

June 28, 1960

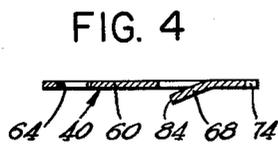
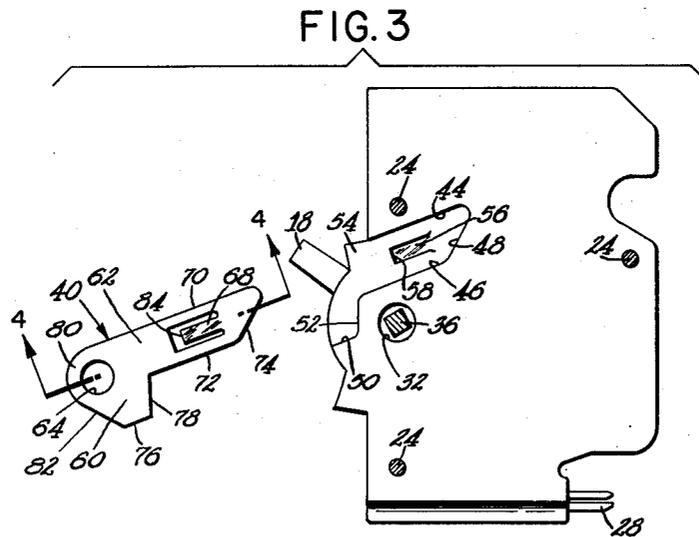
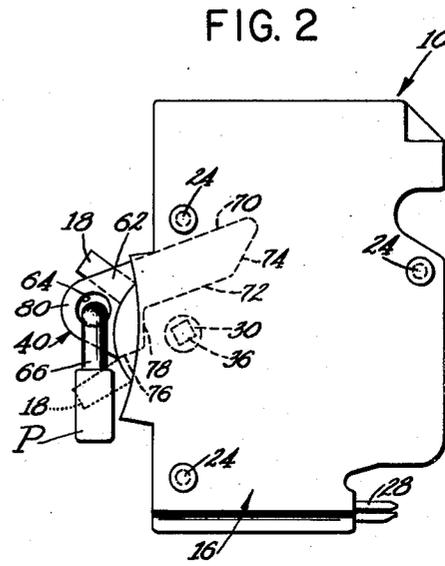
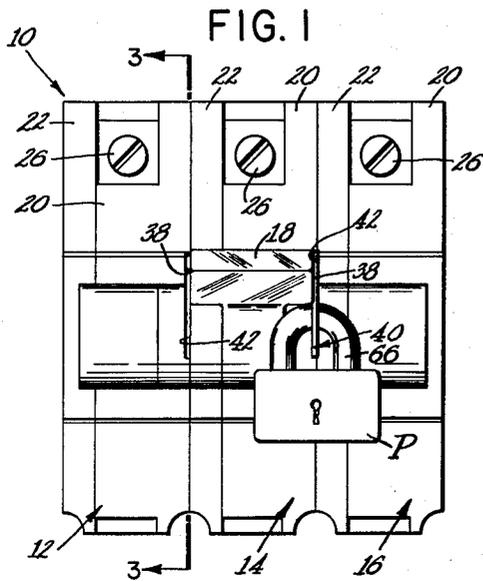
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2,943,162

