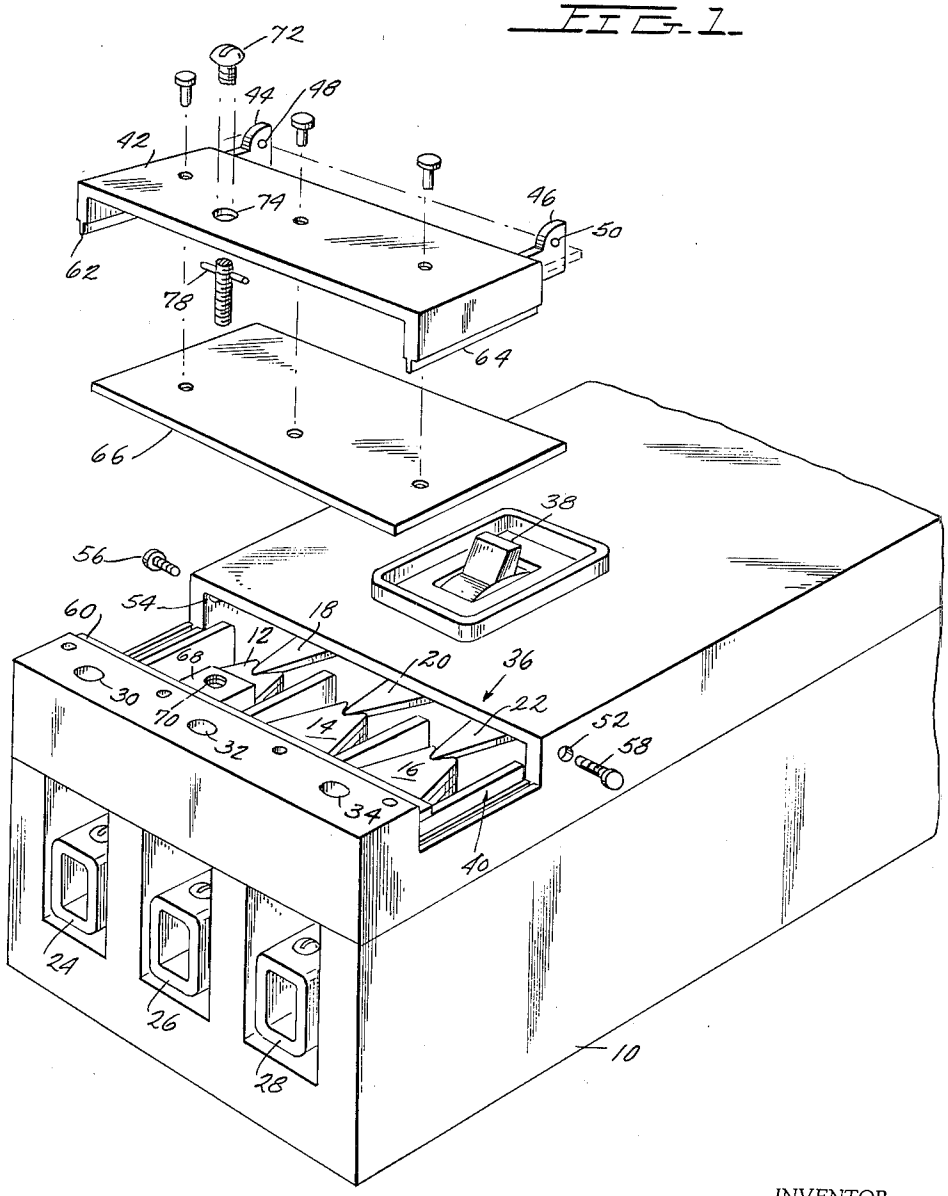
Sept. 18, 1962 W. H. HARMAN, JR 3,054,880

