23. Upon being so released the contact bars 13 will be rotated in a clockwise direction about the pivots 17 under the bias of their springs 22, thus moving the joining bar 23 in an upward direction within its grooves 24 and notches 20. This position of the parts is shown in Figure 4.

To reset the breaker parts after automatic operation, the handle 6 is rotated in a counterclockwise direction whereupon the ends of operating arms 7 positively engage adjacent the joined ends of the bars 13 and force them downwardly against the bias of their springs 22 into the position shown in Figure 3 which corresponds also to the normal "off" position of the device. If, in the meantime, the bimetallic member which was flexed by the overload current to unlatch the breaker mechanism has cooled sufficiently to permit the latching member to return to its normal latching position the breaker may then be moved to its normal operating position by moving the handle 6 in a clockwise direction as in normal operation. In this movement to resetting position the inclined part of the latching portion 27 will readily move past the latching portion 28, moving it slightly in a clockwise direction and the return of the latching bar 28 is effected by the biasing springs 32.

With the parts in normal operating position the pin 43 will be flush with the top of the shield. In Figure 4 the release of the joining bar 23 permits a slight upward rotation of the levers 15 about their pivotal engagement with the base into engagement with the lower portion of the insulating shield 5. This movement forces the indicating end of the pin 43 beyond the exterior portion of the shield 5, as shown, and indicates the automatically tripped position of the circuit breaker. As the mechanism is reset the pin will again be brought down to the normal position of Figures 2 and 3.

In the modification shown in Figure 7 the springs 22 have been omitted and their function is performed by a pair of compression springs 45 serving to bias the bridging bar 23 away from the bottom of the base 1, the rest of the mechanism remaining the same. As can readily be seen, the compression spring 45 will have the same operating function as the springs 22 and will rotate the contact bars 13 in a clockwise direction by the movement of the bridging bar 23 away from the base when released by the latching portion 28.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims:

What is claimed is:

1. In an automatic electric circuit breaker, a

supporting element pivotally mounted on a fixed part, a switching member pivotally mounted on said element, spring means interconnecting said member and element and biasing said member for rotation about its pivotal mounting, a stationary contact, a contact surface adjacent one end of said member cooperating with said contact, current responsive latching means for the opposite end of said member, a manual operator, and spring means interconnecting said operator and element for moving the element about its pivotal mounting in response to movement of said operator.

2. In an automatic electric circuit breaker, a pivotally mounted support, a switching member pivotally mounted on said support, a stationary contact, a contact surface adjacent to one end of said member cooperating with said contact, current responsive latching means for the opposite end of said member, means biasing said member for rotation about its pivotal mounting on said support when released by said latching means, a manual operator, and means for moving said support about its pivotal mounting in response to movement of said operator.

3. In an automatic electric circuit breaker, a pivotally mounted support, a switching member pivotally mounted on said support, a stationary contact, a contact surface adjacent to one end of said member cooperating with said contact, current responsive latching means for the opposite end of said member, means biasing said member for rotation about said support when released by said latching means, a manual operator, and an over-center spring interconnecting said operator and support for moving said support with a snap action in response to movement of said operator.

4. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of individual pivoted supports, a switching member pivoted on each of said supports, said members carrying contact surfaces adjacent one end cooperating with said stationary contacts, common latching means for the opposite ends of said members, a plurality of current responsive elements for moving said latching means, manual operating means, and means for moving said supports in response to movement of said operating means.

5. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of individual pivoted supports, a switching member pivoted on each of said supports, said members carrying contact surfaces adjacent one end cooperating with said stationary contacts, common latching means for the opposite ends of said members, a plurality of current responsive elements for moving said latching means, manual operating means, and means for moving said supports in response to movement of said operating means, said members rotating about their pivotal connections with said supports when released by said latching means.

6. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of floating switching members carrying contact surfaces adjacent to one end cooperating with said stationary contacts, common latching means for the opposite ends of said members, movable pivots for said members intermediate their ends, a manual operator, over-center spring means for moving said pivots in response to movement of said operator to move said contact surfaces to a disengaged position, and a

plurality of current responsive means for moving said latching means to releasing position, said members rotating about said pivots when released by said latching means to move said contact surfaces to automatically disengaged position.

7. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of floating switching members carrying contact surfaces adjacent to one end cooperating with said stationary contacts, common latching means for the opposite ends of said members, movable pivots for said members intermediate their ends, a movable operator, over-center spring means for moving said pivots in response to movement of said operator to move said contact surfaces to a disengaged position, a plurality of current responsive means for moving said latching means to releasing position, said members rotating about said pivots when released by said latching means to move said contact surfaces to automatically disengaged position, and means for positively moving said members into reset position in response to movement of said operator after an automatic operation.

8. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of floating switching members carrying contact surfaces adjacent to one end cooperating with said stationary contacts, common latching means for the opposite ends of said members, movable pivots for said members intermediate their ends, a manual operator, over-center spring means for moving said pivots in response to movement of said operator to move said contact surfaces to a disengaged position, means biasing said members for rotation about said pivots, and a plurality of current responsive means for moving said latching means to releasing position to permit such rotation in response to a current overload through any of the breaker poles.

9. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of individual pivoted supports, a switching member pivoted on each of said supports and carrying a contact surface at one side of its pivotal mounting adapted to cooperate with a stationary contact, common latching means for said members at the other side of their pivotal mountings, a plurality of current responsive means for moving said latching means, manual operating means, and overcenter spring means for moving said supports with a snap action in response to movement of said operating means.

10. In an multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of individual pivoted supports, a switch member pivoted on each of said supports and carrying a contact surface at one side of its pivotal mounting adapted to cooperate with a stationary contact, means joining said members together at the opposite side of their pivotal mountings, means biasing said members for rotation about said mountings, latch means engaging said joining means to prevent such rotation, and a plurality of current responsive means for moving said latch means to release said joining means and permit rotation of said members in response to a current overload.

11. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of individual pivotally mounted supports, a plurality of switching members pivoted on said supports and carrying contact surfaces adjacent to one end cooperating with said stationary con-

tacts, means joining the opposite ends of said members for substantially common movement but permitting limited independent movement of said members, means biasing said members for rotation about their pivotal mountings on said supports, latch means preventing movement of said joining means, and a means responsive to the current in each pole of the breaker for moving said latch means to permit rotation of said members under the action of said biasing means.

12. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of switching members carrying contact surfaces adjacent one end cooperating with said stationary contacts, means joining the opposite ends of said members for substantially common movement, means biasing said members for rotative movement, latching means for said joining means preventing such rotative movement, and a plurality of current responsive means for moving said latch means to releasing position to effect automatic movement of said switching members.

13. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of switching members carrying contact surfaces adjacent one end cooperating with said stationary contacts, means joining the opposite ends of said members for substantially common movement, pivots for said members interjacent their ends, a manual operator, means for moving said pivots in response to movement of said operator, means biasing said members for rotation about said pivots, latch means for preventing such rotation, and a plurality of current responsive means for moving said latch means to releasing position in response to current overload.

14. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of switching members carrying contact surfaces adjacent one end cooperating with said stationary contacts, a latch bar joining the opposite ends of said members, a latch for said bar, and a plurality of current responsive means for moving said latch to release said bar.

15. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of switching members carrying contact surfaces adjacent one end cooperating with said stationary contacts, a latch bar joining the opposite ends of said members, movable pivots on said members, means for moving said pivots to move the members, means biasing said members for rotation about said pivots, a latch for said bar opposing such rotation, and a plurality of current responsive means for moving said latch to release said bar.

16. In a multipole automatic electric circuit breaker, a plurality of stationary contacts, a plurality of pivoted supports, a plurality of switching members pivoted on said supports and carrying contact surfaces adjacent one end cooperating with said stationary contacts, a latch bar joining the opposite ends of said members for substantially common movement, a manual operator, means moving said support in response to movement of said operator to move said contact surfaces to a disengaged position, means biasing said latch bar for movement in a direction to cause rotation of said members about their pivotal mountings on said supports, latch means opposing such movement, and a plurality of current responsive means for moving said latch means to releasing position.

17. In an automatic electric circuit breaker, a stationary contact, a switching member carry-

ing a contact surface at one end cooperating with said stationary contact, a pivotal axis for said member, means biasing said member for rotation about said axis, current responsive latching means for the opposite end of said member, manual means including an operating handle for moving said pivotal axis to move said member, an indicator, and means for moving said indicator into indicating position when said member is released by said latching means.

18. In an automatic electric circuit breaker, a stationary contact, a movable element, a switching member having a pivotal engagement with said element and carrying a contact surface adjacent to one end cooperating with said stationary contact, current responsive latching means for the opposite end of said member, means for moving said element to move said member, means biasing said member for rotation about its pivotal

engagement with said element, an indicating pin operatively connected to said element, said pin being moved into indicating position by movement of said element when said member is released by said latching means.

19. In an automatic electric circuit breaker, a stationary contact, a pivoted support, a switching member pivoted on said support and carrying a contact surface adjacent one end cooperating with said stationary contact, current responsive latching means for the opposite end of said member, means for moving said support to move said member, said member pivoting about said support when released by said latching means, an indicating pin operatively connected to said support, said pin being moved to indicating position by movement of said support when said member is released.

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CERTIFICATE OF CORRECTION.

Patent No. 2,107,246.

February 1, 1938.

JOHN G. JACKSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 30, for the word "stripped" read tripped; page 3, first column, line 55, claim 10, for "an" read a; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of March, A. D. 1938.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.