CIRCUIT BREAKER HAVING LOCKING PROVISION

Filed May 12, 1958

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 5

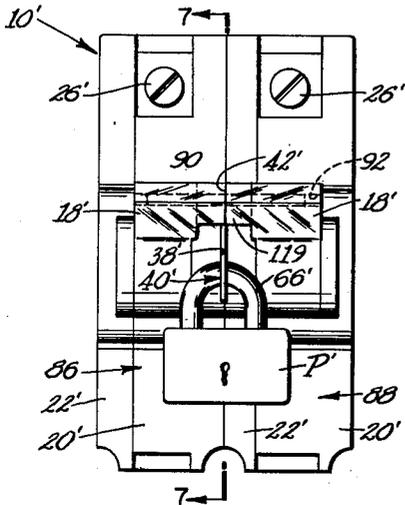


FIG. 6

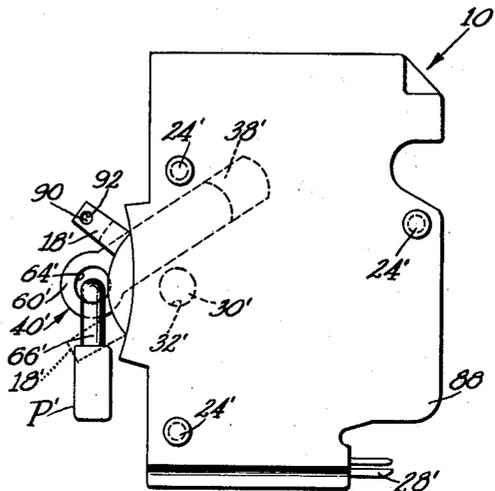


FIG. 7

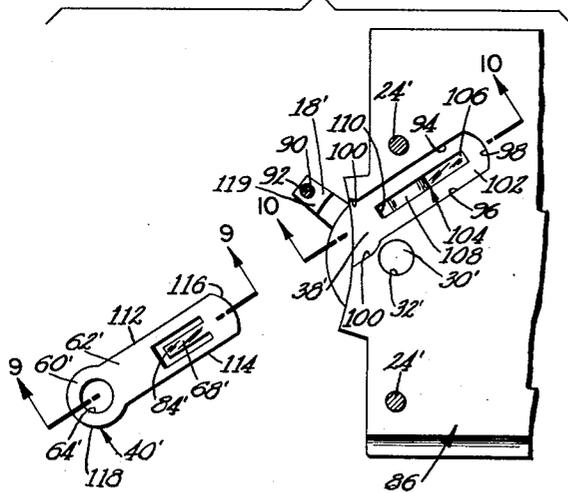


FIG. 8

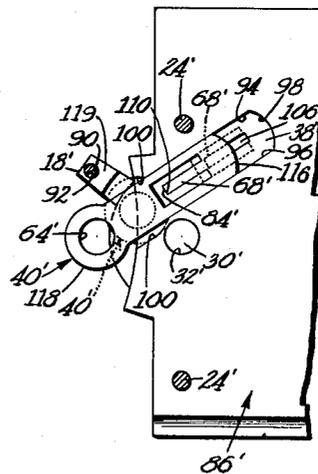


FIG. 9

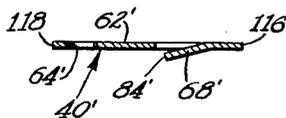


FIG. 10



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1

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CIRCUIT BREAKER HAVING LOCKING PROVISION

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11 Claims. (Cl. 200—44)

This invention relates generally to a circuit breaker or circuit controlling instrumentality and, more particularly, to a circuit breaker having provision for locking the actuating handle thereof in a selected position.

The primary aim and object of the present invention is the provision of a circuit breaker of basically standard construction having a novel provision for locking the actuating handle thereof in both "on" and "off" positions, said locking provision being quickly and facily placed into locking condition by the interengagement of a conventional padlock with said locking provision.

Another important object of the present invention is the provision of a circuit breaker of basically standard construction as aforedescribed in which the circuit breaker may be supplied and used without the locking provision installed in which case the breaker will present a basically standard appearance, and such locking provision may be subsequently installed in the breaker to condition the latter for locking the actuating handle thereof. Pursuant to this object of the present invention the locking provision may be installed in the breaker, in the manner of inserting a key in a lock, in a simple and quick manner and on the installation of the locking provision in the breaker it automatically interengages therewith to prevent the subsequent withdrawal of the locking provision from the breaker. With such locking provision in its unlocked condition, the actuating handle of the breaker may be manipulated in the conventional manner to actuate the breaker mechanism to corresponding positions.

