June 13, 1939. J. W. MAY 2,162,511

SHOCKPROOF DEVICE

Filed Aug. 29, 1936 2 Sheets-Sheet 1

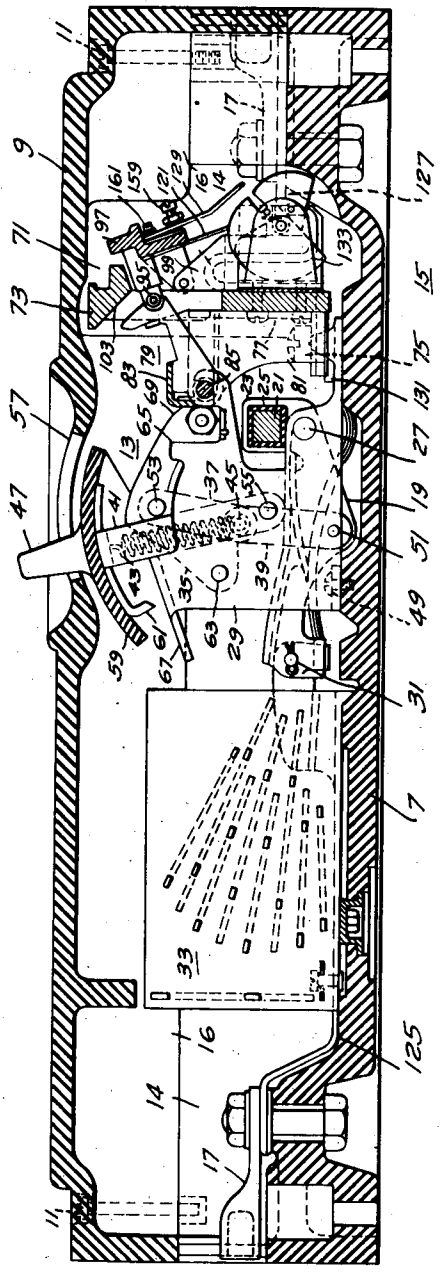


Fig. 1.

WITNESSES:
C. A. McCloskey.
G. L. Parker

INVENTOR
John W. May.
BY
Ralph H. Swingle
ATTORNEY

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Filed Aug. 29, 1936 2 Sheets-Sheet 2

Fig. 2.

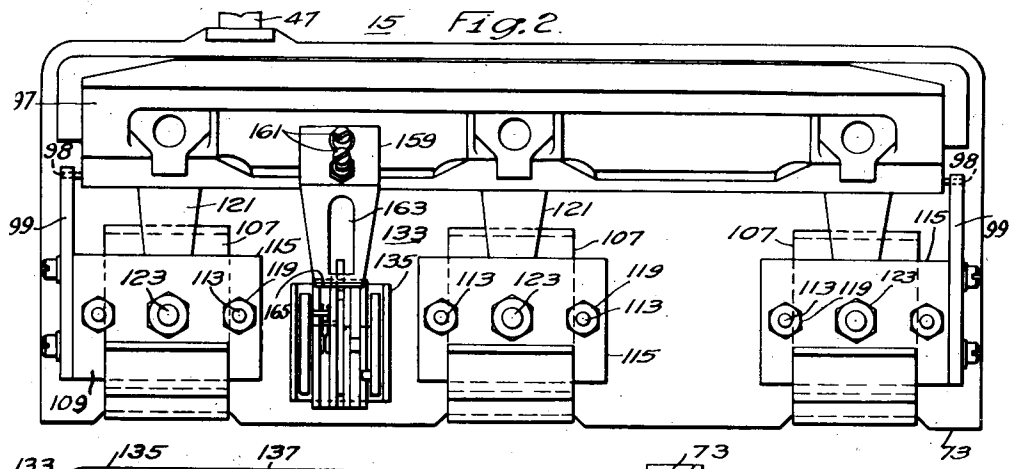


Fig. 4.

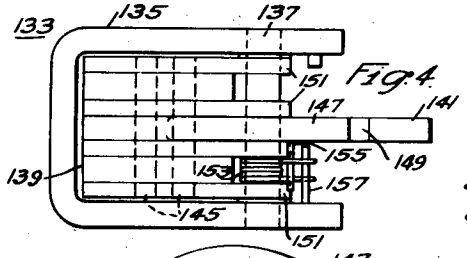


Fig. 3.

