United States Patent

[11] **3,614,685**

[72] Inventors **James P. Ellsworth;**
Robert H. Flick, both of Beaver, Pa.

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[73] Assignee **Westinghouse Electric Corporation**
Pittsburgh, Pa.

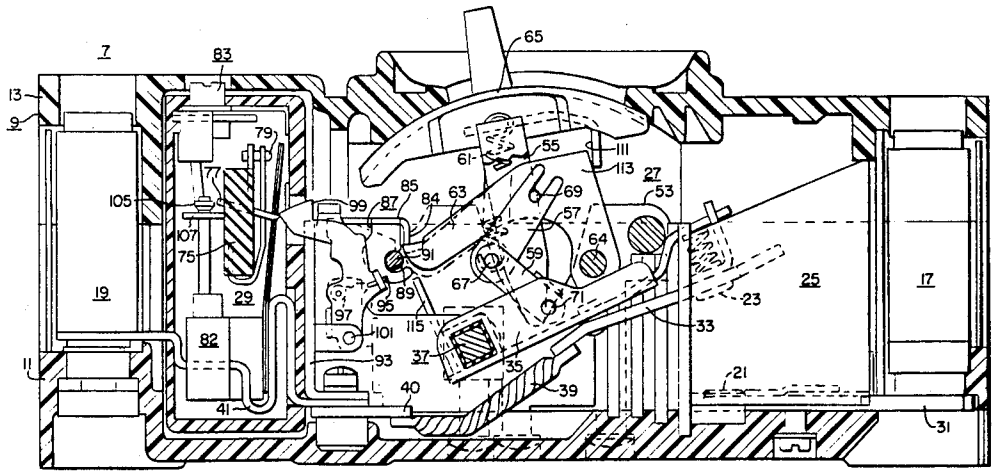
[54] **CIRCUIT BREAKER WITH HANDLE-INDICATING MEANS**
8 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **335/166**
[51] **Int. Cl.** **H01h 9/20,**
H01h 1/52
[50] **Field of Search** 335/166,
43, 35, 170, 172, 174

[56] **References Cited**
UNITED STATES PATENTS
3,525,959 8/1970 Ellsworth et al. 335/166

Primary Examiner—Harold Broome
Attorneys—A. T. Stratton, C. L. McHale and W. A. Elchik

ABSTRACT: An improved circuit breaker comprises means operating, when the contacts are welded closed and the trip member is released, to block the trip member against movement to a resetting position and to maintain the operating handle in the closed position to thereby provide a true indication of the closed condition of the breaker contacts.



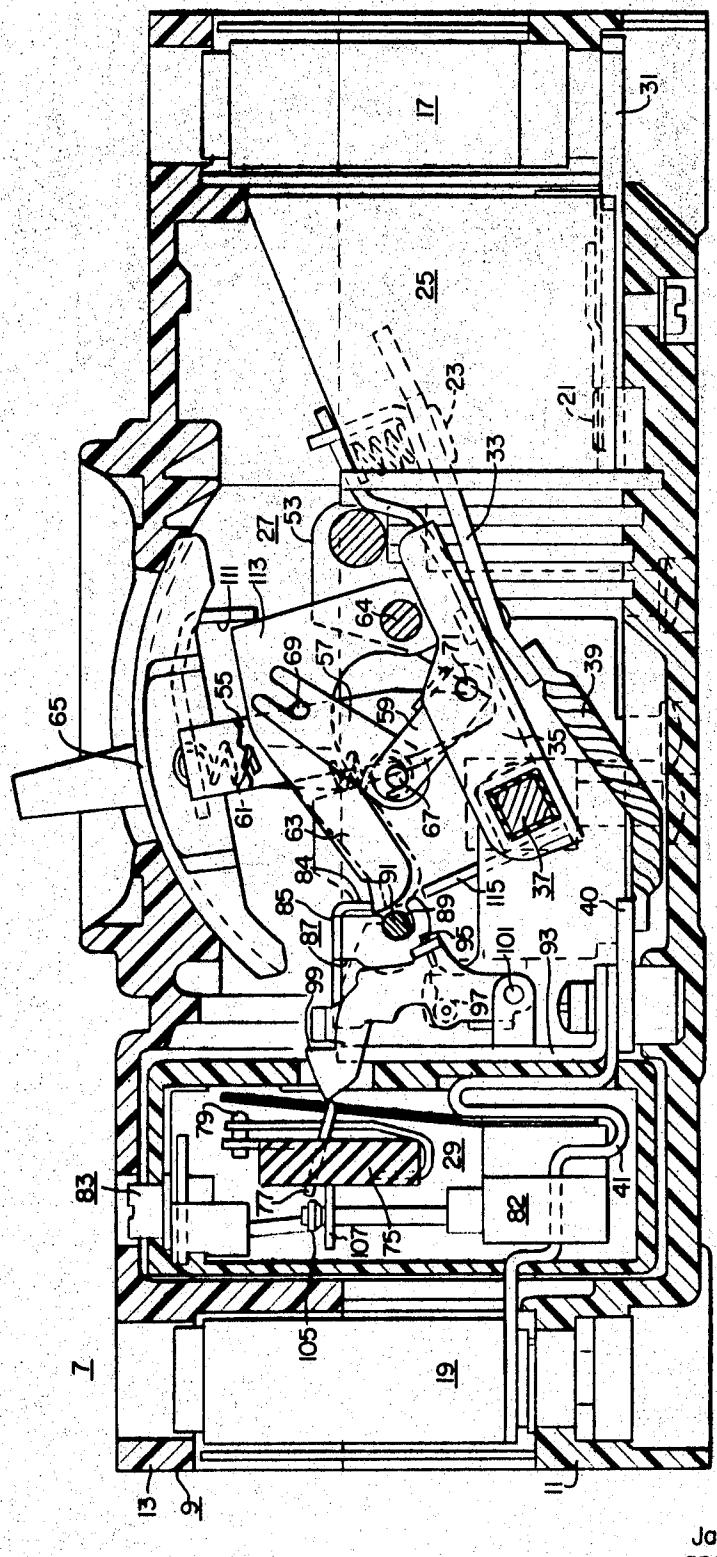


FIG. 1.