VISIBLE INDICATING MEANS FOR CIRCUIT BREAKER CONTACTS

Filed Feb. 4, 1959

2 Sheets-Sheet 1

FIG. 1



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FIG. 2

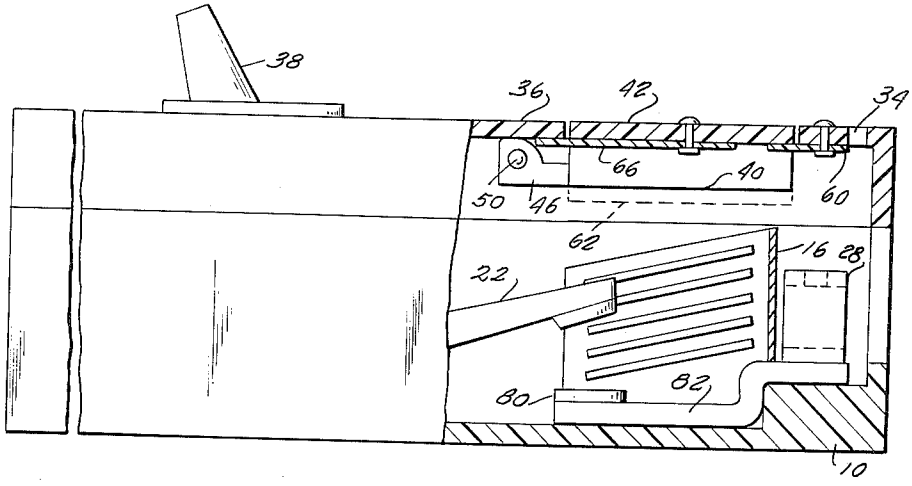


FIG. 3

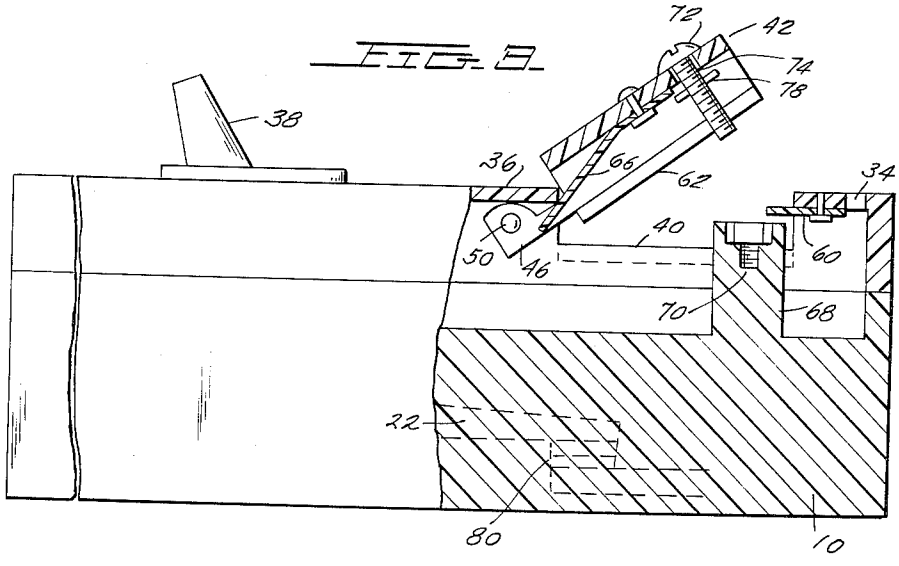
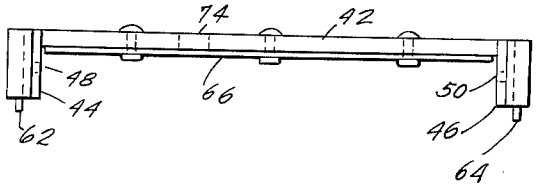


FIG. 4



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VISIBLE INDICATING MEANS FOR CIRCUIT BREAKER CONTACTS

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3 Claims. (Cl. 200—168)

My invention relates to a housing construction for molded case circuit breakers which permits direct visual observation of the circuit breaker contacts without removing the circuit breaker cover.