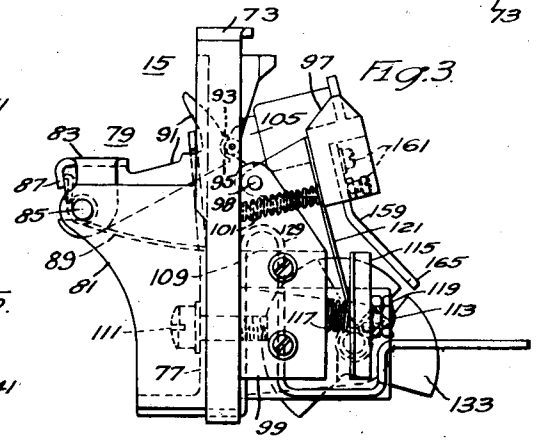


Fig. 5.

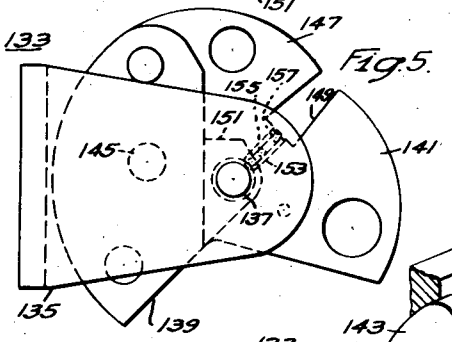
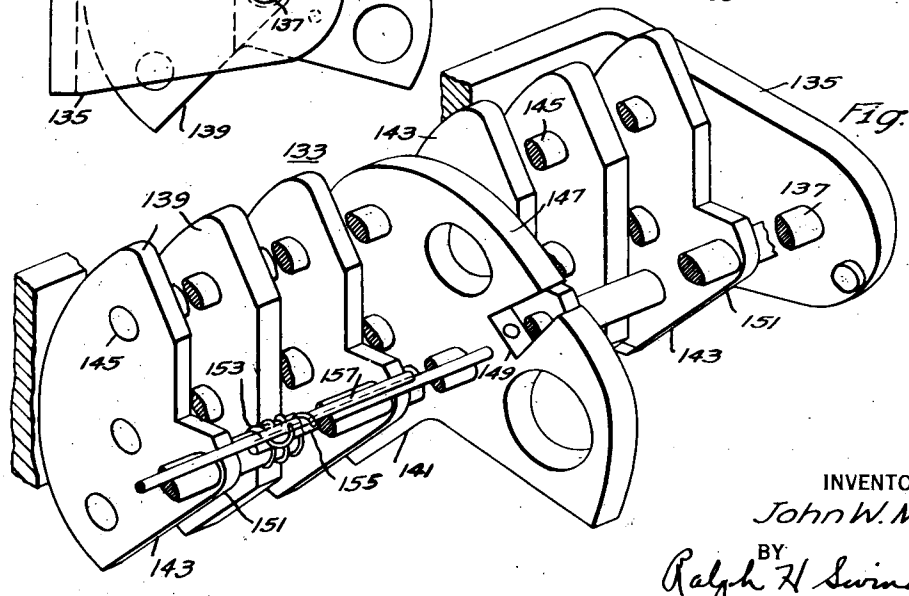


Fig. 6.



INVENTOR
John W. May.
BY
Ralph H. Swingle
ATTORNEY

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2,162,511

SHOCKPROOF DEVICE

John W. May, Forest Hills, Pa., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application August 29, 1936, Serial No. 98,463

21 Claims. (Cl. 200—107)

My invention relates to circuit breakers and, more particularly, to a shock proof device for circuit breakers of the type in which the breaker operating mechanism is manually operable to open or to close the contacts of the breaker with a snap action, and in which a trip device is provided operable upon the occurrence of predetermined overload conditions to cause the mechanism to open the contact means.

In multi-pole circuit breakers of the above described type, the trip device is usually comprised of a pivoted trip bar which in its normal position releasably holds a spring biased mechanism which, when released, causes the contact means of the breaker to move to an open circuit position. The trip bar is moved from its normal position to release the mechanism in response to predetermined overload conditions by an electro-responsive device.