INVENTORS
James P. Ellsworth
and Robert H. Flick

BY
William A. Clohirk
ATTORNEY

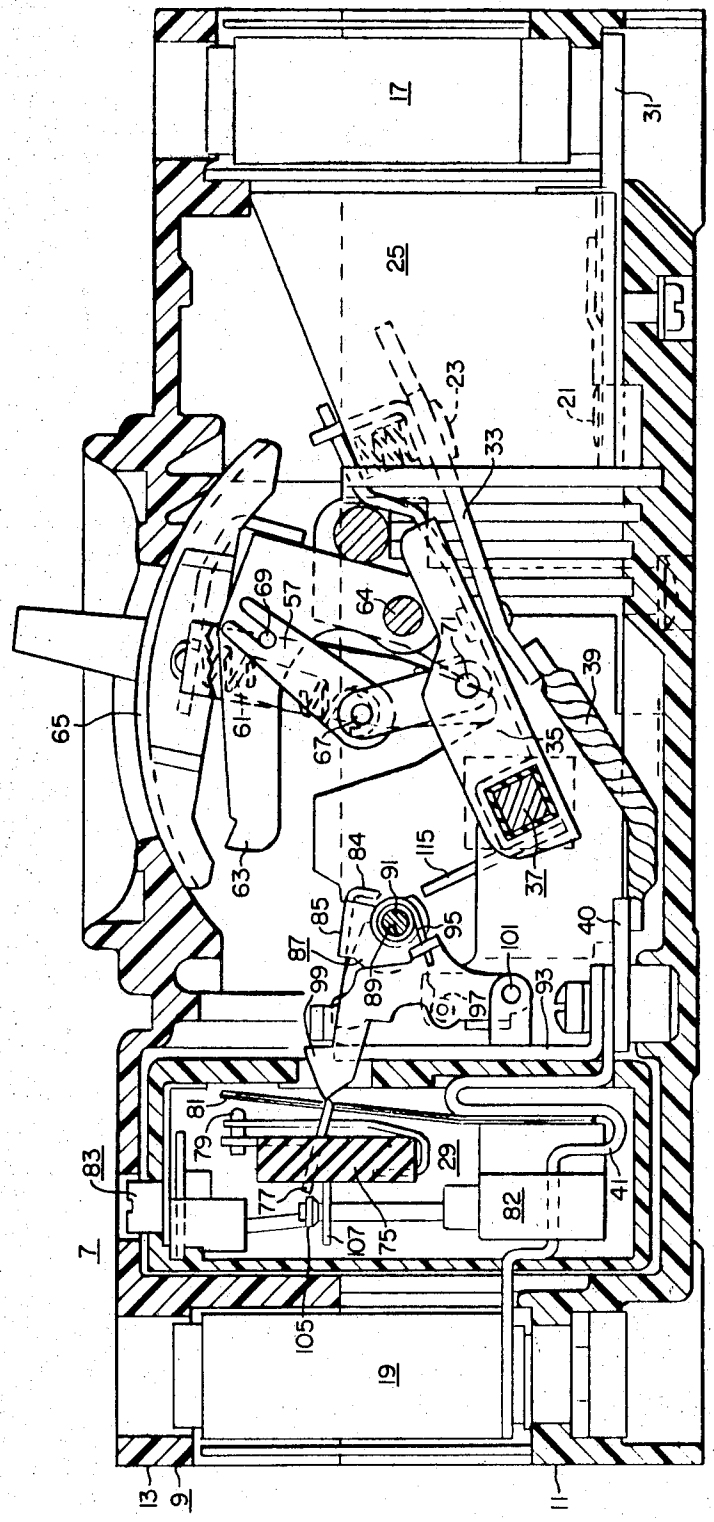

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FIG. 2.

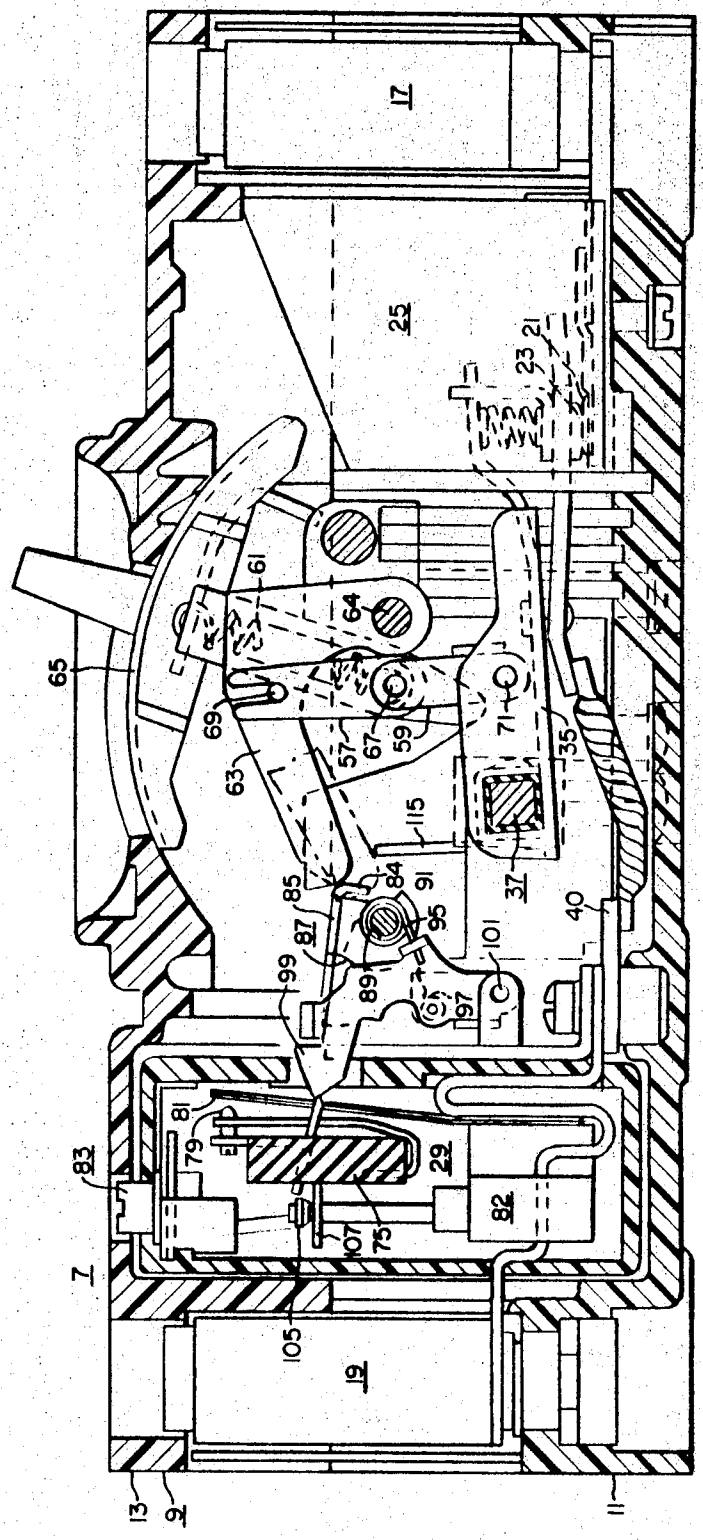
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FIG. 3.

