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2,937,248

CIRCUIT BREAKER HANDLE LOCK

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Ex. 1.

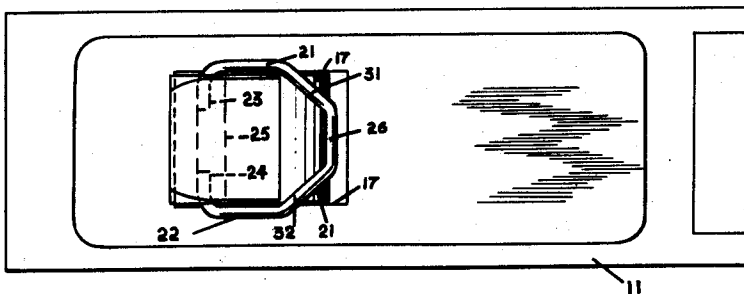


FIG. 8.

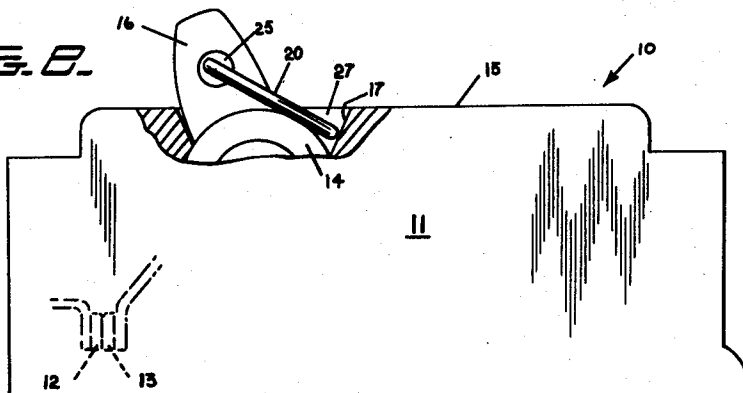
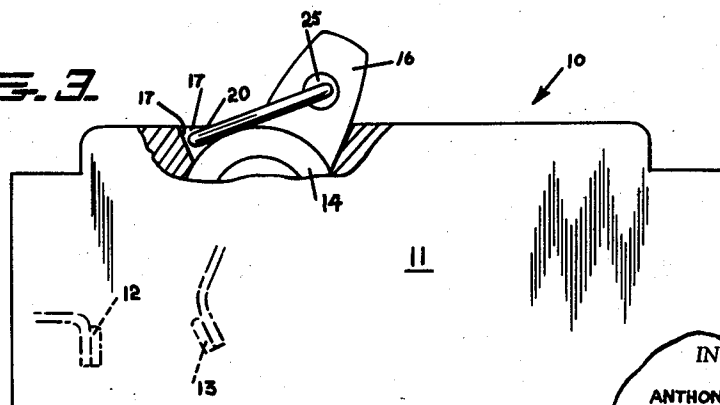


FIG. 3.



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CIRCUIT BREAKER HANDLE LOCK

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4 Claims. (Cl. 200—44)

This application relates to circuit breakers in general and more particularly to a novel handle lock therefor constructed to lock the circuit breaker handle in either the On or Off position.

Molded case circuit breakers which are adapted for the protection of branch circuits in the home and light industrial installations are usually mounted side by side in a panelboard. Since the circuit breakers are very small units usually in the neighborhood of 1 to 2 inches in width, the manual operating handles thereof are very close to one another so that in manually opening one circuit breaker, a circuit breaker adjacent thereto is often inadvertently opened.

This latter breaker may be protecting a clock circuit whose unauthorized interrupting can have serious consequences so that means must be provided to prevent accidental opening thereof. Similarly, it is desirable to lock the manual operating handle in the Off position while work is being performed on its associated branch circuit. The prior art provides such a lock, to prevent the inadvertent operation of the circuit breaker, in the form of a complicated formed piece of metal which is secured to the circuit breaker handle by screw means. This lock may readily be jarred out of position if its securing screws are loosened by repeated vibration. The lock has the further disadvantage that it is difficult to mount to the handle when the circuit breakers are installed in the panelboard because of the close quarters.

In order to overcome the disadvantages of the prior art the instant invention provides a lock constructed of resilient wire material formed in a U-shape with the free ends thereof being inwardly extending. The circuit breaker handle is either provided with a through hole or else is provided with recesses on opposite sides thereof for the reception of the inwardly turned ends.

