June 16, 1953 T. M. COLE ET AL 2,642,509

AUTOMATIC CIRCUIT BREAKER WITH CALIBRATION PROVISION

Filed March 23, 1951

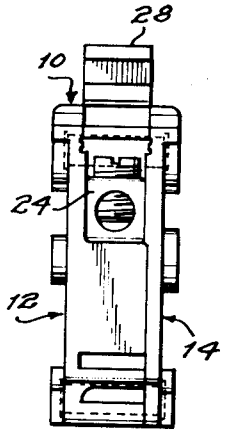


FIG. 7.

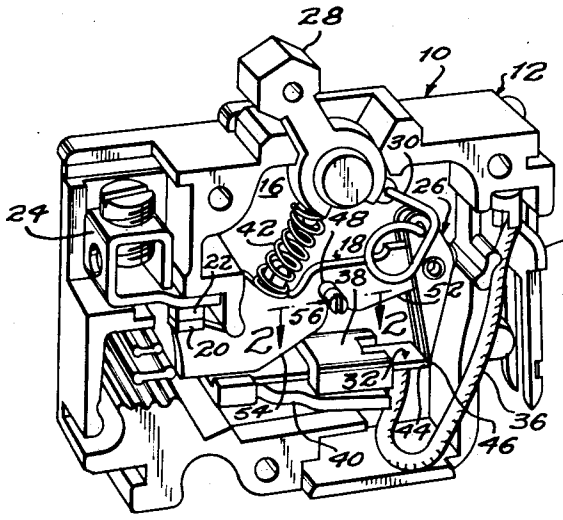


FIG. 1.

FIG. 3.

FIG. 2.

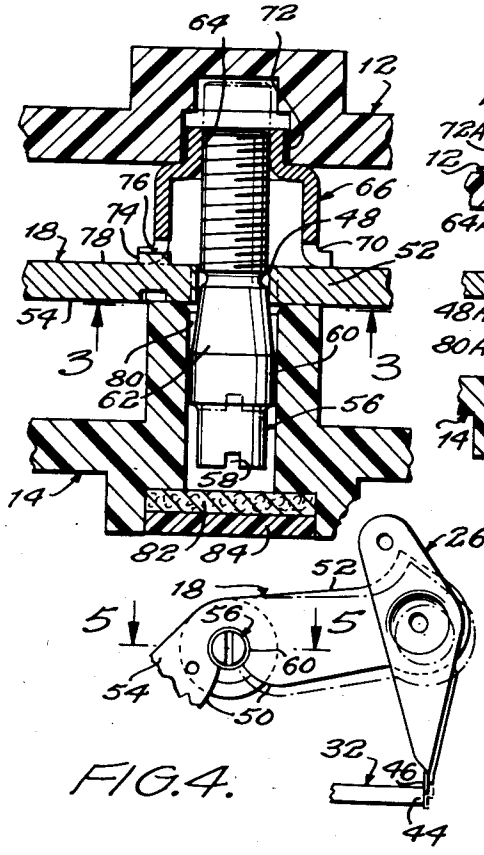


FIG. 4.

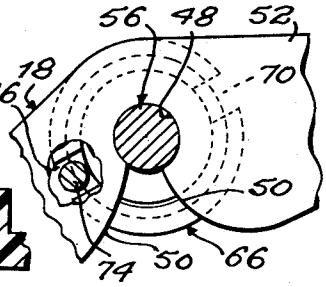


FIG. 6.

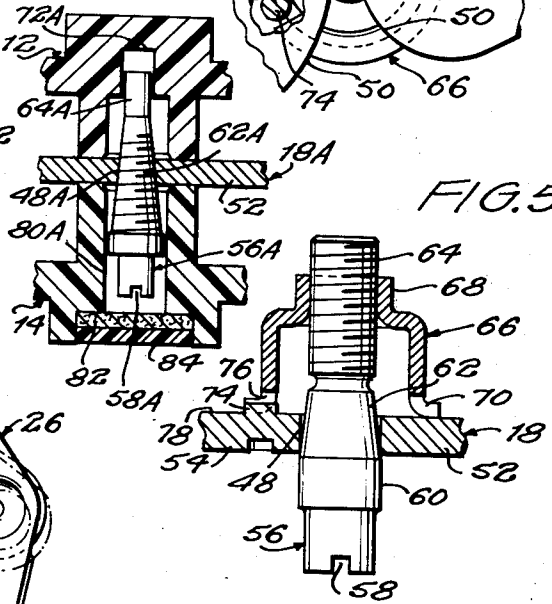


FIG. 5.