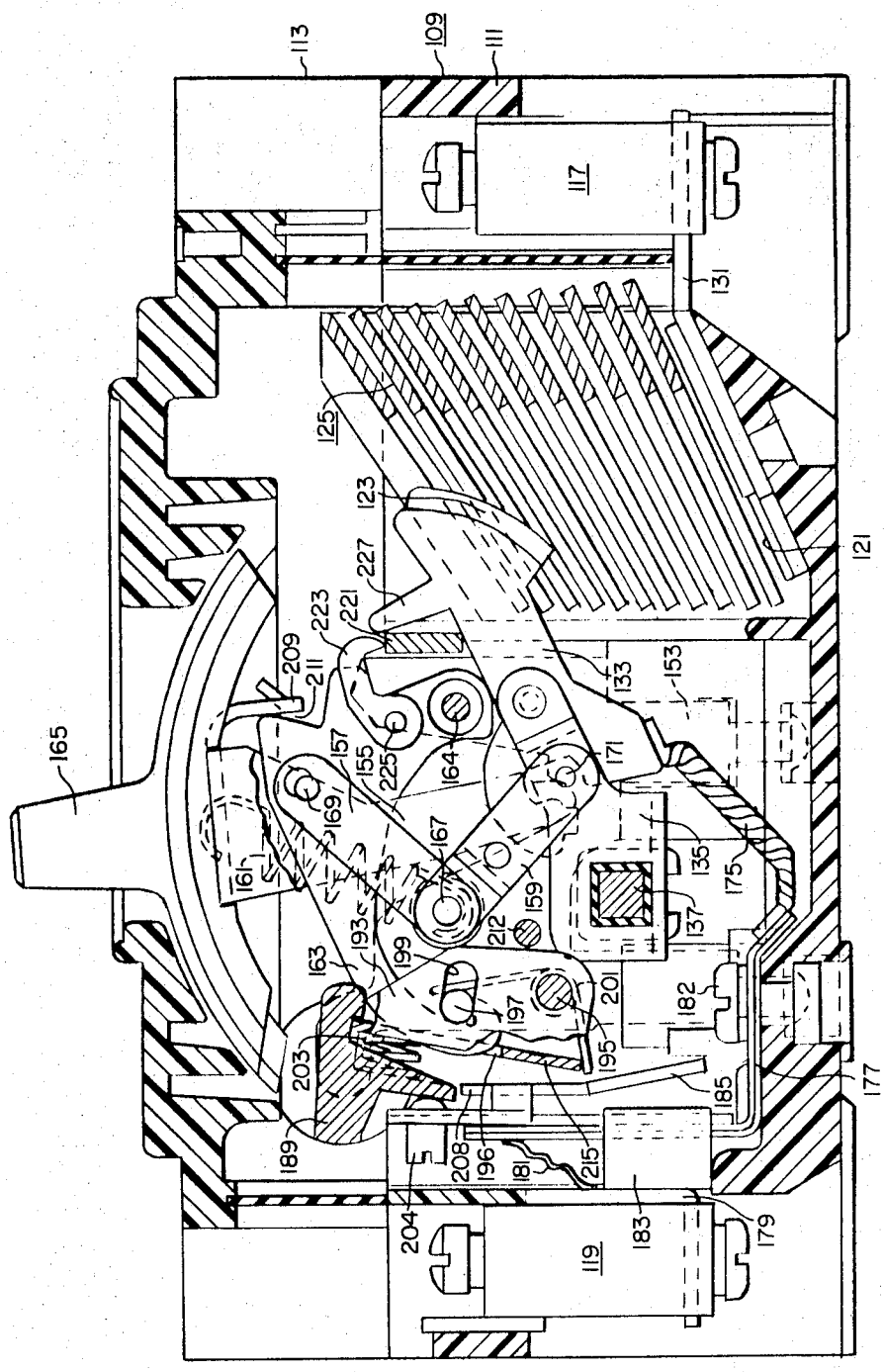
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FIG. 4.

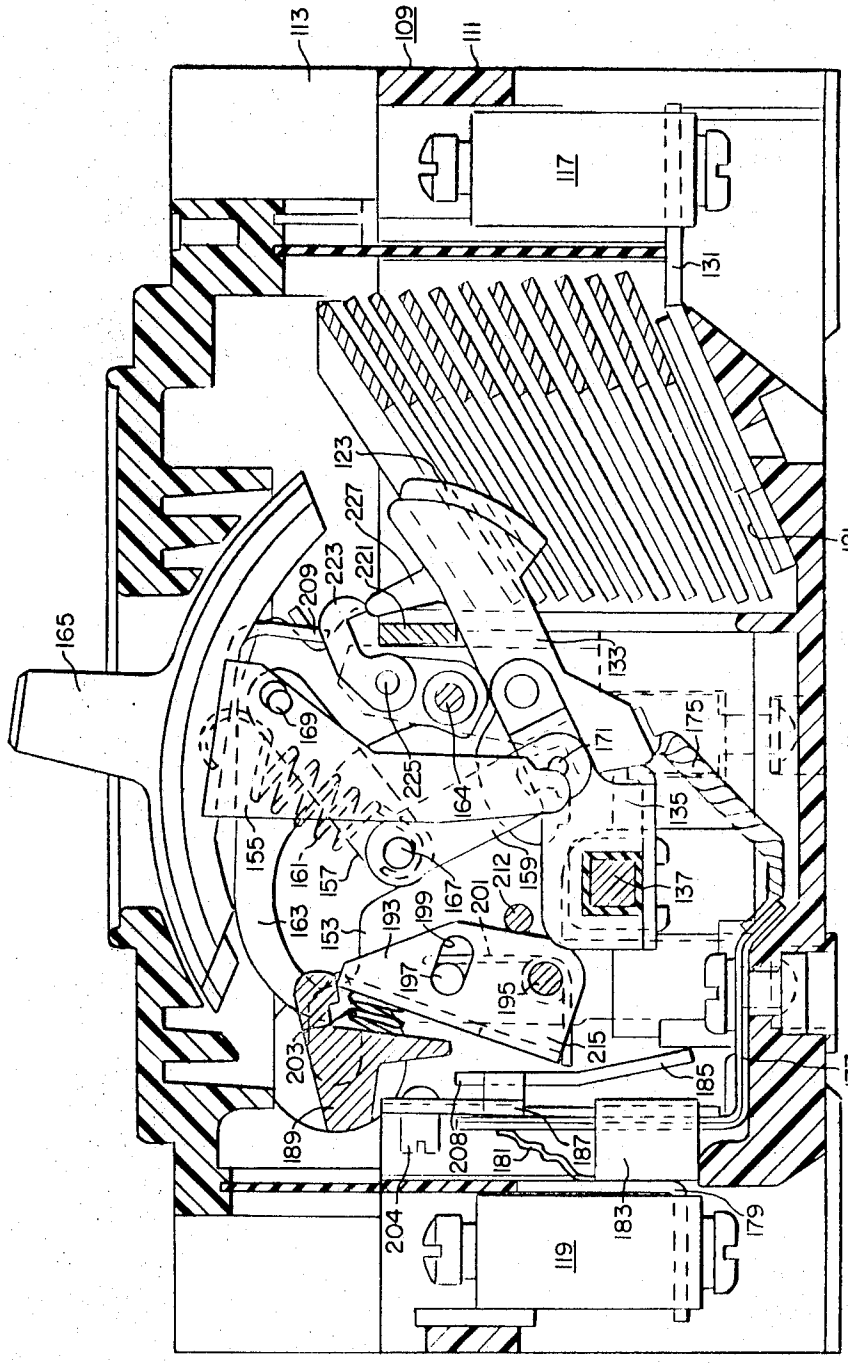
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FIG. 5.

