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CIRCUIT BREAKER LOCKING

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Fig. 1.

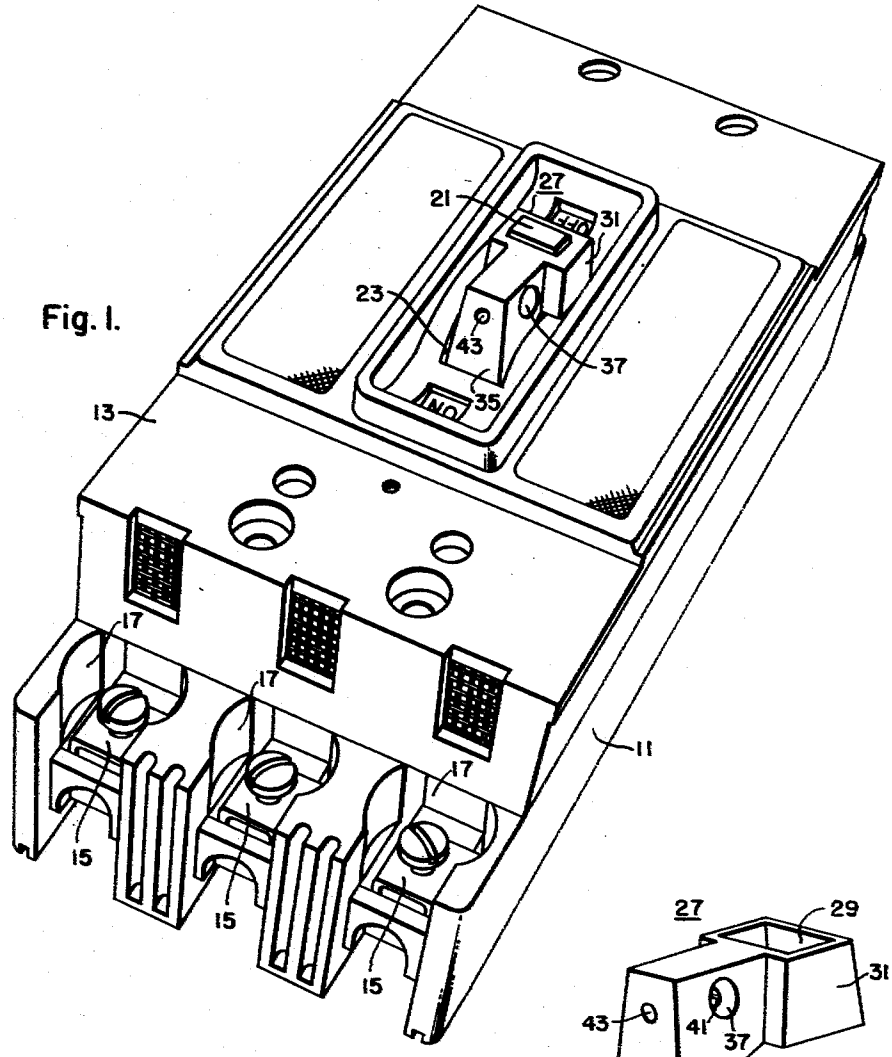
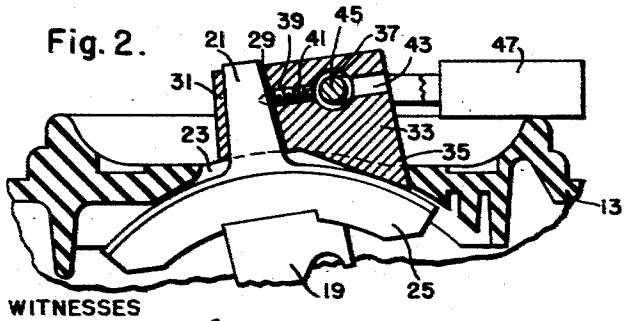


Fig. 3.

Fig. 2.



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CIRCUIT BREAKER LOCKING

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14 Claims. (Cl. 200—42)

This invention relates to circuit breakers and more particularly to holding or locking devices for circuit breakers.

In circuit breaker installations in general and particularly in panelboard, load center and motor control installations, it is often desired or imperative that the setting of a particular circuit breaker or group of circuit breakers remain undisturbed. Situations often occur in which one or more of a group of breakers have been put in the "on" or "off" position for some important reason, and some unauthorized person, either intentionally or inadvertently changes the setting of the breaker or of the group of breakers. Situations of this nature may result in annoying interruptions to service or operations, and may even cause serious damage to apparatus and injury to persons who may be relying on the setting of the breaker or group of breakers.