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AUTOMATIC CIRCUIT BREAKER WITH CALIBRATION PROVISION

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24 Claims. (Cl. 200—116)

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This invention relates to automatic circuit breakers of the general type disclosed in United States Patents Nos. 2,174,669, 2,209,319, 2,209,352, 2,209,353 and 2,459,427, and in particular to calibrating devices therefor.

One object of the present invention is the provision of an automatic circuit breaker having a generally improved and simplified calibrating means.

Another object is the simplification of the overall circuit breaker construction by eliminating the need for a separate pivot means for the movable contact arm thereof, the pivot function being incorporated in a calibration means.

Another object is to provide for calibrating the circuit breaker after the mechanism is all assembled in the casing.

The above and other objects, features and advantages of the present invention will be more fully understood from the following description considered in connection with the accompanying drawings.

In the drawings:

Fig. 1 is a perspective view of an automatic circuit breaker pursuant to the present invention, the cover or one side of the casing being removed and the breaker being closed;

Fig. 2 is a sectional view, on an enlarged scale, taken along the line 2—2 of Fig. 1, the uncalibrated condition of the breaker being shown in full line and a calibrated condition thereof being illustrated in broken line;

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 2;

Fig. 4 is a detail view showing a portion of the movable contact arm and current responsive or overload device of the breaker, a calibrated condition being illustrated in full line and an uncalibrated condition being illustrated in broken line;

Fig. 5 is a view similar to Fig. 2 illustrating the calibrating means in a calibrated condition thereof;

Fig. 6 is a view similar to Fig. 2 illustrating another embodiment of the invention; and

Fig. 7 is an end view of the circuit breaker.

In general, the circuit breaker illustrated herein, and in my above mentioned prior applications, comprises a movable contact member which carries the movable contact for engagement with and disengagement from the stationary contact of the circuit breaker. Said movable contact member is provided with an actuator which is releasably latched to said movable contact member by means of a current responsive, or other overload device, which is carried by the movable contact member and releasably engages said actuator under normal load conditions so as to enable the movable contact member to be held in circuit closed position, or to be manually moved to and from said position, and which, upon release of said actuator, results in the movement of said movable contact member automatically to its open circuit position.

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Briefly described, the provision for calibrating the circuit breaker, pursuant to the present invention, comprises means associated with the pivot means of the movable contact member to facilitate the displacement of a part of the movable contact member of the circuit breaker in relation to another part thereof in such manner as to move the actuator in relation to the current responsive, or overload device, so as to adjust the releasably engaged portions of the actuator and the current responsive device. Pursuant to the present invention, the usual pivot opening is provided in the movable contact member and said opening is extended to the lower marginal edge of said member. A pin is inserted into said opening to serve as a pivot for the movable contact member, said pin being adjustably positioned transversely of the movable contact member and being provided with a tapered portion for accomplishing the displacement of said part of the movable contact member.

Referring now to Figs. 1 through 5 of the drawings in detail, there is shown in Fig. 1 an automatic circuit breaker 10 provided with the body part 12 of a two-part insulated casing or housing, the cover therefore being indicated at 14 in Fig. 2. The circuit breaker mechanism 16 provided in said body part, as here shown, comprises the contact arm 18, mounted for pivotal movement, as hereinafter described in detail. Said contact arm is provided with the movable contact 20, at one end thereof, for engagement with and disengagement from a companion stationary contact 22 provided on a solderless terminal connector 24. At its other end, the movable arm 18 is provided with a pivotally mounted actuator 26 which is in operative engagement with the handle or manual operating member 28 by means of a resilient link 30. The movable contact arm 18 is also provided with a current responsive or overload device, here shown as a bi-metallic element or latch 32, the free end of which is in latched engagement with the actuator 26 in the circuit making or closed condition of the mechanism. As here shown, the latch is connected to a stab element 34, which

constitutes the other terminal of the circuit breaker, by means of a flexible conductor 36. Also, as here shown, the circuit breaker mechanism 16 is provided with electro-magnetic means for effecting the disengagement thereof, said means comprising a magnetic member 38 carried by the latch 32, and the rigid armature 40 which is secured at one end thereof to the latch and to the movable contact member. A spring 42 is interposed between the handle 28 and the movable member 18, as illustrated in Fig. 1.