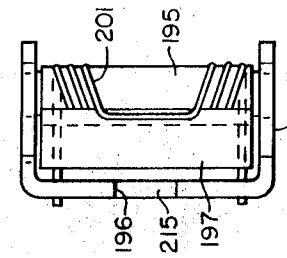
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FIG. 7.

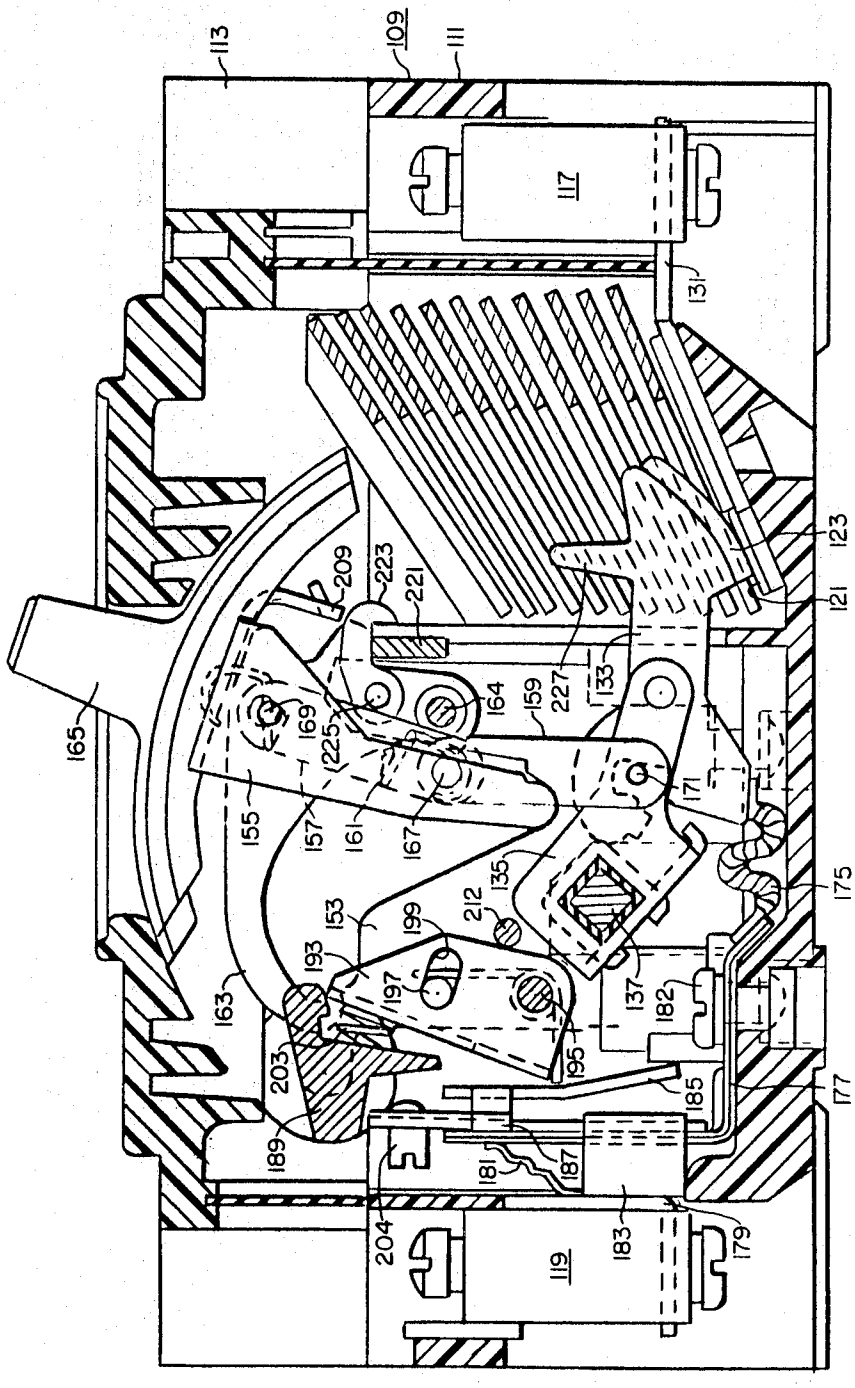
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FIG. 6.

CIRCUIT BREAKER WITH HANDLE-INDICATING MEANS

CROSS-REFERENCE TO RELATED APPLICATIONS

Circuit breakers of the general type herein disclosed are disclosed in the application of Eugene J. Walker et al., Ser. No. 726,474, filed May 3, 1968, now U.S. Pat. No. 3,555,888, and in the application of Nick Yorgin et al., Ser. No. 621,321, filed Mar. 7, 1967 now U.S. Pat. No. 3,460,075.

A circuit breaker with means for preventing a resetting operation when the contacts are welded closed and for maintaining the operating handle in the "on" position when the contacts are welded closed is disclosed in the application of James P. Ellsworth et al., Ser. No. 781,514, filed Dec. 5, 1968 now U.S. Pat. No. 3,525,959.

BACKGROUND OF THE INVENTION

1. Field of the Invention

Circuit breakers of the type comprising latch and trip means automatically releasable to effect tripping operations and manually resettable following tripping operations.

2. Description of Prior Art

In circuit breakers of the type disclosed in the above-mentioned applications Ser. No. 726,474 now U.S. Pat. No. 3,555,888 and Ser. No. 621,321 now U.S. Pat. No. 3,460,075 a trip member, which is latched by latch means, is automatically released upon the occurrence of certain overload current conditions to move to a tripped position to effect automatic opening of the associated breaker. The trip member is reset by movement of the operating handle toward the open or "off" position thereof during which movement the handle engages the trip member and moves the trip member to a position wherein the trip member engages the latch means, near the end of which movement the latch means latches the trip member in the reset or latched position. Following the resetting operation the operating handle may be released and the breaker will be in the reset or open position with the handle in the open or "off" position.