Direct visual observation means for circuit breaker contacts have been provided in the past and generally comprise either a transparent cover portion or a removable cover portion. In the transparent cover portion devices, it has been found their effectiveness is decreased since after a few operations, the transparent cover is directly exposed to the hot arcing gases and becomes clouded so that visual observation of the contacts becomes difficult if not impossible.

In the second type of structure in which a portion of the cover is removable, the observation becomes a time consuming process and is extremely inconvenient since a partial disassembly of the cover is required.

Furthermore, it is possible that the removed parts of the cover can be dropped or lost or the observing personnel will forget to replace the cover after making a visual observation.

The essence of my invention is to provide a cover member on the portion of the molded case circuit breaker cover adjacent the contact area which is hinged to the main cover and may be easily pivoted upwardly in order to make a direct visual observation of the contacts. The cover is normally held in place by any simple locking means which requires a minimum of effort to defeat so that the hinged member may be easily pivoted to an observing position. Since the hinged portion of the cover is always connected to the circuit breaker, it is impossible to lose or drop this member, and if desired, spring biasing means may be provided to normally bias the cover to its locked position.

Accordingly, the primary object of my invention is to provide a novel cover construction for molded case circuit breakers which permits direct observation of the circuit breaker contacts.

Another object of my invention is to provide a novel hinged cover portion adjacent the contacts of a molded case circuit breaker.

Still another object of my invention is to provide a novel hinged cover portion for circuit breakers which is pivoted with respect to the cover and can be moved to a position to permit visual observation of the circuit breaker contacts.

These and other objects of my invention will become apparent from the following description taken in connection with the drawings, in which;

FIGURE 1 is an exploded perspective view of a molded case circuit breaker adapted with my novel hinged cover.

FIGURE 2 is a side cross-sectional view of the circuit breaker of FIGURE 1 with the circuit breaker contacts in the disengaged position and the hinged cover in its closed position.

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FIGURE 3 is a side cross-sectional view of the circuit breaker of FIGURE 1 taken through the locking post portion of the circuit breaker where the circuit breaker contacts are closed and the hinged cover is in its open position.

FIGURE 4 is a front view of the hinged cover of FIGURES 1 through 3.

Referring now to the figures, my novel hinged cover will be seen to be applicable to any type of molded case circuit breaker such as the circuit breaker shown in U.S. Patent No. 2,843,702 issued July 15, 1958 and assigned to the assignee of the present invention.

The typical circuit breaker chosen for FIGURES 1 through 3 is comprised of a base portion **10** which carries the complete circuit breaker mechanism. For purposes of the present invention, the only portion of the mechanism shown in FIGURE 1 are the arc chutes **12**, **14** and **16** which may be of any conventional type, and the movable contacts **18**, **20** and **22** which cooperate with arc chutes **12**, **14** and **16** respectively of the three-phase unit shown.

As will be shown more fully hereinafter, the movable contacts **18**, **20** and **22** cooperate with stationary contacts positioned at the bottom of base **10** and connected to terminals **24**, **26** and **28** respectively. The terminals **24**, **26** and **28** may clearly be of any type and for purposes of illustration, the terminals herein are of the type which are connectible to external conductors by threaded means which are positioned so as to be accessible through apertures **30**, **32** and **34**.

The base **10** of FIGURE 1 is normally enclosed by a cover means **36** which completes the enclosure of the circuit breaker and receives an operating handle **38** in the well known manner where operating handle **38** may manually position the contacts **18**, **20** and **22** in their engaged or disengaged position.

It has previously been necessary to determine the position of movable contacts from the position of the operating handle **38** or by completely removing the cover **36** or a portion thereof. The object of the present invention is to do away with this requirement.