The operation of the circuit breaker is described in detail in the above mentioned patents. However, it will be understood that the bi-metallic element 32 operates to latch the manually operable member 28 and to unlatch said actuator from the movable contact member, the unlatching taking place upon deflection of the bi-metallic element 32 causing the disengagement of the free end 44 thereof from the bottom part 46 of the actuator 26 upon the occurrence of an overload, or under other abnormal predetermined current conditions in the circuit controlled by the circuit breaker. When the bi-metallic element 32 is deflected from engagement with the actuator 26, spring 42 is effective to move the contact member 18 to its open position wherein the contact 20 is disengaged from the companion stationary contact 22.

Pursuant to the present invention, the movable contact member 18 is provided with a generally circular opening 48 at the axis about which it pivotally moves. An opening 50 formed in the lower marginal edge of the contact member 18 constitutes an interruption in the periphery thereof and extends to the circular aperture 48 with which it is in communication, as illustrated in Fig. 3. It will be noted that the opening 50 is formed in the narrower portion 52 of the movable contact member, on the free end of which portion the actuator 26 is pivotally mounted. The body portion 54 of the movable contact member forms the wider and generally larger portion thereof and extends to the left (viewing Fig. 1) of the circular aperture 48 through which the pivot axis of the movable contact member extends.

In order to provide for both the pivotal mounting and the calibration of the movable contact member 18, there is provided a calibrating element or pin member 56. Pin 56 is provided at one end thereof with a portion having a screw driver slot 58, an adjacent bearing portion 60, an intermediate tapering portion 62, and a threaded portion 64 which extends from said tapering portion to the other end of the pin. It will be noted that the portion 62 has its maximum diameter adjacent the bearing portion 60 and its minimum diameter adjacent the threaded portion 64. The pin 56 is threadedly engaged in a nut 66. More particularly, said nut is provided at one end thereof with an interiorly threaded collar 68 of reduced diameter and at its other end with a lateral generally circular flange 70. The collar 68 is disposed within a bearing aperture 72 provided in the body part 12 of the circuit breaker casing. In order to prevent relative movement between the nut 66 and the movable contact member 18, the latter is provided with a preferably pressed-out part 74 adjacent the aperture 48 therein, and the flange 70 is provided with a cut-out portion 76 into which said part 74 engages. Therefore, it will be apparent that as a result of the engagement of part 74 in the cut-out 76, the nut 66 is retained against rotation relative to the outer surface 78 of the movable contact member. It will be noted that the cover 14 of the casing is provided with an aperture 80 which extends completely therethrough and which is in registry with the bearing aperture 72 formed in the casing part 12. It will be understood that the pivot axis for the movable member 18 extends through said casing apertures and through the aperture 48 in said member. Therefore, it will be apparent that when the pin member 56 is disposed in the aperture 80 so that the bearing portion 60 thereof has bearing engagement in said aperture, and with the threaded part 64 engaged in the collar 68 which has bearing engagement in the bearing aperture 72, said pin will serve as the pivot for the movable contact member 18 in view of the fact that the nut 66 does not rotate relative to said movable member, as previously described.

In calibrating the circuit breaker mechanism 16, the pin 56 is threaded into the collar 68 sufficiently to obtain the desired degree of overlap of the actuator end 46 and the free end 44 of the bi-metallic element 32. More specifically, as pin 56 is threaded into the collar 68, the tapering portion 60 is progressively moved into the aperture 48, as the entire pin member 56 moves transversely of the plane of the movable contact member 18. As the tapering portion advances into and moves through the aperture 48 the latter is distended and the narrower portion 52 of the movable contact member is displaced in the plane thereof from the wider body part 54. This action is due to the fact that the distention of aperture 48 causes the distention of the aperture 50 which extends through the movable contact member from the aperture 48 therein to the marginal edge thereof.