SUMMARY OF THE INVENTION

A circuit breaker comprises a stationary contact and a movable contact arm structure carrying a movable contact thereon, which contact arm structure is movable between open and closed positions to open and close the contacts. Latch and trip means comprises a releasable trip member latched by a latch member. An operating mechanism comprises a toggle connected at one end thereof to the movable contact arm structure and at the other end thereof to the trip member, and an operating spring that is connected between the knee pivot of the toggle and a manually operable operating member. With the trip member in the latched position, the operating member is movable from a closed or "on" position to an open or "off" position to change the line of action of the operating spring whereupon the operating spring collapses the toggle to move the contact arm structure to the open position. The operating member is movable from the "off" to the "on" position to change the line of action of operating spring whereupon the operating spring operates to erect the toggle to move the contact arm structure to the closed position. A trip device is automatically operable upon the occurrence of overload current conditions above a predetermined value to release the releasable member whereupon the operating spring operates to move the releasable trip member to a tripped position to cause collapse of the toggle and opening of the contact arm. Following a tripping operation, the releasable trip member must be reset or relatched before the circuit breaker can be operated. The trip member is reset by movement of the operating member toward the "off" position during which movement the operating member engages the trip member to move the trip member toward the latched position and near the end of this movement the trip member engages the latch moving the latch until the trip member reaches a reset position wherein the latch latches the trip member so

that when the operating handle is released the circuit breaker will be latched or reset. In the reset position the operations spring maintains the handle in the "off" position with the circuit breaker contacts in the open position and the toggle in the collapsed condition. Upon the occurrence of a tripping overload when the contacts are welded closed the trip device will operate to effect release of the releasable trip member and the operating spring will move the trip member toward the tripped position; but the weld will prevent movement of the contact arm structure to the open position. The breaker is constructed such that in this condition the operating spring will maintain the operating member in the "on" or closed position providing a visual indication that the circuit breaker contacts are in the closed position. Means is provided to block movement of the releasable trip member to the tripped position so that if an attempt is made to reset the trip member with the contacts welded closed the trip member is blocked from moving to the reset position and upon release of the handle of the operating member the operating member will be returned by the spring to the "on" or closed position. Thus, the operating member, and handle thereof, will be maintained in the "on" or closed position providing an external visual indication that the contacts are welded closed, and an operator will not be able to put the operating member in a maintained open position so long as the contacts are welded closed. In one embodiment, the blocking means comprises a bar that is movable with the movable contact structure and that will block movement of the releasable trip member to the latching position if the contacts are welded closed and the trip member is unlatched. In the other embodiment a latch member is pivotally mounted on the releasable trip member to engage a stationary bar to latch the releasable trip member against movement to the reset position when the contacts are welded closed and the trip member is released. The movable contact arm comprises a projection that engages the pivoted latch to move the latch to an unlatching position when the trip member is released and the contacts are not welded closed so that the contact arm in moving to the open position prevents latching by the pivoted latch member to thereby permit movement of the trip member to the latched or reset position.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a side sectional view, with parts broken away, illustrating the center pole of a three-pole circuit breaker constructed in accordance with principles of this invention;

FIG. 2 is a side sectional view, with parts broken away, illustrating the mechanism of FIG. 1 is the tripped-open position;

FIG. 3 is a view similar to FIG. 2 illustrating the mechanism in the contact-welded position following release of the trip member;

FIG. 4 is a side sectional view, with parts broken away, through the center pole of a three-pole circuit breaker illustrating another embodiment of the invention;

FIG. 5 is a view similar to FIG. 4 with the parts in the tripped-open position;

FIG. 6 is a view similar to FIG. 5 illustrating the position of the parts with the contacts welded closed and the trip member released; and

FIG. 7 is a plan view of the roller latch member seen in FIGS. 4–6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1 of the drawings, a circuit breaker 7 shown therein comprises an insulating housing 9. The insulating housing 9 comprises a base 11 and a removable cover 13 suitably secured to the base 11. The circuit breaker is a three-pole circuit breaker with insulating barrier means, formed with the base and cover, forming three adjacent compartments for housing the three pole units. A pair of terminals 17 and 19 are provided in cavities at opposite ends of each pole unit for enabling connection of each pole unit in an electric circuit.

The circuit breaker is of the type more specifically described in the above-mentioned patent application Ser. No. 726,474, now U.S. Pat. No. 3,555,888 and in the patent to Stevenson Jr. et al., U.S. Pat. No. 3,260,822. The circuit breaker comprises a stationary contact 21, a movable contact 23 and an arc-extinguisher 25 for each pole unit. A common operating mechanism 27 is provided in the center pole unit compartment for simultaneously actuating the three movable contacts to open and closed positions. A thermal and magnetic trip device 29 serves to effect automatic opening of the breaker contacts in response to overload currents in a manner to be hereinafter described.

The terminal 17 is disposed at the outer end of a conductor 31 which extends into the housing and supports the stationary contact 21. The movable contact 23 is mounted on a rigid contact arm 33 that is supported on a switch arm 35 that is connected to rigid insulated tie bar 37. The tie bar 37 extends across all three-pole units of the breaker and supports the switch arms of the several pole units for unitary movement. The tie bar 37 is suitably supported in the housing for movement about an axis to open and closed positions. The contact arm 33 is connected, by means of a flexible conductor 39, to a conductor 40 that is suitably secured to the base 11. A conductor 41, which is suitably secured to the conductor 40 at one end thereof, extends through the trip unit 29 and is connected, at its outer end, to the terminal 19.

The operating mechanism 27 is disposed in the center compartment of the housing and is supported on a pair of spaced frame members 53, (only one being shown) which are secured to the base 11. The operating mechanism comprises an inverted generally U-shaped operating member 55, a toggle comprising toggle links 57, 59, a pair of overcenter springs 61 and a releasable trip member 63 that is latched by the trip device 29. The operating member 55 is pivotally supported at the inner ends of the legs thereof in slots in the spaced supporting plates 53. The cradle or trip member 63 is pivotally supported on a pin 64 that is supported between the spaced plate members 53. An insulating operating handle 65, that is supported on the outer end of the operating member 55, extends through a suitable opening in the front of the cover 9 to permit manual operation of the breaker.

The toggle links 57 and 59 are pivotally connected together by means of a knee pivot 67. The front end of the link 57 is pivotally connected to the trip member 63 by means of a pin 69. The back end of the link 59 is pivotally connected to the switch arm 35, for the center pole unit, by means of a pin 71. The overcenter springs 61 are connected under tension between the outer end of the operating member 55 and the knee pivot 67 of the toggle 57, 59 in a well-known manner.

The circuit breaker is manually operated to the open position seen in FIG. 1 by counterclockwise movement of the handle 65 to the open or "off" position, which movement moves the overcenter springs 61 to cause collapse of the toggle 57, 59 and opening movement of the switch arms 35 for all of the pole units in a well-known manner. The breaker is manually closed by reverse or clockwise movement of the handle 65 to the "on" or closed position which movement moves the operating springs 61 to erect the toggle 57, 59 to thereby move the switch arms 35 for all of the pole units to the closed position in a well-known manner.