In certain installations of circuit breakers embodying the above-described trip device, the breakers and trip devices embodied therein are often subjected to shocks of such magnitude as to cause movement of the trip bar to release the spring biased mechanism for opening the contacts. In such cases the circuits controlled by the breakers are interrupted until some authorized individual makes an investigation and recloses all of the breakers so affected. It will thus be apparent that under such conditions, the breakers are subjected to abnormal wear due to the increased number of operations imposed upon them. Serious consequences may also result from the interruption of the circuits controlled by the circuit breakers so affected.

It is accordingly a primary object of the present invention to provide a device which will prevent the automatic opening of circuit breakers of the above-described type in response to jarring forces to which they may be subjected.

A further object of the invention is to provide a device which will prevent automatic opening of the circuit breaker in response to jarring forces and yet which at the same time, will allow the breaker to automatically open in response to overload conditions.

A further object of the invention is the provision of a device which will be effective to prevent automatic opening of a breaker in response to sudden jarring forces only during the existence of such forces.

A further object of the invention is the provision of a shock proof device for producing the results as stated above, which has a minimum number of parts and which is of simple and rugged construction.

A still further object of the invention is the provision of a shock proof device of the character described which is of such construction that it may be readily associated with many standard types of breakers.

A still further object of the invention is the provision of a shock proof device of the character described which occupies a minimum amount of space.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to structure and operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

Figure 1 is a vertical longitudinal sectional view of a multi-pole circuit breaker having a specific embodiment of my invention applied to the trip device thereof;

Fig. 2 is an end elevational view of the trip unit of the circuit breaker shown in Fig. 1 with my shock proof device mounted in position thereon;

Fig. 3 is a side elevational view of the trip unit shown in Fig. 3 with my shock proof device mounted in position thereon;

Fig. 4 is a top plan view of my shock proof device;

Fig. 5 is a side elevational view of the shock proof device; and

Fig. 6 is an exploded perspective view of the shock proof device shown in Figs. 4 and 5.

Referring to Fig. 1, the circuit breaker structure shown therein is of the same general type as is disclosed in Patent No. 2,025,697, issued on December 24, 1935, to Benjamin P. Baker, and assigned to the assignee of the present invention. This type of breaker has been shown for illustrative purposes only in order to illustrate the application of my improved shock proof device to a circuit breaker structure. The shock proof device is capable of application to various standard forms of current-responsive circuit breakers, as will be apparent hereinafter. The specific structural details of the breaker illustrated in Fig. 1 may be found in the disclosure of the aforementioned patent and consequently, only a brief description of the same will be given in this application.

The three-pole circuit breaker illustrated in

Fig. 1 comprises in general, a base 7 of molded insulating material, a cover 9 of similar material secured to the base by means of bolts 11, contact actuating means indicated generally at 13, and a trip unit indicated generally at 15. The casing formed by the base and cover is divided into three longitudinal compartments at the forward end thereof by partitions 14 (only one being shown) formed integral with the base. Each compartment is adapted to receive a stationary contact and a cooperating movable contact (not shown) which with their corresponding terminals 17 collectively form the three poles of the breaker.

The partitions form insulating barriers between the contact means of each pole of the breaker and align with similar partitions 16 formed in the cover 9.

Three terminals 17, only two of which are shown, are secured in openings formed in the base at each end thereof; one terminal at each end being provided for each pole of the breaker. The respective movable contacts, (not shown) one for each pole of the breaker, are each carried by a pivoted channel-shaped frame 19, only one of these being shown. The channel-shaped frames are rigidly fastened for movement together by means of a steel tie bar 21 which extends across all of the poles of the breaker. The tie bar is affixed to the frames adjacent the pivoted ends thereof by means of iron straps 23 which loop about the bar and have projecting ends extending through openings in the frames and which are clinched thereagainst. An insulating tube 25 is disposed about the tie bar 21 in order to prevent the short circuiting of the poles of the breaker. The bar serves to mechanically interconnect all of the channel-shaped contact supporting frames 19 and thereby makes it possible to operate all three of the frames from a single actuating mechanism to be hereinafter described. The channel-shaped frame 19 of one of the poles of the breaker is pivotally supported on a pin 27 carried by a main frame of the common actuating mechanism. The other channel-shaped frames may be pivotally supported on other pins, not shown, which are mounted on supports extending from the base.