Heretofore in certain instances circuit breakers mounted in metal enclosures have been provided with locking means on the metal enclosure for locking the breaker in set position. Since it could not be foreseen whether any particular breaker would require a locking means, it was necessary to provide the metal box for each of a line of breakers with the above described locking means.

Other forms of locking devices devised to lock individual breakers in the set position require that holes be drilled by the user either in the breaker handle or the cover, or in both, thus weakening these structures and making it impossible to use the locking device without first drilling one or more holes. Other locking devices necessitate the insertion of thin metal strips or tabs in the clearance space between the breaker handle and the under side of the cover. Such metal strips or tabs are removable by unauthorized persons and may not be usable if the particular breaker does not have sufficient space to receive them.

An object of the invention is to provide an improved form of a device for preventing movement of a circuit breaker operating handle and which does not have the above disadvantages.

Another object of the invention is to provide an improved form of a device for preventing movement, or at least indicating that there should be no movement, of the manual operating handle of a circuit interrupter, and which is capable of being quickly and easily attached to or detached from the circuit interrupter structure so that it can be moved from one interrupter to another as desired, thus making it unnecessary to provide a locking device for every interrupter where they all do not need to be locked or held at any one time.

Another object of the invention is to provide an improved holding or locking device for preventing movement of the operating handle of a circuit breaker, which does not require any support or cooperating member to be mounted on the breaker cover.

Another object of the invention is to provide an improved locking device for preventing movement of the operating handle of a circuit breaker, which does not require a hole to be drilled in the operating handle or in the breaker cover.

Another object of the invention is to provide an improved locking device for the operating handle of a circuit breaker, which does not require the insertion of any part between the breaker operating handle and the under side of the cover.

Another object of the invention is to provide a holding device for preventing substantial movement of the operating handle of a circuit breaker, which is provided with means for quick attachment to or removal from the circuit breaker structure and which is provided with means for receiving a padlock for preventing removal of the device from the circuit breaker by unauthorized persons.

Another object of the invention is to provide an improved holding device for preventing substantial movement of the operating handle of a circuit breaker, which comprises a single rigid element secured to the handle and provided with means for receiving the bow of a padlock, if desired, to prevent removal of the device from the handle.

The invention both as to structure and operation, together with additional objects and advantages thereof, will be best understood from the following detailed description thereof when read in conjunction with the accompanying drawing.

In said drawing:

Figure 1 is a perspective view of a circuit breaker showing the locking device mounted on the operating handle of the circuit breaker;

Fig. 2 is an elevational view partly in section showing the locking device applied to the handle of a circuit breaker and a padlock applied thereto for preventing its removal.

Fig. 3 is a perspective view of the locking device.

The locking device may be used in connection with many conventional circuit interrupter structures. For illustrative purposes the locking device is shown applied to a circuit breaker of the type disclosed in Patent No. 2,419,125, issued April 15, 1947, to Hiller D. Dorfman and Gerald J. Freese and assigned to the assignee of this invention.

The circuit breaker shown in Fig. 1 of the drawing comprises a housing which consists of a base **11** and cover **13** both of molded insulating material. Line terminals and load terminals are provided for connecting the circuit breaker to an electric current. Only the line terminals **15** are shown and these are mounted in recesses **17** at the end of the base **11**. The circuit breaker is preferably provided with a trip free operating mechanism (not shown herein) which is controlled by a trip device to effect automatic opening of the circuit breaker and which is operable by means of a handle to manually open and close the breaker. Since the details of the circuit breaker do not form an essential part of this invention they have not been illustrated or described herein. For a complete understanding of the structure and operation of the circuit breaker mechanism, reference may be had to the aforementioned Patent No. 2,419,125.

Included in the breaker operating mechanism is an operating member **19** (Fig. 2) on which is mounted a handle **21** of molded insulating material. The handle **21** extends out through an opening or slot **23** in the cover **13** and has an integral arcuate portion **25** which substantially closes the opening **23** in all positions of the handle.

The handle **21** is shown in Figs. 1 and 2 in the breaker open position and is movable in a single plane back and forth between the ends of the slot **23** to close and open the breaker.