Yet another object of the present invention is the provision of a circuit breaker actuating handle locking mechanism which is of simple and unique design and construction, economical to manufacture, and which may be installed quickly and easily either prior, or subsequent, to the installation of the breaker.

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

In the drawings:

Fig. 1 is a front elevational view of a three-pole circuit breaker formed according to the present invention with the handle shown in a locked condition;

Fig. 2 is a side elevational view thereof;

Fig. 3 is a view taken on the line 3—3 of Fig. 1 with the locking provision shown disassembled from the breaker;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 1 of a two-pole circuit breaker having a modified form of locking provision;

Fig. 6 is a side elevational view thereof;

Fig. 7 is a view taken on the line 7—7 of Fig. 5 with the locking provision shown disassembled from the breaker;

Fig. 8 is a view similar to Fig. 7 with the locking provision shown assembled with the breaker;

2

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 7; and

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 7.

Referring now to the drawings, and more particularly to Figs. 1—4 thereof, the circuit breaker 10 is shown as a three-pole unit of basically standard construction and differs from a standard breaker in the manner to be described in detail hereinafter. The breaker 10 consists of three poles 12, 14 and 16 which are interconnected for conjoint and simultaneous operation in any well known manner, the breaker being opened and closed at all of the poles by the actuating handle 18 and being opened automatically at all of the poles upon the occurrence of an overload in the circuit at any one of the poles. More particularly, the handle 18 is of well known construction and is pivotally movable between "on" and "off" positions as shown in Fig. 2 to correspondingly close and open, respectively, the circuit breaker mechanisms at each of the poles. On the occurrence of a predetermined overload current in the circuit of any one of the poles, the companion contacts at all of the poles will be opened. The breaker is of the trip-free type in which the breaker contacts separate on predetermined circuit overload conditions even if the handle is held in its "on" position. The circuit breaker is resettable after tripping by releasing the handle for return to its "off" position.

The circuit breaker mechanism for each of the poles is contained within a casing or housing formed by a body part 20 and a cover or closure part 22 therefor. Each of said parts is formed, preferably by a molding operation, of a suitable insulating material, such as a urea plastic. The casing parts are secured together in any suitable manner, such as by means of the fasteners 24. Each pole contains the usual circuit breaker mechanism including stationary and movable contacts (not shown) and terminal members 26 and 28. A further description of the circuit breaker mechanism is considered unnecessary as such mechanism forms no part of the present invention. The handle 18 is preferably of molded construction and is formed of a suitable insulating material, said handle having an externally projecting portion at the center pole and having aligned pivots 30 in end walls 22 and 20, respectively, of poles 12 and 16. The handle is formed of three internal parts joined for operation in unison by square shaft 36 that extends through openings 32 in the intervening casing walls.

Pursuant to the present invention, the breaker is provided with a pair of locking recesses 38 disposed adjacent to the respective ends of the actuating handle 18, said recesses being adapted for the reception of a locking device or lock-off 40 formed complementary thereto to interfit and interlock therein. Each recess 38 is defined between a body part and cover of adjacent poles, one recess 38 being defined between the body part 20 and cover 22 of the poles 12 and 14, respectively and the other recess being defined between the body part 20 and cover 22 of the poles 14 and 16, respectively. The recesses 38 are substantially in alignment with the end surfaces of the handle, said recesses being defined in the body parts 20 with the covers 22 having a planar confronting surface 42 forming a closure therefor. The recesses 38 are inclined upwardly of the breaker as shown in Figs. 2 and 3 in spaced relation with the shaft 36. The recesses and locking device have corresponding configurations, each recess having laterally spaced edges 44 and 46 interconnected at their inner ends by the inner edge 48 which is shown upwardly inclined. Each recess further includes forward edges 50 and 52, the edge 50 being substantially parallel with edges 44, 46 and with the edge 52 extending vertically between edges 46 and

50. Thus the periphery of each recess is defined by the edges 44, 48, 46, 52 and 50, the recess being open to the front of the breaker to receive a companion locking device 40. The wall 54 of the recess, defined in the part 20, is provided with an inclined depression 56, the latter ascending in depth towards the shoulder 58.