To install the lock of the instant invention, the ends thereof are spread apart so that the lock straddles the circuit breaker handle and then the ends are introduced into the handle openings. When the lock is in locking position the web thereof is disposed in a recess formed between the circuit breaker manual operating member and the casing opening in which the operating member travels. The lock is moved into and out of its locking positions by pivoting the lock member about a point defined by the handle openings. The lock is compressed as it is moved into locking position so that pressure is applied to the circuit breaker handle and the resulting frictional engagement prevents the lock from being jarred out of locking position.

Accordingly, a primary object of the instant invention is to provide a novel locking means for the manual operating handle of a circuit breaker.

Another object is to provide a locking means whereby the manual operating member of a circuit breaker may be locked in either the On or Off position without dismounting the locking member from the operating member by merely rotating the locking member to the desired locking position.

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Still another object is to provide a novel circuit breaker locking member which is especially economical to construct.

A still further object is to provide a novel locking means for a circuit breaker operating handle which is convenient to install even while the circuit breaker is mounted in a panelboard.

These as well as other objects of the instant invention shall become readily apparent after reading the following description of the accompanying drawings in which:

Figure 1 is a plan view of a molded case circuit breaker having the novel locking means of the instant invention mounted thereto.

Figure 2 is a side elevation partially sectioned of the circuit breaker of Figure 1 with the manual operating handle in the On position.

Figure 3 is a view similar to Figure 2 with the manual operating handle in the Off position.

Now referring to the figures, circuit breaker 10 is of a type fully described in U.S. Patent #2,678,359 assigned to the assignee of the instant invention and comprises a molded casing 11 wherein cooperating contacts 12 and 13 are disposed. Manual operating handle 14 is operatively connected to the movable cooperating contact 13, in a manner fully described in the aforesaid patent, whereby the cooperating contacts 12, 13 are manually operable into and out of engagement. Casing 11 includes formations 17, 17' which define an opening in the top surface 15 thereof through which the manual operating handle portion 16 of operating member 14 extends with formations 17, 17' defining the limits of movement for manual operating handle 16 between the On and Off positions thereof.

Lock member 20 is generally U-shaped and is constructed of a resilient wire material. The free ends of the U-arms 21, 22 are inwardly turned at 23, 24, respectively, with these free ends 23, 24 being entered into recesses on opposite sides of operating handle 16 formed by handle bore 25. In order to mount lock member 20 to handle 16 it is necessary to merely spread apart arms 21, 22 until the distance between the intumed ends 23, 24 is equal to or greater than the width of handle 16 and then place the inwardly turned ends 23, 24 in alignment with bore 25. When arms 22, 23 are thereafter released, the resilient nature of the material of lock member 20 will force the inwardly turned ends 23, 24 into bore 25 thereby securing lock member 20 to manual operating handle 16. Since no additional fastening means are required to secure lock member to operating handle 16 it can be said that lock member 20 is self-secured to handle 16.

With operating handle 16 in the On position of Figure 2, lock member 20 is pivotable thereabout, with bore 25 as a center, and web 26 is enterable into recess 27 defined by casing formation 17, 17' and operating member 14. With lock member 20 in the On position of Figure 2 movement of manual operating handle 16 to the Off position of Figure 3 is prevented by the engagement of web 26 with the right hand end portion 17 of casing formation 17, 17'. In order to operate manual operating handle 16 to the Off position it is first necessary to remove web 26 from recess 27.

When manual operating handle 16 is thereafter moved to the manual Off position of Figure 3, lock member 20 may be pivoted counterclockwise, with handle bore 25 as a center, to the position of Figure 3 wherein web 26 is disposed within recess 28, which is defined by casing formation 17, 17' and operating member 14 in the manual Off position thereof. With lock member 20 in its position of Figure 3, manual operating handle 16 cannot be operated counterclockwise to the On position

of Figure 2 since web 26 is blocked by the left hand end portion 17 of casing formation 17, 17'.

The U-arms 21, 22 include portions 31, 32, respectively, which diverge away from web 26. These diverging portions 31, 32 are engaged by the side portions 17' of casing formations 17, 17' as lock member 20 is moved into its locking positions of Figures 2 and 3. The engagement between the diverging portions 31, 32 of U-arms 21, 22 by casing formations 17' forces arms 21, 22 toward one another with this action being resisted by the resilient nature of the material forming lock member 20. Thus, diverging portions 31, 32 are now biased outwardly into frictional engagement with the case formation 17' and to a limited extent arms 21, 22 will be forced against the sides of manual operating handle 16. This frictional engagement assures that lock member 20 will remain in locking position until web 26 is intentionally moved out of recesses 27, 28.

Thus, this invention provides a novel circuit breaker lock means comprising a single member which is self-secured to the operating handle. The simple construction of the lock means makes it economical to produce and convenient to install, even in cramped quarters.