Referring now to Fig. 2, the full line position of the pin 56 shows the tapering portion 62 as it enters the aperture 48, thus indicating a minimum calibration adjustment or maximum overlap of the actuator end 46 relative to the free end 44 of the bi-metal. This maximum overlap condition is illustrated in broken line in Fig. 4, Fig. 3 also illustrating this condition and showing the undistended relationship of the opposing sides of the edge aperture 50. As the pin 56 is threaded further into the aperture 48, the latter is distended and the sides of the aperture 50 are forced apart, the relative displacement of said opposing sides resulting from full entry of the tapering portion 62 into the aperture 48 being illustrated in full line in Fig. 4. It will be apparent that as a result of said distention or displacement of the opposing sides of aperture 50, the entire narrower portion 52 of the movable contact member 18 is moved in the plane thereof from the broken line position thereof, in Fig. 4, to the full line position thereof, thereby moving the actuator 26 relative to the bi-metal 32 to reduce the degree of overlap, as illustrated in said figure. The position of the pin 56 at the maximum penetration of the tapering portion 62 into the aperture 48 is illustrated in Fig. 5, it being noted that the said portion projects outwardly from the collar 68. As illustrated in Fig. 2, the bearing aperture 72 in the casing part 12 is deep enough to accommodate the extended portion of the pin 56.

The adjustment of the pin 56 may be conveniently made with the cover 14 of the casing in position thereon. This may be accomplished by inserting a screw driver into the open-ended aperture 80 in the cover, which remains open until the

circuit breaker is calibrated. After the circuit breaker is calibrated, and in order to prevent the misadjustment thereof, washer 82, preferably formed of fiber-glass or other suitable material, is inserted in the casing cover 14 to close the aperture 80, as illustrated in Fig. 2. Thereafter, any suitable sealing compound 84 may be inserted into the opening in the cover 14 to seal the washer in position.

Figure 6 illustrates another embodiment of the invention. Pursuant thereto, the pivot member 56A is provided with a screw driver slotted end portion 58A, an intermediate threaded tapering portion 62A, and an unthreaded bearing end portion 64A at the other end thereof. The contact member 18A is provided with a threaded pivot aperture 48A which extends to or communicates with the previously mentioned marginal edge opening 50. The tapering portion 62A is in threaded engagement in the pivot opening 48A and the bearing portion 64A is directly engaged in the bearing aperture 72A provided in the casing body 12, it being noted that the portion 58A extends into the aperture 80A provided in the casing cover 14. Therefore, it will be apparent that as the tapering portion 62A is screwed further into the pivot opening 48A, the marginal opening 50 will be distended in the same manner, as previously described, to effect the displacement of the part 52 of the contact member 18A in the plane thereof for adjusting the amount of overlap of the end portion 46 of the actuator 26. This adjustment may take place by inserting a screw driver into the casing opening 80A, prior to closing the latter, for turning portion 58A of the pivot member 48. After the circuit breaker is calibrated, to the desired degree, the opening 80A may be closed by means of the washer 82 and the sealing compound 84, as previously described.

It will be noted that in both of the described embodiments of the present invention, the movable contact member is retained against lateral displacement. In the embodiment illustrated in Fig. 2, the nut 66 and the inwardly extending portion of casing part 14 which defines the aperture 80 therein serve to prevent lateral displacement of the movable contact member 18. In the embodiment illustrated in Fig. 6, the movable contact member 18A is retained against lateral displacement by the inwardly extending casing portions which define the bearing apertures 72A and 80A, respectively.

While we have shown and described the preferred embodiment of our invention, it will be understood that various changes may be made in the present invention without departing from the underlying idea or principles of the invention within the scope of the appended claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. An automatic circuit breaker, comprising a casing having laterally spaced walls provided with aligned bearing portions, a movable contact member, pivot means on which said movable contact member is mounted for pivotal movement between said walls, said pivot means being supported for pivotal movement by said bearing portions of the casing, an actuating member carried by said movable contact member and a current responsive device for operatively connecting said actuating member releasably to said movable contact member for operating the latter except when said current responsive device is disconnected from said actuating member upon overload, and means including interengaging relatively adjustable parts of said pivot means and said movable contact member, respectively, for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload.

2. An automatic circuit breaker, comprising a casing having laterally spaced walls provided with aligned bearing portions, a movable contact member, pivot means on which said movable contact member is mounted for pivotal movement between said walls, said pivot means being supported for pivotal movement by said bearing portions of the casing, an actuating member carried by said movable contact member and a current responsive device for operatively connecting said actuating member releasably to said movable contact member for operating the latter except when said current responsive device is disconnected from said actuating member upon overload, and means including interengaging relatively adjustable parts of said pivot means and said movable contact member, respectively, for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload, one of said walls having an opening at said bearing portion thereof for access to said part of the pivot means for moving the latter axially of the pivot for effecting said adjustment of the parts.