Accordingly, I have placed a slot **40** in cover **36** as best seen in FIGURE 1 and positioned a hinged cover **42** in the slot **40**. As best seen in FIGURES 1 and 4, the hinged cover **42** carries inwardly displaced projecting ears **44** and **46** which may be integrally mounted with cover **42**. Ears **44** and **46** each contain an aperture **48** and **50** respectively as best seen in FIGURE 1. A rivet means or any desired pin means then cooperates with apertures **50** and **52** in cover **36** and apertures **48** and **54** so as to provide a pivot about which the cover **42** may turn with respect to the main cover **36**. For purposes of illustration, FIGURE 1 shows this pivotal means as rivets **56** and **58** for ears **44** and **46** respectively. Clearly, these rivets will be so formed as to not bind ears **44** and **46** to the cover **36**, but merely to provide a pivotal mounting for the movable cover **42**.

It will be further observed that ears **44** and **46** have an inwardly curved portion with the curve of apertures **48** and **50** as a center. The purpose of this cover will become apparent from a later description of FIGURES 2 and 3.

In order to form a complete seal between cover **36** and cover **42**, a first sheet of insulation **60** is fastened to the underside of cover **36** as best seen in FIGURES 2 and 3

by any desired means such as the rivets shown in the FIGURES. The sides of the cover **42** may have a projecting tongue section seen as tongue numbers **62** and **64** in FIGURE 4 which cooperates with a groove in the lower part of slot **40** along the sides of cover **36** in the well known manner.

The vertical sides of slot **40** of FIGURE 1 may carry a protruding insulating portion fastened to the interior of the cover **36** in the manner illustrated by insulating member **60** so that the sides of the slot may be covered.

The opening at the hinged end of cover **42** may then be sealed by means of an insulator member **66** which is preferably of a flexible insulating material and is carried by the underside of hinged cover **42** as by a rivet means illustrated in FIGURES 2 and 3 or by any desired means. It is to be clearly noted that the flexible insulating member **66** is carried by the underside of cover **42** at a point removed from the hinged end of member **42** whereby member **66** serves the dual function of both sealing between cover members **42** and **36** and serving as a biasing means to normally bias cover member **42** to a closed position.

In order to secure cover **42** in its closed position, an extending insulating post **68** extends from the base **10** of circuit breaker and carries an aperture **70** therein. Aperture **70** may have a threaded metallic insert therein and cooperates with a securing means such as screw **72** which is carried in aperture **74** of cover **42**. Screw **72** is preferably a captive screw and for this purpose, it may be distorted as shown by pin **78** in FIGURES 1 and 3 after being inserted in aperture **74**.

The manner in which my novel hinged cover operates may now be understood from FIGURES 2 and 3. FIGURE 2 is a side cross-sectional view of FIGURE 1 when taken through the phase including contact **22** and arc chute **16** with the contact **22** in its disengaged position as illustrated in FIGURE 1. The stationary contact which cooperates with movable contact **22** is seen in FIGURE 2 as contact **80** which is electrically connected to terminal **28** by a conductor means **82**. The contacts **22** and **80** are further seen in dotted lines in FIGURE 3 which is a cross-sectional view taken through the post **68** where the contacts are in their engaged position and the hinged cover has been moved upwardly.

The cover is normally locked in its closed position by means of screw **72** which threadably engages the cooperating screw means **70** contained within post **68**. A gas tight seal is provided when cover **42** is in the closed position of FIGURE 2 by means of insulating members **60**, **66**, insulating strips positioned across the vertical portions of slot **40** of FIGURE 1 and the tongue and groove arrangement between tongues **62** and **64** of FIGURE 4 and a cooperating groove in the bottom of slot **40**. Therefore, when the circuit breaker contacts are moved to their disengaged position, the hot arc gases generated will be confined by covers **36** and **42**.

If it is now desired to observe the position of the contacts, the captive screw **72** is quickly and simply loosened and the cover member **42** is then pivoted upwardly as shown in FIGURE 3. In order to permit this pivotal action to take place, ears **44** and **46** have the aforementioned curved portion about the center of apertures **48** and **50** as a center. It will further be observed that while the cover **42** is moved to the open position, that the flexible insulator strip **66** is bent away from the inside of hinged cover **42** so as to serve as a returning bias for cover **42**. This bias could be made as strong as desired to assure that the cover **42** is not inadvertently left in the open portion.