The locking device or lock-off 40 is preferably formed of sheet metal as by a stamping operation, said lock-off being shaped and dimensioned to be received in a companion recess 38. The lock-off 40 comprises head and shaft parts 60 and 62, resp. the head part being apertured as indicated at 64 to receive the shank 66 of padlock P. The shaft part 62 has a depressed inclined tongue 68 as best shown in Fig. 4 which is adapted to interfit in the depression 56 of the recess in the installed condition of the lock-off. The lock-off includes laterally spaced edges 70 and 72 and an inclined forward edge 74, said edges being adapted to interfit with the edges 44, 46 and 48, resp. of the recess 38 in the installed condition of the lock-off. The head part of the lock-off includes edges 76 and 78 which are adapted to interfit with the companion edges 50 and 52, resp. of the recess. The edge 70 terminates in a rounded forward edge portion 80, said latter edge terminating in a straight portion 82 extending to edge 76.

It will be noted that the breaker 10 resembles a standard multi-pole breaker prior to the installation of a lock-off, said breaker differing from a standard breaker by the inclusion of the lock-off recesses. The lock-off may be readily manually engaged in a recess 38 by inserting the shaft part therein until the tongue 68 interengages in the depression 56. The inclined or cam edge 74 will aid in guiding the lock-off, said cam edge being adapted to coact with edges 46 and 52 of the recess to aid in guiding and locating the lock-off into proper registered position. The free end 84 of the tongue 68 will snap engage over the shoulder 58 on the insertion of the lock-off into the recess, and said tongue and shoulder will coact to prevent withdrawal of the lock-off subsequent to installation. It will be understood that the tongue 68 will have sufficient resiliency to provide for the ready insertion thereof in the recess which has a depth substantially corresponding to the material thickness of the lock-off. In the installed condition of the lock-off edges 70, 74, 72, 78 and 76 thereof will interfit with the edges 44, 48, 46, 52 and 50, resp. of the recess with the lock-off part 60 projecting forwardly of the breaker substantially in the plane of the end surfaces of the handle. In the installed non-locked condition of the lock-off, the handle may be manually actuated in the usual manner as no blocking action is performed by the lock-off. As shown in Figs. 1 and 2, the handle may be locked in either the "on" or "off" position by passing the shank 66 of a padlock P through a companion aperture 64 of the lock-off, the padlock thereby being disposed in the path of handle movement and exerting a blocking and locking action. In the up or "on" position of the handle as shown in solid lines in Fig. 2, the external locking thereof will prevent any substantial rotation of the handle whereas in the down or "off" position of the handle as shown in broken lines in Fig. 2, the external locking thereof will permit limited rotation of the handle but insufficient rotation to close the breaker. From the above it will be apparent that one or two lock-offs may be installed in the breaker which may be externally padlocked to lock the actuating handle in a selected position.

With reference to Figs. 5-10, there is shown another embodiment of the present invention as applied to a two-pole breaker 10'. The breaker 10' generally corresponds to the breaker 10 described above and differs therefrom in the respects now to be described. Corresponding but primed reference numerals have been applied on the drawings of breaker 10' to denote corresponding structure with breaker 10. The breaker 10' consists of poles 86 and 88, each of which is provided

with a part of the composite actuating handle 18' pivotally movable between spaced extreme "on" and "off" positions. The handle parts are interconnected for conjoint movement by means of a bridging pin 90 extending in apertures 92 of the handles. The recess 38' is defined between the body part and cover of poles 86 and 88, respectively, and is shaped and dimensioned to receive the lock-off 40' best shown in Figs. 7 and 9.