3. An automatic circuit breaker, comprising a casing having laterally spaced walls provided with aligned bearing portions, a movable contact member, pivot means on which said movable contact member is mounted for pivotal movement between said walls, said pivot means being supported for pivotal movement by said bearing portions of the casing, an actuating member carried by said movable contact member and a current responsive device for operatively connecting said actuating member releasably to said movable contact member for operating the latter except when said current responsive device is disconnected from said actuating member upon overload, said pivot means including a member which is internally screw threaded and which has a cylindrical portion turnably supported by one of said bearing portions, a spindle on which said movable contact member is mounted, one end portion of said spindle being in screw threaded engagement with said internally screw threaded member and the opposite end of said spindle being supported by the other of said bearing portions, said movable contact member having an opening therethrough, said opening extending to an edge of the contact member, and said spindle having an axially tapering part passing through said opening in engagement with the wall of said opening, whereby turning of said spindle about its axis relatively to said movable contact member is effective to displace a part of the latter for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload, and interengaging means on said internally screw threaded member and said movable contact member for retaining said members against relative rotation.

4. An automatic circuit breaker, comprising a casing having laterally spaced walls provided with aligned bearing portions, a movable contact member, pivot means on which said movable contact member is mounted for pivotal movement between said walls, said pivot means being sup-

ported for pivotal movement by said bearing portions of the casing, an actuating member carried by said movable contact member and a current responsive device for operatively connecting said actuating member releasably to said movable contact member for operating the latter except when said current responsive device is disconnected from said actuating member upon overload, said pivot means being a spindle extending between said bearing portions and supported thereby, said movable contact member having an opening therethrough, said opening extending to an edge of the contact member, and said spindle having an axially tapering threaded part passing through said opening in threaded engagement with the wall of said opening whereby turning of said spindle about its axis relatively to said movable contact member is effective to displace a part of the latter for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload.

5. An automatic circuit breaker, comprising a casing having laterally spaced walls provided with aligned bearing portions, a movable contact member, pivot means on which said movable contact member is mounted for pivotal movement between said walls, said pivot means being supported for pivotal movement by said bearing portions of the casing, an actuating member carried by said movable contact member and a current responsive device for operatively connecting said actuating member releasably to said movable contact member for operating the latter except when said current responsive device is disconnected from said actuating member upon overload, said pivot means including a member which is internally screw threaded and which has a cylindrical portion turnably supported by one of said bearing portions, a spindle on which said movable contact member is mounted, one end portion of said spindle being in screw threaded engagement with said internally screw threaded member and the opposite end of said spindle being supported by the other of said bearing portions, said movable contact member having an opening therethrough, said opening extending to an edge of the contact member, and said spindle having an axially tapering part passing through said opening in engagement with the wall of said opening whereby turning of said spindle about its axis relatively to said movable contact member is effective to displace a part of the latter for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload, and means for retaining said internally screw threaded member and said movable contact member against relative rotation.

6. An automatic circuit breaker, comprising a casing, a movable contact member in said casing, pivot means for mounting said contact member in the casing for pivotal movement therein, an actuating member, means including a current responsive device for operatively connecting said actuating member releasably to said contact member for actuating the latter, and means including interengaging relatively adjustable parts of said pivot means and said movable contact member, respectively, for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload.

7. An automatic circuit breaker, comprising a casing, a movable contact member in said casing, pivot means for mounting said contact member in the casing for pivotal movement therein, an actuating member, means including a current responsive device for operatively connecting said actuating member releasably to said contact member for actuating the latter, and means including interengaging relatively adjustable parts of said pivot means and said movable contact member, respectively, for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload, said interengaging parts comprising an apertured edge portion of the movable contact member and a tapering portion of said part of the pivot means whereby axial movement of said tapering portion in said apertured portion displaces a part of said movable contact member in relation to said actuating member for the adjustment of said releasable connection.

8. An automatic circuit breaker, comprising a casing, a movable contact member in said casing, pivot means for mounting said contact member in the casing for pivotal movement therein, an actuating member, means including a current responsive device for operatively connecting said actuating member releasably to said contact member for actuating the latter, and means including interengaging relatively adjustable parts of said pivot means and said movable contact member, respectively, for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload, said interengaging parts comprising a recessed edge portion of the movable contact member provided with a threaded aperture and a tapering threaded portion of said part of the pivot means in threaded engagement in said aperture, whereby turning movement of said tapering portion in said apertured portion results in axial movement of said tapering portion in said apertured portion to displace a part of said movable contact member in relation to said actuating member for the adjustment of said releasable connection.