The movable contacts, not shown, are each carried by an arm pivoted to its corresponding channel-shaped frame 19 by means of a pin connection 31 described in detail in the Patent No. 2,025,697, referred to above. The particular contact means do not form an important part of my invention and hence, will not be described or shown in detail. Suitable arc extinguishing means 33 of the spaced plate type may be provided for the contact means of each pole of the breaker.

The single actuating means 13 comprises in general a U-shaped main frame 29, a carrier or support member 35 pivoted to said frame, a pair of toggle links 37 and 39 interconnecting the carrier member and the channel-shaped contact supporting frame 19 of one pole of the breaker, a U-shaped operating lever 41, overcenter springs 43 for connecting the operating lever to the knee pivot pin 45 of the toggle links, and an operating handle 47 for the lever.

The U-shaped main frame 29 is secured to the base 7 by means of screws 49 which extend through the frame and engage in suitable openings provided in the base. The lower toggle links are pivoted to the channel-shaped frame by means of a pin 51, while the upper toggle links are pivotally connected to the carrier by means of a pin 53. The legs of the operating lever are pivoted to the sides of the main frame by a pin 55. The operating handle projects through a slot 57 provided in the cover 9 and has a curved protective portion 59 provided with a hook 61 on the under side thereof for engaging and moving the carrier member 35 when the operating handle is moved to its open position. The carrier member is pivoted to the main frame by a pin 63 and is adapted to be moved by the hook 61 to its latched position, in which its nose or latch engaging portion 69 is releasably held by a latch of the trip unit to be hereinafter described. Movement of the operating lever is limited by stop lugs 65 struck in from the main frame and by a transverse portion 67 of said frame.

The operation of the circuit breaker actuating means is as follows. With the parts in the position shown in Fig. 1, in which all of the contact means are closed and in which the carrier member is held in the latched position; if the operating handle 47 is moved from the position shown to the opposite edge of the slot 57 to rotate the lever 41 in a clockwise direction, the overcenter springs 43 will snap over and cause the toggle links 37—39 to collapse. The collapse of the toggle links causes a simultaneous movement of all of the channel-shaped frames and movable contacts to the open circuit position with a snap action. To reclose the breaker the operating handle is moved in the opposite direction back to the position shown in Fig. 1. This movement of the handle will cause the overcenter springs to snap over in the opposite direction and move the toggle links to their operative position to simultaneously close all of the contact means with a snap action.

The mechanism of the current responsive trip unit is mounted in a compartment 71 in the casing and is supported by a panel 73 which extends across all the poles of the breaker. The panel is removably mounted in a vertical position in the compartment 71 by means of bolts 75, which pass through openings provided in angle brackets 77 secured to the panel and which are threadedly engaged in openings formed in the base of the breaker. Referring to Fig. 3, a common latch mechanism 79 is mounted on the forward side of the panel by means of a frame 81. The latch mechanism comprises a pivoted latch member 83 mounted on a pin 85 carried by the frame 81. The latch member has a latched portion 87 for engaging and holding the latch engaging portion 69 of the carrier member 35. The latch member is biased in a counter-clockwise direction by means of a spring 89 coiled about the pin 85 and which engages under the latch portion at one end thereof and which has its other end secured against the face of the panelboard. The latch member has a hook shaped extension 91 which is provided at its outer edge with a detent 93 adapted to be engaged by a roller 95 which is carried by a trip bar 97. The trip bar is pivotally mounted at each end, by means of pins 98 supported by brackets 99 carried by the panelboard, and extends across all of the poles of the breaker. The trip bar is biased in a counter-clockwise direction by means of a coiled spring 101 which has one end engaged in a socket provided in the panel 73 and the other end engaging a similar socket provided in the trip bar 97. An opening 103 is cut in the panel to accommodate the end of the hook shaped portion 91 of the latch mem-

ber 83 and in a projection 105 formed on the trip bar which carries the roller 95. The trip bar is biased by the spring 101 to engage the roller 95 in the detent 93 in the end of the latch member. The trip bar thus holds the latch member in latching position by the means described above.