The recess 38' has laterally spaced parallel edges 94 and 96 and an arcuate edge 98 extending therebetween, the entrance to the recess being enlarged as indicated at 100 to facilitate the entry of the lock-off therein and to accommodate the head part 60'. The wall 102 of the recess defined in the part 20' is provided with a depression 104 (Fig. 10), the latter comprising an inclined portion 106 which descends in depth to the arcuate protuberance or support part 108, the inner end of said depression being defined by the shoulder 110 which corresponds to the shoulder 58 of the previous embodiment. The lock-off 40' comprises head and shaft parts 60' and 62', respectively the head part being apertured and indicated at 64' to receive the shank of padlock P'. The shaft part 62' has a depressed inclined resilient tongue 68' which is adapted to interfit in the depression 104 of the recess in the manner to be described. The lock-off includes laterally spaced edges 112 and 114 interconnected at the inner end thereof by the arcuate edge 116. The head part of the lock-off has a circular peripheral edge 118 which terminates at the edges 112 and 114. The lock-off is manually engaged in recess 38' in the manner previously described, the edges 112 and 114 of the lock-off interfitting with the edges 94 and 96, respectively of the recess. In the installed position of the lock-off the latter is manually axially movable in the recess between the depressed position shown in broken lines in Fig. 8 and the projected position shown in solid lines in said figure. The resilient tongue 68' of the lock-off engages the part 108 of the depression to provide a frictional engagement to retain the lock-off in position. In said depressed position the edge 116 of the lock-off interfits with the edge 98 of the recess and the edge 118 clears the space defined under the bridging portion 119 of the composite handle so that the latter may be actuated without lock-off interference to correspondingly actuate the breaker mechanism. In the projected position of the lock-off, the free end 84' of the tongue 68' will coact with the shoulder 110 of the depression, this arrangement preventing withdrawal of the lock-off subsequent to installation while at the same time permitting limited axial movement of the lock-off so that the latter may be moved out of the path of handle movement to the non-locked or depressed position thereof. With the lock-off in the projected position, the handle may be locked in either the "on" or "off" position by passing the shank 66' of padlock P' through the aperture 64' of the lock-off as shown in Figs. 5 and 6, the padlock thereby preventing the movement of the lock-off to depressed position while at the same time the lock-off at edge 118 thereof provides a handle block. Thus the handle may be locked "on" or "off" by padlocking the lock-off in the projected position thereof. The lock-off may not be withdrawn from the recess once installed because of the provision of shoulder 110 which coacts with the tongue 68' of the lock-off to limit the withdrawal of the lock-off from the recess. In the unlocked condition of the lock-off, the latter may be fully depressed to the dotted position thereof to clear the handle whereby the latter may be actuated without interference. It will be observed that in the depressed position of the lock-off, the head part thereof projects sufficiently forwardly of the breaker casing so that such part may be readily grasped for manipulation to the projected position.

In both of the embodiments described above, many circuit breakers may be installed in a panelboard without regard to whether a lock-off is to be used. Lock-offs

may be applied to the exposed part of the circuit breakers, without removal of the trim plate that forms part of usual panelboards.

While there is shown and described herein certain specific structure embodying the invention it will be manifest to those skilled in the art that various modifications and rearrangements of the parts may be made without departing from the spirit and scope of the underlying inventive concept and that the same is not limited to the particular form herein shown and described except insofar as indicated by the scope of the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A lock-off device insertable in a companion recess of a circuit controlling instrumentality for locking the actuating handle thereof in a predetermined position, said device being relatively thin and flat and comprising head and shaft parts, said shaft part having a laterally offset resilient part snap engageable with complementary structure in said recess to thereby prevent the retraction of said device from the latter, and said head part having an aperture therethrough for the reception of a padlock.

2. A molded-case enclosed circuit controlling device having an enclosing casing of insulation and an actuating handle movable between selected spaced positions corresponding to different circuit conditions, and means providing for the locking of said handle in one of said positions comprising a locking device having external provision for receiving a padlock to block the movement of said handle out of either one of said selected positions, a passage formed within the casing and opening to the exterior adjacent said handle, and said locking device and said passage being formed for reception of the locking device in said passage and said locking device and said casing having normally inaccessible coacting locking formations internal of the circuit controlling device.