Although I have here described preferred embodiment of my novel invention, many variations and modifications will now be apparent to those skilled in the art, and I therefore prefer to be limited, not by the specific disclosure herein, but only by the appending claims.

I claim:

1. A circuit breaker comprising a casing including a first portion defining an opening, a manual operating member extending through said opening and having a second portion projecting externally of said casing, a pair of cooperating contacts disposed within said casing and operable into and out of engagement by movement of said operating member to a first and a second position respectively, and a lock member self-secured at a first end thereof to said operating member second portion; said lock member being movable between a third and a fourth position; said casing first portion and said operating member forming a first recess when said operating member is in said first position; said casing first portion and said operating member forming a second recess when said operating member is in said second position; said lock member including a second end disposed in said first recess when said lock member is in said third position and when so disposed preventing operation of said operating member to said second position; said lock member second end being disposed in said second recess when said lock member is in said fourth position and when so disposed preventing operation of said operating member to said first position; said lock member being constructed of resilient material; said lock member being generally U-shaped with the free ends of the U arms having inwardly turned portions; said manual operating member having recesses in said second portion thereof wherein said lock member inwardly turned portions are disposed.

2. A circuit breaker comprising a casing including a first portion defining an opening, a manual operating member extending through said opening and having a second portion projecting externally of said casing, a pair of cooperating contacts disposed within said casing and operable into and out of engagement by movement of said operating member to a first and a second position respectively, and a lock member self-secured at a first end thereof to said operating member second portion; said lock member being movable between a third and a fourth position; said casing first portion and said operating member forming a first recess when said operating member is in said first position; said casing first portion and said operating member forming a second recess when said operating member is in said second position; said lock member including a second end disposed in said first recess when said lock member is in said third position and when so disposed preventing operation of

said operating member to said second position; said lock member second end being disposed in said second recess when said lock member is in said fourth position and when so disposed preventing operation of said operating member to said first position; said lock member being constructed of resilient material; said lock member being generally U-shaped with the free ends of the U arms having inwardly turned portions; said manual operating member having recesses in said second portion thereof wherein said lock member inwardly turned portions are disposed; said lock member being narrower at the second end thereof than at the first end thereof.

3. A circuit breaker comprising a casing including a first portion defining an opening, a manual operating member extending through said opening and having a second portion projecting externally of said casing, a pair of cooperating contacts disposed within said casing and operable into and out of engagement by movement of said operating member to a first and a second position respectively, and a lock member self-secured at a first end thereof to said operating member second portion; said lock member being movable between a third and a fourth position; said casing first portion and said operating member forming a first recess when said operating member is in said first position; said casing first portion and said operating member forming a second recess when said operating member is in said second position; said lock member including a second end disposed in said first recess when said lock member is in said third position and when so disposed preventing operation of said operating member to said second position; said lock member second end being disposed in said second recess when said lock member is in said fourth position and when so disposed preventing operation of said operating member to said first position; said lock member being constructed of resilient material; said lock member being generally U-shaped with the free ends of the U arms having inwardly turned portions; said manual operating member having recesses in said second portion thereof wherein said lock member inwardly turned portions are disposed; said lock member being narrower at the second end thereof than at the first end thereof; said first and said second recesses being constructed to force said U arms toward one another as said lock member is moved into said third and said fourth positions respectively thereby retarding movement of said lock member out of said first and said second recesses.

4. A circuit breaker comprising a casing including a first portion defining an opening, a manual operating member extending through said opening and having a second portion projecting externally of said casing, a pair of cooperating contacts disposed within said casing and operable into and out of engagement by movement of said operating member to a first and a second position respectively, and a lock member self-secured at a first end thereof to said operating member second portion; said lock member being movable between a third and a fourth position; said casing first portion and said operating member forming a first recess when said operating member is in said first position; said casing first portion and said operating member forming a second recess when said operating member is in said second position; said lock member including a second end disposed in said first recess when said lock member is in said third position and when so disposed preventing operation of said operating member to said second position; said lock member second end being disposed in said second recess when said lock member is in said fourth position and when so disposed preventing operation of said operating member to said first position; said lock member being constructed of resilient material; said lock member being generally U-shaped with the free ends of the U arms having inwardly turned portions; said manual operating member having recesses in said second portion thereof

of wherein said lock member inwardly turned portions are disposed; said U arms including portions diverging from the web of the U; said U arm diverging portions being engaged by said casing first portion as said lock member is moved into said first and said second recesses whereby said U arms are forced to one another thereby retarding movement of said lock member out of said first and said second recesses.

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