A plurality of electromagnetic trip elements 107 are provided, one for each pole of the breaker. Each trip element consists of a U-shaped stator 109 of magnetic material secured to the panelboard by means of bolts 111. The ends of the legs of the U-shaped stators 109 form pole faces. Each pole face has a bolt 113 extending therefrom for supporting an armature 115. The armature consists of a flat plate of magnetic material having two openings provided therein for receiving the bolts 113. A coiled spring 117 surrounds each bolt and engages the pole face at one end thereof, and the armature at its other end. This spring is for the purpose of biasing the armature away from the pole face. Lock nuts 119 are threaded on the outer end of the bolts in order to adjustably position the armature and to limit movement of the same away from the pole faces. The trip bar 97 carries a plurality of strips 121, one for each pole of the breaker. The strips 121 extend at right angles to the trip bar and are adapted to be engaged by an adjustable projecting bolt 123 carried by each of the armatures of the trip elements, and engageable by the armatures to move the trip bar to tripping position when any armature is attracted. The end electrical connections for each pole of the breaker are the same and are as follows: One terminal 17 of each pole of the breaker is connected to the stationary contact not shown by a conductor 125. The other terminal 17 of each pole is connected, by a conductor bar 127, which has a looped portion 129 extending around the bight of the U-shaped stator of its trip element, to a second conductor 131 which is connected, in turn, to the movable contact. The looped shaped portion 129 of the conductor 127 forms a one-turn coil for the stator of the trip element. Current passes from one terminal 17 of the breaker through the conductor member 127, around the loop 129 to the conductor 131, thence to the movable contact, the stationary contact and the conductor 125 to the other terminal 17. The connections for each pole of the breaker are the same, hence each trip element is responsive to the current flowing through its corresponding pole and is operative when an overload of predetermined magnitude occurs therethrough to move the trip bar 97 to its tripped position.

The operation of the trip unit is as follows: With the parts of the circuit breaker in the position shown in Fig. 1, i. e., with the contact means in the closed circuit position and the carrier member in its latched position; if an overload occurs in any of the circuits extending through the pole of the breaker, the corresponding electromagnet formed by the U-shaped stator and looped conductor is energized, its armature is attracted and the projection 123 thereon engages the strip 121 and rotates the trip bar in a clockwise direction. Rotation of the trip bar 97 in the clockwise direction moves the roller 95 out of engagement with the detent 93 in the latch member 83, thus releasing the same. The carrier member 35 being biased in a counter-clockwise direction by the overcenter springs 43 partially rotates the latch member in a clockwise direction, thus freeing its latch engaging portion 87 from engagement with the latch portion 69 of the carrier member. When the carrier member is thus released, the toggle links 37—39 are collapsed by means of the overcenter springs 43 and cause the channel shaped frames 19 to move the movable contacts to an open circuit position. The breaker cannot be reclosed until the operating handle has been moved to full open position in order to reset and latch the carrier member. After the carrier member has been latched, the operating handle may then be moved to its closed circuit position to effect closing of the contact means.

In order to prevent accidental movement of the tripping bar to its tripping position in response to jarring forces, I provide a shock proof device indicated generally at 133. The shock proof device is illustrated in Figs. 4, 5 and 6 and consists of a U-shaped frame 135 which supports a pin 137 between the legs thereof. Mounted on the pin 137 is an unbalanced weight member 139 consisting of a main plate 141 and a plurality of auxiliary plates 143 secured thereto by means of pins 145. The auxiliary plates form weights which unbalance the main plate. The main plate is provided with offset curved edge portions 147, as indicated in Fig. 5, and a slot 149 transversely cut in the plate 141 between the offset curved edges. The main plate 141 and the auxiliary plates 143 may be made of any suitable metallic material. The curved edge portions are hardened by any suitable means as by nitriting. The end auxiliary plates 143 and those adjacent the main plate are provided with projections 151 which have openings for receiving the main pivot pin 137. A double acting spring 153 is coiled about the main pivot pin 137 and has one end adapted to engage a pin 155 carried by the main plate and the other end adapted to engage a pin 157 extending from and secured to one leg of the U-shaped support 135. The main plate 141 and auxiliary weight plates 143 secured thereto are thus biased to a normal position by means of the double acting spring 153. A strip 159 of hardened steel has openings or other suitable material provided at one end thereof for receiving bolts or screws 161 for fastening the same at right angles to the trip bar as shown in Figs. 2 and 3. The other end of the strip 159 is provided with a longitudinal opening 163 adapted to receive a portion of the main plate 141. The opening also provides a transverse cross piece 165 at the end of the strip of a width such that it can be received in the slot 149 provided in the main plate 141 of the weight member. The frame or support 135 for the unbalanced weight member is secured to the panel 73 of the trip unit as indicated in Figs. 2 and 3, so that the main plate member 141 in its normal position has the slot thereof in position to receive the cross piece 165 on the strip 159 which is secured to the trip bar 97. The clearance between the cross piece and the slot when the cross piece is moved into the same is very small. Normally, when the trip bar is rocked in response to an overload, the cross piece 165 moves into the slot 149 provided in the main plate 141 of the weight member and allows the trip bar to move freely to its tripping position. However, if a jarring force is applied to the base of the breaker of such magnitude as to normally cause the trip bar to move to its tripping position, the unbalanced plate 141 is caused to rotate about its axis by such jarring force and presents one of its curved edges 147 to the cross piece 165 of the strip 159, thus preventing substantial movement of the trip bar during the