The locking device preferably comprises a rigid locking member **27** molded or cast in one piece and having

an opening 29 formed in the main or handle engaging portion 31 thereof shaped to accommodate the handle 21 of the circuit breaker. A wedge-shaped blocking portion 33 preferably formed integral with the main portion 31 extends rearwardly of the handle engaging portion 31 and is adapted, when the member 27 is placed in locking position on the handle 21, to extend into the slot or handle opening 23 of the breaker cover so that the nose 35 lies adjacent the end wall of the slot or handle opening 23. The blocking portion 33 is provided with a transverse opening 37 spaced from the handle opening 29 and substantially at a right angle therewith. A tapped hole 39 is provided extending between the transverse opening 37 and the handle opening 29 to receive a set screw or other holding member 41. An opening 43 in alignment with the opening 39 and on the other side of the opening 37 provides access for the insertion of a suitable tool for the purpose of tightening the set screw 41 against the breaker handle 21. The openings 39 and 43 form a continuous opening in the blocking portion 33 which is normal to the handle opening 29 and which intersects and is crossed by the lock opening 37.

The locking device may be attached to the handle of the breaker in the position shown in Figs. 1 and 2, or in reverse position so that the operating handle may be held against substantial movement in either its closed position or open position, whichever is desired.

The locking device when mounted on the handle with the nose 35 in the handle opening thus effectively prevents any substantial movement of the operating handle. If desired, the bow or shackle 45 of a padlock 47 may be inserted in the opening 37 to prevent access to the set screw 41 and removal of the locking device. Thus, the operating handle may be locked against movement by any one other than the person who has possession of the key to the padlock.

The holding or locking device may be used with many standard lines of switches either of the current responsive or noncurrent responsive type. The device may be made in different sizes for use with different circuit breakers. They are easily attached and removed and may either be sold as a unit for use with the breakers already in commercial use or as an attachment for new lines of breakers. This locking or holding device may be moved from one breaker to another as an electrician works first on one circuit and then on another.

It will be seen that the invention provides a simple and efficient device for preventing substantial movement of the operating handle of a circuit breaker, which is of simple, rugged one-piece construction and inexpensive to manufacture. The locking device is of rigid one-piece construction which does not require holes to be drilled either in the breaker cover or in the breaker operating handle. However, if the handle of the breaker does have a hole therein, the holding member 41 may extend into the opening.

Having described the invention in accordance with the provisions of the patent statutes, it is to be understood that various changes and modifications may be made in the structural details disclosed without departing from the spirit of the invention.

I claim as my invention:

1. The combination with a circuit interrupter having an operating handle, a casing having a slot in which said handle is movable to "on" and "off" positions, of a single member adapted to be mounted on said handle, said member being of one-piece rigid construction, means defining an opening in said one-piece member for receiving said operating handle, an integral portion of said one-piece member when said member is mounted on said operating handle extending into said slot for engaging an end wall of said slot to thereby prevent substantial movement of said handle, and means in said one-piece member movable to engage said operating handle and rigidly secure said one-piece member to said handle.

2. The combination with a circuit interrupter having an operating handle, a casing having a slot in which said handle is movable in a single plane to "on" and "off" positions, of a one-piece member mounted on said handle, said member having an opening receiving said handle, a blocking portion on said member extending into said slot and engaging an end wall of said slot to thereby prevent substantial movement of said handle, an opening in said blocking portion extending into said handle-receiving opening, and a holding member movable in said opening in the blocking portion and engaging the circuit interrupter handle.

3. The combination with a circuit interrupter having an operating handle, a casing having a slot therein in which said handle is movable in a single plane to "on" and "off" positions, of locking means removably mounted on said handle, said locking means comprising a single member having an opening therein for receiving said handle, fastening means movable in said single member engaging said handle for rigidly fastening said single member to said handle, and an integral portion of said single member extending into said slot when said member is mounted on said handle and engaging said casing to thereby prevent substantial movement of said handle.

4. The combination with a circuit interrupter having an operating handle free of openings, a casing having a slot in which said handle is movable in a single plane to "on" and "off" positions, of a single rigid member removably mounted on said handle, said rigid member having a portion extending into said slot when mounted on said handle to prevent substantial movement of said handle, securing means movable in an opening in said single member to engage said handle to rigidly secure said rigid member to said handle, and locking means engageable with said single rigid member for preventing access to said securing means.

5. The combination with a circuit interrupter having an operating handle free of openings, a casing having a slot in which said handle is movable in a single plane to "on" and "off" positions, of a single rigid member removably mountable on said handle, said rigid member having a portion extending into said slot when mounted on said handle to prevent substantial movement of said handle, and securing means for rigidly securing said rigid member to said handle, and locking means engageable with said single rigid member for preventing access to said securing means.