3. A molded-case enclosed circuit controlling device having an enclosing casing of insulation and having a handle movable between "off" and "on" positions to respectively open and close the device, and a passage formed within the casing and opening to the exterior adjacent said handle to receive a locking device, the wall of said passage having a formation internal of the device, and not normally accessible, for self-locking coaction with a locking formation of the locking device in self-locking non-disengageable relation, such locking device to receive a padlock and thereby prevent movement of said handle from one selected position to the other.

4. An enclosed circuit breaker having a casing of molded insulation and an actuating handle movable to different positions to open and close the breaker, and means for locking the handle in either of said positions thereof comprising a passage extending within said casing and opening to the exterior adjacent said handle, and a locking device formed for insertion into said passage, said passage and said device having mutually interengageable means including a laterally biased spring tang rendered effective upon insertion of said device in said passage to prevent disengagement therefrom, said locking device having an aperture for receiving a padlock and coacting therewith to block movement of the handle out of either of said selected positions.

5. An enclosed circuit breaker having a casing of molded insulation and an actuating handle movable to different positions to open and close the breaker, and means for locking said handle in either of said positions thereof comprising a passage extending within said casing and opening to the exterior adjacent said handle, and a locking device formed complementary to said passage and insertable therein, said passage and said device having interengageable means effective on the insertion of said device into said passage to prevent disengagement therefrom, said device having a provision for externally receiving a padlock and coacting therewith to prevent

movement of the handle out of either position to the other, said means comprising a depression in said passage defining a locking shoulder and a laterally biased resilient tongue on said device receivable in said depression for abutment with said shoulder.

6. A multi-pole circuit breaker having an actuating handle movable to different positions to open and close the circuit breaker and each pole of the multi-pole circuit breaker having a casing wall of insulation abutting that of a next adjacent pole, and means for locking the handle in either of said positions thereof comprising a passage defined between a pair of abutting walls and said passage being disposed adjacent said handle, and a locking device receivable in said passage, said passage and said device having interengageable means to prevent removal of said locking device, said device having provision for receiving a padlock and acting therewith to block the movement of said handle out of either of said positions.

7. A multi-pole circuit breaker in accordance with claim 6 wherein said device when received in said recess is longitudinally slidable therein between a retracted handle-clearing position and a projected handle-blocking position, with a portion thereof disposed in the path of movement of said handle from either selected position to the other and with an aperture for receiving a padlock and retaining said device in said projected position.

8. A circuit breaker in accordance with claim 6 wherein said recess is formed laterally adjacent said handle and out of the path of movement thereof from one of said positions to the other, said device having an opening in an external portion thereof for receiving a padlock and disposing the padlock in the path of movement of the handle from either of said positions to the other.

9. Apparatus in accordance with claim 6 wherein said device is in the form of a unitary generally flat sheet-metal part having a padlock receiving opening and having an integral laterally extending resilient tang as part of said interengageable means.

10. A multi-pole circuit breaker having an actuating handle movable to different positions to open and close the circuit breaker and each pole of the multi-pole circuit breaker having a casing wall of insulation abutting that of the next adjacent pole, said circuit breaker having an internal locking recess that opens to the circuit breaker exterior adjacent said actuating handle and said recess being defined by abutting walls of insulation of adjacent poles of the circuit breaker, and said recess having a formation for interlocking with a locking device insertable therein, said recess being located adjacent said handle for receiving a locking device to be padlocked for obstructing movement of the handle out of either of its said positions.

11. A circuit breaker having an actuating handle pivotally movable to different positions to open and close the breaker, and means for locking said handle in either of said positions thereof comprising a locking passage extending into said circuit breaker and opening to the exterior thereof adjacent said handles, a locking device received in said passage for limited captive longitudinal sliding therein and having a head portion correspondingly movable between handle-blocking and non-blocking positions, said device and said passage having interlocking portions limiting the outward sliding of the locking member.

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