existence of the jarring force. When the jarring force has ceased, the unbalanced plate 141 is returned to its normal position with the slot 149 thereof adjacent the cross piece, by means of the double acting spring 153. The off center curvature of the edges 147 of the plate member 141 are provided in order to prevent sticking under short circuit conditions occurring during the existence of a jarring force which rotates the unbalanced plate. In other words, if a jarring force has occurred and rotated the unbalanced plate to prevent movement of the trip bar, and a short circuit occurs in any of the poles of the breaker, the sustained pull exerted on the trip bar will cause the cross piece 165 to move the main plate to its normal position even during the existence of the jarring force to thus allow the trip bar to move to its tripping position in response to such short circuit condition.

It will thus be seen that I have provided a shock proof device which prevents accidental movement of the trip bar in response to jarring forces only during the existence of such jarring forces and yet which under overload conditions allows the trip bar to operate in the usual manner.

In the absence of shocks and jarring forces the shock-proof device does not offer any resistance to the operation of the trip device, or to manual resetting of the breaker mechanism.

I have provided a shock proof device which is simple and rugged, which can be manufactured at an extremely low cost, and which can be applied to many standard forms of breaker structures.

While I have illustrated but one embodiment of my invention, it will be apparent to those skilled in the art that various changes, substitutions and omissions may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

I claim as my invention:

1. In a multi-pole circuit breaker, a base, contact means for each pole of said breaker, a common actuating means for all of said contact means for simultaneously moving the same to an open circuit position or to a closed circuit position, said actuating means including a releasable means for causing movement of all of said contact means to the open circuit position when said means is released, a trip device including a pivoted trip bar movable to a tripping position to cause release of said means in response to predetermined conditions in the circuits through any of the poles of said breaker, and means effective in the absence of said predetermined conditions to prevent movement of said trip bar and the release of said releasable means, in response to, and only during the existence of, sudden jarring forces, said means comprising a bar secured to said trip bar in spaced relation thereto, an unbalanced weight member pivotally supported on said base, said member having curved edges with different centers of curvature, and provided with a radial slot, spring means for resiliently holding said weight member with the slot thereof in a position to receive said bar when said trip bar is moved to its tripping position in response to said predetermined conditions, said weight member being adapted to be rotated in response to said sudden jarring forces to present one of said edges to said bar to prevent movement of said trip bar only during the existence of said forces, and in the absence of heavy overload conditions.

2. In a circuit breaker, a base, contact means, actuating means for said contact means for moving the same to an open circuit or to a closed circuit position, a trip device including a trip bar movable to a tripping position in response to predetermined conditions to cause said contact means to move to an open circuit position, means including a member secured to said trip bar and an unbalanced weight member pivotally supported on said base for preventing movement of said trip bar in response to shocks and jarring forces, said means being effective to prevent movement of the trip bar to tripping position only during the existence of shocks and jarring forces and in the absence of said predetermined conditions.