9. An automatic circuit breaker, comprising a casing having laterally spaced walls provided with aligned bearing portions, a movable contact member, pivot means on which said movable contact member is mounted for pivotal movement between said walls, said pivot means being supported for pivotal movement by said bearing portions of the casing, an actuating member carried by said movable contact member and a current responsive device for operatively connecting said actuating member releasably to said movable contact member for operating the latter except when said current responsive device is disconnected from said actuating member upon overload, said pivot means including a member which is internally screw threaded and which has a cylindrical portion turnably supported by one of said bearing portions, means for retaining said internally screw threaded member and said movable contact member against relative rotation, a spindle on which said movable contact member is mounted, one end portion of said spindle being in screw threaded engagement with said internally screw threaded member and the opposite end of said spindle being supported by the other of

said bearing portions, said movable contact member having an opening therethrough, said opening extending to an edge of the contact member, said spindle having an axially tapering part passing through said opening in engagement with the wall of said opening, and means for retaining said movable contact member against lateral displacement, whereby turning of said spindle about its axis causes axial movement of said tapering part relatively to said movable contact member to displace a part of the latter for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload.

10. An automatic circuit breaker, comprising a casing, a movable contact member in said casing, pivot means for mounting said contact member in the casing for pivotal movement therein, an actuating member, means including a current responsive device for operatively connecting said actuating member releasably to said contact member for actuating the latter, and means including interengaging relatively adjustable parts of said pivot means and said movable contact member, respectively, for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload, said interengaging parts comprising an apertured edge portion of the movable contact member and a tapering portion of said part of the pivot means, and means for retaining said movable contact member against lateral displacement, whereby turning of said part of the pivot means about its axis causes axial movement of said tapering portion relatively to said movable contact member to displace a part of the latter for adjusting the releasable connection between said actuating member and said current responsive device whereby to calibrate the circuit breaker for automatic opening thereof upon overload.

11. In a movable contact member for a circuit breaker, said movable contact member having an actuator movably mounted on a part thereof and having a current responsive device releasably engageable with said actuator for releasably latching said actuator to said member for movement of said member by said actuator; pivot means for said contact member, said pivot means and said contact member being provided with interengaging relatively movable portions for displacing said part in said member and thereby moving said actuator in relation to said current responsive device for adjusting the releasably engaged portions of said actuator and said current responsive device.

12. In a movable contact member for a circuit breaker, said movable contact member having an actuator movably mounted on a part thereof and having a current responsive device releasably engageable with said actuator for releasably latching said actuator to said member for movement of said member by said actuator; pivot means for said contact member, said pivot means being provided with means for displacing said part in said member and thereby moving said actuator in relation to said current responsive device for adjusting the releasably engaged portions of said actuator and said current responsive device, said member having provision therein operable in response to said displacing means for facilitating the displacement of said part by said pivot means.

13. In a movable contact member for a circuit breaker, said movable contact member having an actuator movably mounted on a part thereof and having a current responsive device releasably engageable with said actuator for releasably latching said actuator to said member for movement of said member by said actuator; pivot means for said contact member, said pivot means being provided with means for displacing said part in said member and thereby moving said actuator in relation to said current responsive device for adjusting the releasably engaged portions of said actuator and said current responsive device, said member having an opening defined therein at the pivotal axis thereof, said displacing means being disposed in said opening and being adjustably positionable along said pivotal axis to effect said displacement.

14. In a movable contact member for a circuit breaker, said movable contact member having an actuator movably mounted on a part thereof and having a current responsive device releasably engageable with said actuator for releasably latching said actuator to said member for movement of said member by said actuator; pivot means carried by said contact member for pivotal movement thereof, said pivot means being provided with means for displacing said part of said member, said member having an opening therein at the pivotal axis thereof, said displacing means being disposed in said opening and being adjustably positionable along said pivotal axis, and said member having an interrupted peripheral edge portion extending to said opening, said interrupted portion being distended in response to said adjustment of said displacing means, whereby to effect displacement of said part of the member and thereby move said actuator in relation to said current responsive device for adjusting the releasably engaged portions of said actuator and said current responsive device.