The trip device 29 is of the type more specifically described in the above-mentioned application Ser. No. 726,474 now U.S. Pat. No. 3,555,888. The trip device comprises an insulating trip bar 75 having a latch part 77 embedded therein and a calibrating screw 79 carried thereon. The trip bar 75 is supported for pivotal movement about an axis normal to the plain of the paper as seen in FIG. 1. An elongated bimetal 81 is supported at the lower end thereof on the conductor 41 to provide thermal-tripping operations. An electromagnetic structure 82, that is adjustable by means of an adjusting structure 83, is provided to be magnetically energized by the current in the conductor 41 to effect magnetic tripping operations. The trip bar 75, which is common to all three-pole units, is supported to be actuated by the bimetal 81 or magnetic trip 82 from any of the three-pole units of the circuit breaker.

The releasable trip member 63 is latched against clockwise movement by a latch member 85 of the latch 21 structure 87.

The latch structure 87 is a standard type of latch structure that is well known in the art of molded-case-type circuit breakers. The latch structure 87 comprises the latch 85 having slots means 89 therein that receives a pin 91, that is mounted on a supporting bracket 93, to mount the latch 85 for pivotal and sliding movement on the pin 91. The latch 85 is biased in a clockwise direction by a spring 95. The latch 85 (FIG. 1) is latched against counterclockwise movement by a roller 97 that is supported on a latch 99 that is pivotally mounted on the supporting bracket 93 by means of a pin 101. The latch 99 engages the latch piece 77 on the trip bar 75 to prevent counterclockwise movement of the latch 99. The torsion spring 95 biases the latch 99 in a clockwise direction. When the trip bar 75 is rotated counterclockwise to the tripping position, the latch piece 77 releases the latch 99 which moves counterclockwise to release the trigger latch 85 which moves counterclockwise to thereby release the releasable trip member 63 which then moves clockwise to trip the breaker. The torsion spring 95 resets the latches 99, 85, and a suitable spring means resets the trip bar 75. When the breaker is reset, the trip member 63 wipes past the latch 85, with the slot 89 permitting sliding movement of the latch 85, to the reset position wherein the latch 85 again latches the releasable trip member 63.

The circuit breaker is automatically tripped by operation of the trip bar 75 in a counterclockwise direction to a tripped position to release the latch 99. The trip bar 75 is rotated to the tripped position by means of either a thermal actuation or an electromagnetic actuation. The thermal actuation occurs upon the occurrence of a sustained lesser overload current, above a first predetermined value, which heats the bimetal 81 that flexes to the left (FIG. 1) to engage the calibrating screw 79 to rotate the trip bar 75 to the tripped position. The thermal trip occurs with a time delay. An electromagnetic trip occurs by operation of the electromagnet 82 which draws a pin 105 downward to operate against a projection 107 on the trip bar 75 to rotate the trip bar 75 to the tripped position. The electromagnet 82 is operated instantaneously upon the occurrence of overload current conditions above a second predetermined value higher than the first predetermined value in a manner well known in the art. Upon the occurrence of either a thermal or magnetic actuation, the trip bar 75 rotates counterclockwise to move the latch portion 77 to release the latch 99 whereupon the latch 99 rotates counterclockwise to release the trigger latch 85 which moves counterclockwise to release the trip member 63. Upon release thereof, the trip member 63 is rotated in a clockwise direction about the pin 64 under the force of the springs 61. This movement changes the line of action of the springs 61 which operate to collapse of the toggle 57, 59 to thereby pivotally move the switch arms 35 for all three-pole units to the open position shown in FIG. 2.

Following an automatic tripping operation, it is necessary to reset and relatch the circuit breaker mechanism before the contacts can be closed. Resetting is achieved by moving the handle 65 to a position slightly past the full "off" or open position. During this movement a portion 111 on the operation member 55 engages a shoulder portion 113 on the trip member 63 to rotate the trip member 63 in a counterclockwise direction. As can be understood with reference to FIGS. 1–3, the torsion spring 95 biases the trigger latch 85 in a clockwise direction so that the latching portion 84 of the trigger latch 85 is at a lower position in FIGS. 2 and 3 than in FIG. 1. When the contacts are not welded so that the contact arm moves to the open position upon release of the trip member 63, near the end of the resetting movement the latch end of the trip member 63 engages the latch 85 by sliding the latch 85 to the left, and the trip member wipes by the latch 85 whereupon the spring 95 returns the latch 85 to the right to the latching position. Thereafter, upon release of the handle 65, the operating springs 61, operating against the toggle link

57 to bias the trip member 63 in a clockwise direction, will move the trip member 63 upward moving the latch 85 to the position seen in FIG. 1 in which position the latch 85 is latched, in the manner hereinbefore specifically described, to thereby latch the trip member 63. The circuit breaker may then be manually operated in the same manner as was hereinbefore described.

A solid rigid blocking member 115 is fixedly secured to the tie bar 37 in the center pole unit to block movement of the trip member 63 to a resetting position if the contacts 21, 23 are welded closed when the releasable trip member 63 is released. As can be seen in FIG. 3, the contacts 21, 23 are welded closed and the trip member 63 is shown in the tripped position with the latch 85 rotated slightly in a clockwise direction to position the latch portion 84 thereof lower than the position of FIG. 1. If an attempt is made to reset the releasable trip member 63, the blocking member 115 will engage the undersurface of the trip member 63 to prevent movement of the releasable trip member 63 to the lower position below the latch 85. Thus the trip member 63 cannot reach a position that will permit latching thereof by means of the latch 85. The position that the trip member 63 must reach in order to effectively be relatched, is shown in broken lines in FIG. 1 to illustrate that the trip member 63 cannot be reset if the contacts 21, 23 are welded closed. The line of force of the tension operating springs 61, relative to the pivot point of the operating member 55 is such that when the contacts are in the welded closed position and the trip member 63 is released the handle 65 will be biased to the closed position (FIG. 3). Thus, the handle 65 provides an external indication that the contacts 21, 23 are in the closed position. If an attempt is made to reset the trip member 63, the trip member 63 will not reset because of the blocking action of the member 115, and upon release of the handle 65, the springs 61 will return the trip member 63 and handle 65 to the position seen in FIG. 3 wherein the handle 65 provides an external visual indication that the contacts 21, 23 are welded closed.