3. In a circuit breaker, contact means, means for actuating said contact means to an open or to a closed circuit position, means biasing said contact means to an open circuit position when said contact means are in the closed circuit position, a releasable latch device for holding said contact means in said closed position and means for preventing the release of said latch in response to jarring forces, said means acting to prevent release of the latch only during the existence of such forces.

4. In a circuit breaker, a base, contact means, actuating means for said contact means for moving the same to an open circuit position or to a closed circuit position, spring biased releasable means which when released causes said contact means to move to an open circuit position, a trip device including a trip bar pivotally mounted about an axis on said base for normally holding said spring biased means and movable to release the same in response to predetermined conditions, means including an unbalanced weight pivotally supported on said base about an axis parallel to the axis of said trip bar for preventing movement of said trip bar in response to jarring forces, said means acting to prevent movement of said trip bar only during the existence of such forces.

5. In a circuit breaker, a base, contact means, means for actuating said contact means to an open or to a closed circuit position, a trip device operable to cause said contact means to move to an open circuit position in response to predetermined conditions, and a shock proof means for preventing operation of said trip device in response to sudden jarring forces only during the existence of such forces, said means comprising an unbalanced pivoted weight member, having normal position in which it allows said trip device to operate, said weight member being moved in response to jarring forces and only during the existence of the same to positions in which it prevents operation of the trip device.

6. In a circuit breaker, a base, contact means, actuating means for said contact means for moving the same to an open circuit position or to a closed circuit position, a trip device including a pivotally mounted trip bar movable to a tripping position in response to predetermined conditions to cause said contact means to move to an open circuit position, a shock proof device for preventing movement of said trip bar to tripping position in response to, and only during the existence of, jarring forces of a magnitude which would cause said trip bar to so move, said shock proof means comprising a bar secured to said trip bar in spaced parallel relation thereto, a plate having a curved edge provided with a radial slot, a weight secured to said plate to unbalance the same, means for pivotally supporting said

plate from said base about an axis parallel to the axis of said trip bar with said curved edge in closely spaced relation to said bar and spring means for resiliently holding said plate with the slot thereof in position to receive the bar when said trip bar is moved to tripping position.

7. A shock proof device for preventing movement of the trip bar of a trip unit comprising a bar having a cross piece at one end thereof and means for securing the same to a trip bar adjacent the other end, and a pivotally mounted unbalanced weight member adapted to be secured to the trip unit base in cooperative relation to said bar.

8. A shock proof device for preventing movement of the trip bar of a trip unit in response to jarring forces comprising a member adapted to be secured to the trip bar and a pivoted weight member adapted to be secured to the strip unit base.

9. A shock proof device for preventing movement of a movable trip element of a circuit breaker in response to jarring forces, comprising an unbalanced mass piivotally supported on the circuit breaker base, and a cooperating member secured to the trip element, said device being effective to prevent movement of said trip element only during the existence of the jarring forces.

10. In a switch having a movable contact and a cooperating stationary contact, a shock proof device for preventing movement of said movable contact to its open circuit position in response to jarring forces comprising a member mounted to move substantially simultaneously with said movable contact when said movable contact moves away from its closed circuit position, an inertia device movably supported and biased to a normal position, said member and said device being provided, one with a portion of predetermined dimensions and the other with a cooperating passage of a size just sufficient to receive said portion when said device is in its normal position, said device being movable in response to jarring forces to block or prevent movement of said member.

11. In combination with a switch having a stationary contact and a cooperating movable contact, a shock proof device for preventing movement of the movable contact to its open circuit position in response to jarring forces comprising a member mounted to move substantially simultaneously with said movable contact when said movable contact moves away from its closed circuit position, an inertia device pivotally supported at a point displaced from its center of gravity and biased to a normal position, said member and said device being provided, one with a portion of predetermined dimensions and the other with an engaging surface having a slot therein of a size just sufficient to receive said portion in the normal position of said device, said device being movable about its pivot point in response to jarring forces to present said surface to said portion to block movement of said member, the engaging surface of said device being so shaped that a steady or prolonged force applied to said member during the existence of the jarring force will move said device to its normal position and thus allow said movable contact to move to its open circuit position.