15. An automatic circuit breaker comprising a casing, a movable contact member for said circuit breaker contained therein, said movable contact member having an actuator movably mounted on a part thereof and having a current responsive device releasably engageable with said actuator for releasably latching said actuator to said member for movement of said member by said actuator, said part having a distensible portion, and pivot means for said contact member having bearing engagement in said casing, said pivot means being adjustably positionable axially thereof and transversely of said casing and having a portion engaged in said distensible portion for displacing said part in said member in response to said adjustment thereof, whereby to adjust the releasably engaged portions of said actuator and said current responsive device for calibrating the circuit breaker.

16. In a movable contact member for a circuit breaker, said movable contact member having an actuator movably mounted on a part thereof and having a current responsive device releasably engageable with said actuator for releasably latching said actuator to said member for movement of said member by said actuator; pivot means carried by said contact member for pivotal movement thereof, said pivot means being provided with means for displacing said part of said member and thereby moving said actuator in relation to said current responsive device for adjusting the releasably engaged portions of said actuator and said current responsive device, said

displacing means being a tapering portion of said pivot means.

17. In a movable contact member for a circuit breaker, said movable contact member having an actuator movably mounted on a part thereof and having a current responsive device releasably engageable with said actuator for releasably latching said actuator to said member for movement of said member by said actuator; pivot means carried by said contact member for pivotal movement thereof, said pivot means being provided with means for displacing said part in said member, said member having a pivot opening therein and an additional opening at an edge portion thereof in communication with said pivot opening, said displacing means being a tapering portion of said pivot means adjustable transversely of said pivot opening for distending said additional opening, whereby to effect displacement of said part of the member and thereby move said actuator in relation to said current responsive device for adjusting the releasably engaged portions of said actuator and said current responsive device.

18. In a movable contact member for a circuit breaker, said movable contact member having an actuator movably mounted on a part thereof and having a current responsive device releasably engageable with said actuator for releasably latching said actuator to said member for movement of said member by said actuator; a pivot member for said contact member, said pivot member having a threaded end portion and a tapering portion, said contact member having a pivot opening therein and an interrupted peripheral edge portion in communication with said opening, a bearing member carried by said contact member and retained against rotation relative thereto, said bearing member having an internally threaded portion in registry with said opening, said tapering portion being disposed in said opening and said threaded end being engaged in said threaded portion, whereby, as said pivot member is threaded into said bearing member, said tapering portion thereof effects displacement of said part of the contact member and thereby moves said actuator in relation to said current responsive device for adjusting the releasably engaged portions of said actuator and said current responsive device.

19. In a movable contact member for a circuit breaker, said movable contact member having an actuator movably mounted on a part thereof and having a current responsive device releasably engageable with said actuator for releasably latching said actuator to said member for movement of said member by said actuator; a pivot member for said contact member, said pivot member having a tapering threaded portion and a bearing end extending therefrom, said contact member having a threaded pivot opening therein and an interrupted peripheral edge portion in communication with said opening, said tapering portion being threaded into said opening for movement transversely of said contact member whereby to effect displacement of said part of the contact member and thereby to move said actuator in relation to said current responsive device for adjusting said releasably engaged portions of said actuator and said current responsive device.

20. In combination, a movable contact member for a circuit breaker and a pivot member therefor, said contact member having a pivot opening defined therein and a recessed edge portion in communication with said opening, said pivot member having an axially tapering portion engaged in said opening and movable axially of said pivot member for enlarging said pivot opening whereby to enlarge said recess for calibrating the circuit breaker.

21. A pivot member for the pivot opening of a movable contact member in a circuit breaker, said pivot member having a tapering portion for engagement in said opening for enlarging the latter, and a bearing portion at each end of said tapering portion, said bearing portions being of constant diameter, respectively.

22. A pivot member for the pivot opening of a movable contact member in a circuit breaker, said pivot member having a tapering portion for engagement in said opening for enlarging the latter, and a bearing portion of constant diameter extending from said tapering portion.

23. A pivot member for the pivot opening of a movable contact member in a circuit breaker, said pivot member having a tapering portion for engagement in said opening for enlarging the latter, and a bearing portion of constant diameter extending from said tapering portion, said tapering portion being unthreaded and said bearing portion being threaded.

24. A pivot member for the pivot opening of a movable contact member in a circuit breaker, said pivot member having a tapering portion for engagement in said opening for enlarging the latter, and a bearing portion extending from said tapering portion, said tapering portion being threaded and said bearing portion being unthreaded.

THOMAS M. COLE.
PAUL M. CHRISTENSEN.

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