Another embodiment of the invention is disclosed in FIGS. 4–6. Referring to these figures, the circuit breaker shown therein is of the type that is described in the above-mentioned application Ser. No. 621,321 now U.S. Pat. No. 3,460,075. The circuit breaker is a three-pole circuit breaker comprising an insulating housing 109 that comprises a base 111 and cover 113, which housing is separated into three adjacent compartments for housing the three-pole units of the circuit breaker. The sectional view in FIGS. 4–6 is through the center-pole unit of the three-pole breaker. A pair of terminals 117, 119 are supported at opposite ends of the breaker for each pole unit. There is a separate stationary contact 121 and separate movable contact 123 and separate arc-extinguishing structure 125 for each pole unit. Each stationary contact 121 is supported on a conductor 131 that extends out to one end of the breaker and is connected at the outer end to the associated terminal connector 117. Each of the stationary contacts is supported on a contact arm 133 that is pivotally supported on a switch arm 135 that is fixedly secured to a common insulating tie bar 137. The tie bar 137 extends across the three-pole units and is supported for movement about an axis normal to the plane of the paper as seen in FIGS. 4–6. A pair of supporting plates 153 are mounted in the center pole unit for supporting an operating mechanism. An inverted U-shaped operating member 155 is pivotally supported, at the ends of the legs thereof of the supporting plates 155. A toggle, comprising toggle links 157, 159, is supported in the center pole unit and connected to the switch arm 135 of the center pole unit. A releasable trip member 163 is pivotally supported on the plates 153 by means of a pin 164. A pair of overcenter springs 161 are connected under tension between the knee pivot 167 of the toggle 157, 159 and the bight portion of the inverted generally U-shaped operating member 155. An insulating operating handle 165 is supported on the front of the operating member 155 to provide for manual operation of the breaker. The toggle link 157 is pivotally connected to the trip member 163 by means of a pin 169 and the toggle link 159 is pivotally connected to the center pole switch arm 135 by means of a pin 171. A flexible conductor 175 is connected at one end to the contact arm 133 and at the other end to a generally L-shaped bimetal conductor 177 that is connected to a conductor 179 by means of a flexible conductor 181. The terminal 119 is connected to the conductor 179. The bimetal 177 is secured to the base by means of a bolt 182. A U-shaped magnetic yoke 183 is supported on the conductor 179 with the opposite legs thereof on opposite sides of the bimetal 177, and a magnetic armature 185 is pivotally supported on the base 111, at 187, for pivotal movement relative to the stationary magnetic member 183.

An insulating trip bar 189, which extends across all three-pole units, is supported for movement about an axis normal to the plane of the paper as seen in FIGS. 4–6. The trip bar 189 engages a latch member 193 that is supported on the frame 153 for pivotal movement about a pin 195. The latch member 193 comprises a pair of connected sidewalls with the trip member 163 moving in a slot 196 between the sidewalls to the tripped and reset position. A roller latch 197 is mounted on a pin which fits in slots 199 in the sidewalls of the latch member 193. A torsion spring 201 biases the roller member 197 to the left, and a compression spring 203 is supported between the trip bar 189 and latch 193 to bias the trip bar 189 in latching (clockwise) direction and the latch member 193 in unlatching (clockwise) direction.

With the contacts in the closed position, the circuit through each pole unit extends from the terminal 117 through the conductor 131, contact 121, contact 123, contact arm 133, flexible conductor 175, bimetal conductor 177, flexible conductor 181, conductor 179 to the other terminal 119.

With the trip member 163 in the latched position shown in FIG. 4 the circuit breaker is operated between open and closed positions by operation of the handle 165. Upon movement of the handle 165 from the "off" or open position seen in FIG. 4 in a clockwise direction to the "on" or closed position the operating member 155 moves the springs 161 to cause erection of the toggle 157, 159 to thereby simultaneously move the three switch arms 135 to the closed position. Upon reverse or counterclockwise movement of the handle 165 from the closed position to the open position the springs 161 are moved to cause collapse of the toggle 157, 159 to simultaneously move the three switch arms 135 to the open position seen in FIG. 4.

When the contacts are in the closed position and a sustained lesser overload above a first predetermined value occurs in any of the pole units the associated bimetal 177 becomes heated and flexes, with a time delay, to the right whereupon a calibrating screw 204 at the upper end of the bimetal engages the associated depending projection 206 of the trip bar 189 to rotate the trip bar 189 in a counterclockwise (FIG. 4) direction to effect a thermal tripping operation. Upon the occurrence of a high overload or short circuit, above a second predetermined value higher than the first predetermined value, in any of the pole units the associated armature 185 is immediately pivoted toward the associated magnet member 183 and a projection 208 on the upper side of the pivot of the armature 185 engages the associated depending projection 206 of the trip bar 189 to rotate the trip bar 189 in a counterclockwise direction to effect an instantaneous magnetic tripping operation.

The circuit breaker is shown in FIG. 4 in the latched or reset and "off" or open position. The contacts can be closed by operation of the handle 165 in the manner hereinafter set forth. With the releasable trip member 163 in the latched position and the contacts in the closed position, the circuit breaker is tripped open by rotation of the trip bar 189 in the manner hereinbefore set forth. Upon rotation of the trip bar 189 in a counterclockwise direction to the tripped position the trip bar 189 will release the latch member 193 hereupon the latch member 193 is free to move in a clockwise direction. Upon release of the latch member 193, the springs 161 and 203

operate to rotate the releasable trip member 163 in a clockwise direction moving the latch member 193 to the tripped position seen in FIG. 5. A stop pin 212 limits movement of the latch member 193 in the tripped position. Upon release of the latch member 193 the latch member 193 releases the trip member 163 and the tension springs 161 move the trip member 163 clockwise about the pivot 164 to the tripped position. Upon movement of the trip member 163 to the tripped position the line of action of the springs 161 is moved to cause collapse of the erected toggle 157, 159 to thereby effect simultaneous movement of the switch arms 135 to the tripped open position seen in FIG. 5.

Upon the occurrence of a tripping operation the springs 161 move the operating handle 165 to a tripped position (FIG. 5) intermediate the "off" and "on" positions to provide a visual indication that the circuit breaker has been tripped. A projection 209 on the operating member 155 engages a shoulder 211 on the trip member 163 to limit movement of the handle 165 toward the "off" position (FIG. 5).

Before the circuit breaker can be manually operated after an automatic tripping operation, the releasable trip member 163 must be reset and relatched. Resetting is achieved by movement of the handle 165 from the intermediate position seen in FIG. 5 to a position slightly past the full "off" or open position. During this movement, the part 209 on the operating lever 155, engaging the shoulder 211 on the trip member 163, rotates the trip member 163 in a counterclockwise direction about the pivot 164. During this movement, the latching end of the trip member 163 moves in the slot 196 (FIG. 7) between the sidewalls of the latch member 193 and the end port of the trip member 163 wipes past the roller 197 which moves in the slot 199, and when the end part of the releasable trip member 163 passes the roller 197 the torsion spring 201 moves the roller back to the latching position. During this resetting movement of the releasable trip member 163, the end part thereof engages a surface 215 (FIG. 7) on the latch member 193 moving the latch member 193 in a counterclockwise direction about the pivot 195. As the latch member 193 clears the end or hook portion of the trip bar 89, the spring 203 operates against the trip bar 189 to move the trip bar 189 in a clockwise direction to the latching position wherein the hook projection or latch part thereof again engages the latch member 193. Thereafter, the handle 165 can be released and the springs 161, operating through the link 157, bias the trip member 163 clockwise with the latch part of the trip member 163 engaging the roller 197 in the latched position seen in FIG. 4. Clockwise movement of the latch member 193 is limited by engagement of the latch portion of the trip bar 189. After the circuit breaker is reset, the handle 165 can be manually moved between the "off" and "on" positions to operate the contacts in the manner hereinbefore described.