12. In combination with a switch having a stationary contact and a movable contact, a shock proof device for preventing movement of said movable contact to its open circuit position in response to jarring forces comprising a pivoted member interlinked with said movable contact to move substantially simultaneously therewith when said movable contact moves away from its closed circuit position said member having a portion of predetermined dimensions, an inertia member pivoted about an axis parallel to axis of said member at a point displaced from its center of gravity having a curved engaging surface provided with a slot of a size just sufficient to receive said portion, means biasing said inertia member to a normal position with said slot adapted to receive said portion said inertia member being movable about its pivot in response to jarring forces which would cause movement of said member about its pivot, to present said engaging surface to said portion to prevent movement of said member and movable contact.

13. In a circuit controlling device, contact means, a trip device operable to cause said contact means to open the circuit, in combination, normally inoperative means operable in response to and only during the existence of sudden jarring forces for preventing operation of said trip device by said forces.

14. A trip device for a circuit breaker comprising a trip member movable from a normal position to a tripping position to trip the breaker, and means normally permitting movement of said trip member and operable to prevent movement of said trip member in response to and only during the existence of sudden jarring forces.

15. In a multipole circuit breaker, contact means for each pole of said breaker, a common actuating means for simultaneously opening or closing said contact means including a spring biased member releasable to cause opening of said contact means, a trip device comprising latch means for normally restraining said releasable member, means operable in response to predetermined conditions in the circuit through any one of the poles of said breaker to release said latch means to effect release of said member and opening of said contact means, and means for preventing release of said latch means in response to shocks and jarring forces, said means acting to prevent release of said latch means only during the existence of shocks and jarring forces and in the absence of said predetermined conditions.

16. In a multipole circuit breaker, contact means for each pole of the breaker, a common actuating means for simultaneously opening or closing all of said contact means including a spring biased member releasable to cause opening of said contact means, a trip device comprising a latch for restraining said member, a trip bar having a normal position in which it restrains said latch in latching position, said trip bar being movable to a tripping position to release said latch and member, means operable in response to predetermined conditions in the circuits through any one of the poles of said breaker for moving said trip bar to tripping position, and means for preventing movement of said trip bar to tripping position in response to shocks and jarring forces, said means acting to prevent movement of said trip bar to tripping position only during the existence of shocks and jarring forces and in the absence of said predetermined conditions.

17. In a circuit breaker having contact means and actuating means therefor, a trip device comprising a tripping member movable from a normal position to a tripping position to cause opening of said contact means, means operable in re-

sponse to predetermined conditions to move said tripping member to tripping position, and means for preventing movement of said tripping member to tripping position in response to shocks and jarring forces, said means acting to prevent movement of said tripping member to tripping position only during the existence of shocks and jarring forces and in the absence of said predetermined conditions.

18. In a circuit breaker, contact means and actuating means therefor, a spring biased member releasable to cause opening of said contact means, a trip device comprising a latch for normally engaging and restraining said member, said latch being movable to release said member and cause opening of said contacts, means operable in response to predetermined conditions to cause movement of said latch to release said member, and means for preventing releasing movement of said latch in response to shocks and jarring forces, said last mentioned means acting to prevent releasing movement of said latch only during the existence of shocks and jarring forces and in the absence of said predetermined conditions, said actuating means being operable to reset said releasable member for engagement by said latch.

19. In a circuit breaker, contact means, a trip means operable in response to predetermined conditions to cause opening of said contact means, and means operable in response to and only during the existence of jarring forces for preventing tripping of said breaker by jarring forces.

20. A trip device for a circuit breaker comprising a trip member movable from a normal position to a tripping position to cause opening of said breaker, means operable in response to predetermined conditions to move said trip member to tripping position, and means for preventing movement of said trip member to tripping position in response to shocks and jarring forces applied to the breaker, said means being effective to prevent movement of the trip member to tripping position only during the existence of shocks and jarring forces and in the absence of said predetermined conditions.

21. A trip device for a circuit breaker comprising a base, a pivotally mounted trip bar movable from a normal position to a tripping position to trip said breaker, means operable to move said trip bar to tripping-position in response to predetermined conditions, and means including a member carried by said trip bar and a slotted weight pivotally supported on said base for preventing movement of said trip bar to tripping position in response to shocks and jarring forces, said last mentioned means acting to prevent movement of said trip bar to tripping position only during the existence of shocks and jarring forces and in the absence of said predetermined conditions.

JOHN W. MAY.