Clearly, when the cover **42** is moved to the upper position of FIGURE 3, an observer may easily look directly at the contacts **18**, **20** and **22** to see if the contacts are in the open position of FIGURE 2 or in the closed position of FIGURE 3. Furthermore, this cover affords visual access to the arc chutes so that their condition may be readily ascertained.

In the foregoing, I have described my invention only in connection with preferred embodiments thereof. Many variations and modifications of the principles of my invention within the scope of the description herein are obvious. Accordingly, I prefer to be bound not by the specific disclosure herein, but only by the appending claims.

I claim:

1. In a molded housing for a circuit breaker; said circuit breaker having a pair of cooperable contacts movable between an engaged and a disengaged position; said molded housing enclosing said circuit breaker and having a removable cover member; said removable cover member having an opening therein adjacent said pair of cooperable contacts; a hinged cover member; said hinged cover member being normally positioned across said opening in said removable cover member; means disposed within said housing and pivotally mounting said hinged cover member at one end thereof to said removable cover member; said hinged cover member being pivotally movable from its said normal position across said opening to an open position; said hinged cover member exposing said pair of cooperating contacts to direct visual observation when moved to its said open position; a locking means for said hinged cover member; said locking means being operable to lock said hinged cover member in said normal position across said opening in said removable cover member; said locking means including an easily removable threaded member extending from and captively carried by said hinged cover member to a portion of said molded housing; said cover member comprising a central portion having a pair of extending arms positioned substantially perpendicular to said central portion; at least one of said arms extending beyond one end of said central portion in a direction substantially parallel to said central portion for pivotal engagement with an interior wall of said molded housing; biasing means for said hinged cover member secured to said central portion operable to bias said cover member to its said normally closed position.

2. In a molded housing for a circuit breaker; said circuit breaker having a pair of cooperable contacts movable between an engaged and a disengaged position; said molded housing enclosing said circuit breaker and having a removable cover member; said removable cover member having an opening therein adjacent said pair of cooperable contacts; a hinged cover member; said hinged cover member being normally positioned across said opening in said removable cover member and being pivotally mounted to said removable cover member at one end; said hinged cover member being pivotally movable from its said normal position across said opening to an open position; said hinged cover member exposing said pair of cooperating contacts to direct visual observation when moved to its said open position; a biasing means for said hinged cover member; said biasing means being operable to normally bias said hinged cover member to its said normal position; said biasing means comprising an insulating sheet carried by said hinged cover member and engaging said removable cover member; said sheet being constructed and positioned to constitute sealing means between said removable cover member and said hinged cover member when the latter is in its normal position.

3. In a molded housing for a circuit breaker; said circuit breaker having a pair of cooperable contacts movable between an engaged and disengaged position; said molded housing enclosing said circuit breaker and having a removable cover member; said removable cover member having an opening therein adjacent said pair of cooperable contacts; a hinged cover member; said hinged cover member being normally positioned across said opening in said removable cover member; rearwardly extending ears on opposite sides of said hinged cover member and disposed within said housing, individual pin means for each of said ears mounted thereto; each of said pins extending outwardly from the ear to which it is mount-

ed and operatively mounted to said removable cover member at a side thereof whereby said hinged cover member is pivotally mounted to said removable cover member at one end; said hinged cover member being pivotally movable from its said normal position across said opening to an open position; said hinged cover member exposing said pair of cooperating contacts to direct visual observation when moved to its said open position; a locking means for said hinged cover member; said locking means being operable to lock said hinged cover member in said normal position across said opening in said removable cover member; said locking means including an easily removable threaded member extending from and carried by said hinged cover member to a portion of said molded housing; a biasing means for said hinged cover

member; said biasing means being operable to normally bias said hinged cover member to its said normal position.

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