The circuit breaker comprises means for maintaining the handle 165 in the "on" or closed position when the trip member 163 is released with the contacts 121, 123 welded in the closed position, and blocking means for preventing a resetting operation of the trip member 163 whereby the external handle 165 will provide a true indication that the contacts 121, 123 are closed. A rigid stop bar 221 is fixedly supported in the center pole unit on the sideplates 153. When the circuit breaker trips clockwise (FIG. 5) movement of the trip member 163 is stopped when the trip member 163 engages the stop bar 221. A latching member 223 is pivotally mounted on the trip member 163 by means of a pin 225. The contact arm 133 in the center pole unit has a rigid projection 227 thereon. Upon the occurrence of a tripping operation, when the contacts are not welded closed, the contact arms will move to the open position and the projection 227 on the center pole contact arm will engage the latching member 223 to prevent the latching member 223 from latching onto the bar 221. Thus, when the handle 165 is operated to reset the breaker the trip member 163 is free to move counterclockwise to the reset position thereof. When the trip member 163 is releases and the contacts are welded in the closed position, the parts will move to the position seen in FIG. 6. In this position, the projection 227 on the contact arm 133 does not operate against the latching member 223 and the latching member 223 will engage the bar 221 to prevent counterclockwise movement of the trip member 163. The line of force of the operating springs 61 (FIG. 6) maintains the operating handle 165 in the "on" or closed position to provide a true indication that the contacts 121, 123 are closed, and the circuit breaker cannot be reset since the latch between the latching member 223 and latch bar 221 will prevent counterclockwise movement of the trip member 163 to the reset position. Thus, an operator cannot reset the breaker and the handle 165 provides a true indication that the contacts are in the closed position.

We claim:

1. A circuit breaker comprising a stationary contact, a movable contact arm structure carrying a movable contact thereon and being movable between open and closed positions to open and close said contacts, a releasable trip member supported at one end thereof for pivotal movement and comprising a latch portion at the free end thereof, latch means in a latching position latching said latch portion to latch said trip member in a latched position, a toggle structure connected between said movable contact arm structure and said trip member an operating member, spring means connected between said toggle structure and said operating member, with said trip member in the latched position said operating member being movable from an open position wherein said toggle is collapsed to a closed position to operate said spring means whereupon said spring means operates said toggle to an erected condition to move said contact arm structure to close said contacts, with said trip member in the latched position said operating member being movable from said open position to said closed position to operate said spring means whereupon said spring means operates said toggle to a collapsed condition to move said contact arm structure to open said contacts, trip means, with said contacts closed said trip means operating upon the occurrence of predetermined overload current conditions to effect operation of said latch means to release said trip member whereupon said spring means operates to pivotally move said trip member to a tripped position and to collapse said toggle to effect opening of said contact arm structure, following release of said trip member said operating member being operable to close said contacts only after said trip member is relatched in said latched position, upon release of said trip member with said contacts welded in the closed position said spring means pivotally moving said trip member to the tripped position and maintaining said operating lever in the closed position to provide a true indication of the closed condition of said contacts, a rigid blocking member movable unitarily with said contact arm structure, said rigid blocking member being in the path of movement of said trip member to engage said trip member to prevent movement of said trip member to the latched position when said trip member is released by operation of said trip means and said contacts are welded closed, and said rigid blocking member being out of the path of movement of said trip member to permit movement of said trip member to the latched position when said trip member is released by operation of said trip means and said contact arm structure is operated to the open position.

2. A circuit breaker a according to claim 1, said circuit breaker comprising a multipole circuit breaker, a separate stationary contact for each of said poles, a separate movable contact arm structure for each of said poles, a separate movable contact on each of said movable contact arm structures cooperable with the associated stationary contact, a tie bar connecting said contact arm structures for simultaneous movement, said trip member being a single trip member in the center pole unit of said multipole breaker, and said blocking member being a single blocking member in said center pole unit for preventing movement of said single trip member to the latched position when said single trip member is released and the contacts in any of said pole units are welded closed.

3. A circuit breaker according to claim 1, said toggle structure comprising a first link pivotally connected to said trip member and a second link pivotally connected to said movable contact arm structure a knee pivot pin pivotally connecting said first and second links, said spring means comprising tension spring means connected between said knee pivot and said operating member.

4. A circuit breaker comprising a stationary contact, a movable contact arm structure carrying a movable contact thereon and being movable between open and closed positions to open and close said contacts, a releasable trip member, latch means in a latching position latching said releasable trip member in a latched position, a toggle structure connected between said movable contact arm structure and said trip member, an operating member, spring means connected between said toggle structure and said operating member, with said trip member in the latched position said operating member being movable from an open position wherein said toggle is collapsed to a closed position to operate said spring means whereupon said spring means operates said toggle to an erected condition to move said contact arm structure to close said contacts, with said trip member in the latched position said operating member being movable from said open position to said closed position to operate said spring means whereupon said spring means operates said toggle to a collapsed condition to move said contact arm structure to open said contacts, trip means, with said contacts closed said trip means operating upon the occurrence of predetermined overload current conditions to effect operation of said latch means to release said trip member whereupon said spring means operates to move said trip member to a tripped position and to collapse said toggle to effect opening of said contact arm structure, following release of said trip member said operating member being operable to close said contacts only after said trip member is relatched in said latched position, upon release of said trip member with said contacts welded in the closed position said spring means moving said trip member to the tripped position and maintaining said operating lever in the closed position to provide a true indication of the closed condition of said contacts, a stationary latch part, a movable latch member mounted on said trip member for movement with said trip member and for movement on said trip member relative to said trip member, said movable latch member latching onto said stationary latch part to prevent movement of said trip member to the latched position when said contacts are welded closed and said trip member is released by operation of said trip means, and means on said contact arm structure engaging said movable latch member onto said stationary latch part when said trip member is released by operation of said trip means and said contact arm structure is operated to the open position.

5. A circuit breaker according to claim 4, and said movable latch member being pivotally connected to said trip member for movement with said trip member and for pivotal movement relative to said trip member into and out of latching engagement with said stationary latch part.

6. A circuit breaker according to claim 4, said toggle comprising a first toggle link pivotally connected to said trip member and a second toggle link pivotally connected to said movable contact arm structure, a knee pivot pivotally connecting said first and second toggle links, and said spring means comprising tension spring means connected between said knee pivot of said toggle and said operating member.

7. A circuit breaker according to claim 6, said movable latch member being pivotally mounted on said trip member for movement with said trip member and for pivotal movement relative to said trip member into and out of latching engagement with said stationary latch part.

8. A circuit breaker according to claim 7, and said trip member being pivotally mounted on a fixed pivot for movement between the latched and released positions thereof.