6. The combination with a circuit interrupter having an operating handle free of openings, a casing having a slot in which said handle is movable in a single plane to "on" and "off" positions, of a one-piece member removably mountable on said handle to prevent substantial movement of said handle, said one-piece member having an opening therein for receiving said handle, and adjustable securing means movable in an opening in said one-piece member to provide a pressure engagement of said one-piece member with said handle to rigidly secure said one-piece member to said handle.

7. The combination with a circuit interrupter having an operating handle free of openings, a casing having a slot in which said handle is movable in a single plane to "on" and "off" positions, of a one-piece member removably mountable on said handle to prevent substantial movement of said handle, said member having an opening therein for receiving said handle, adjustable securing means for providing a pressure engagement of said member with said handle to rigidly secure said member to said handle, and locking means engageable with said one-piece member to prevent access to said adjustable securing means.

8. The combination with a circuit interrupter having an operating handle free of openings, a casing having a slot in which said handle is movable in a single plane to "on" and "off" positions, of a single member removably mountable on said handle in either of two positions

for locking said handle in either its "on" or "off" positions, said member having an integral portion extending into said slot in the plane of movement of said handle for preventing substantial movement of said handle, said member having an opening therein for receiving said handle, and adjustable means in said single member engaging said handle providing pressure engagement of said member with said handle in either position of said single member to rigidly secure said member to said handle.

9. The combination with a circuit interrupter having an operating handle free of openings, a casing having a slot in which said handle is movable in a single plane to "on" and "off" positions, of a single member removably mountable on said handle in either of two positions for locking said handle in either its "on" or "off" positions, said member having an integral portion extending into said slot in the plane of movement of said handle for preventing substantial movement of said handle, said member having an opening therein for receiving said handle, adjustable means for providing pressure engagement of said member with said handle in either position of said member to rigidly secure said member to said handle, and locking means engageable with said member to prevent access to said adjustable means.

10. The combination with a circuit interrupter having an operating handle free of openings, a casing having a slot in which said handle is movable to "on" and "off" positions, of means comprising a one piece member adapted to be removably mounted on said handle in either of two positions and having an integral locking portion for locking said handle in either its "on" or "off" position, means defining an opening in said member for receiving said handle, and securing means in said one-piece member engaging said handle to rigidly secure said one piece member to said handle, and locking means engageable with said one-piece member to prevent access to said securing means.

11. The combination with a circuit interrupter having a handle, a casing having a slot in which said handle is movable to "on" and "off" positions, of a one-piece handle holding device having an opening therein surrounding said handle and having a blocking portion extending into said slot for preventing substantial movement of said handle, an opening in the blocking portion extending substantially normal to and intersecting with

the opening surrounding the handle, securing means comprising a set screw in the aforesaid opening in the blocking portion for securing said handle holding device to said handle, said device having a second opening in the blocking portion thereof transverse to the first said opening between the head of the set screw and the outer end of the blocking portion for receiving locking means to prevent access to said set screw.

12. In a circuit interrupter handle holding device, a single one-piece rigid casting including a handle-receiving portion and a blocking portion, said handle-receiving portion of the casting having an opening therein for receiving a circuit interrupter handle, said blocking portion of the casting extending rearwardly from the handle-receiving portion, an opening in the blocking portion extending substantially normal to and intersecting with the handle-receiving opening, and a securing member movable in the opening in the blocking portion into a position extending into the handle-receiving opening.

13. In a circuit interrupter handle holding device, a portion having opposed surfaces for receiving opposite sides of a circuit interrupter handle therebetween, a portion extending rearwardly of the handle receiving portion and having a blocking tip at its lower rear edge, an opening in the rearwardly extending portion extending into the handle-receiving portion; and a securing member movably mounted in the opening in the rearwardly extending portion for movement of one end thereof into the space between the opposed surfaces for receiving the circuit interrupter handle.

14. In a circuit interrupter handle holding device, a portion having opposed surfaces for receiving opposite sides of a circuit interrupter handle therebetween, a portion extending rearwardly of the handle receiving portion and having a blocking tip at its lower rear edge, an opening in the rearwardly extending portion extending into the handle-receiving portion; and a lock receiving opening in the rearwardly extending portion extending in a direction transversely of the first said opening.

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