Aug. 20, 1968 E. P. DESSERT 3,398,249

MOLDED CASE CIRCUIT BREAKER AND MOUNTING MEANS THEREFOR

Filed Feb. 13, 1967 2 Sheets-Sheet 1

FIG. 1

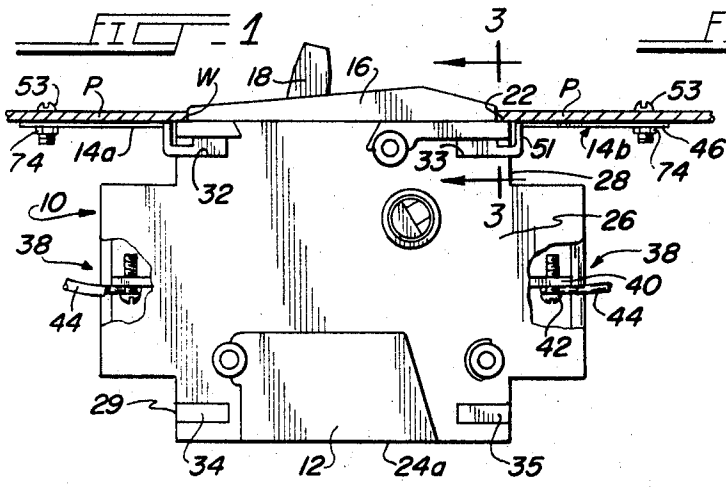


FIG. 2

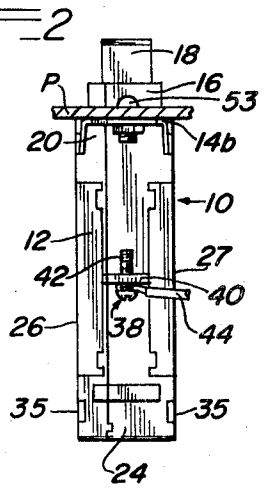


FIG. 3

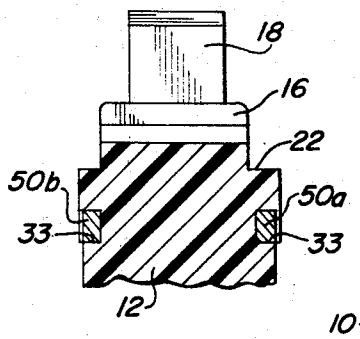
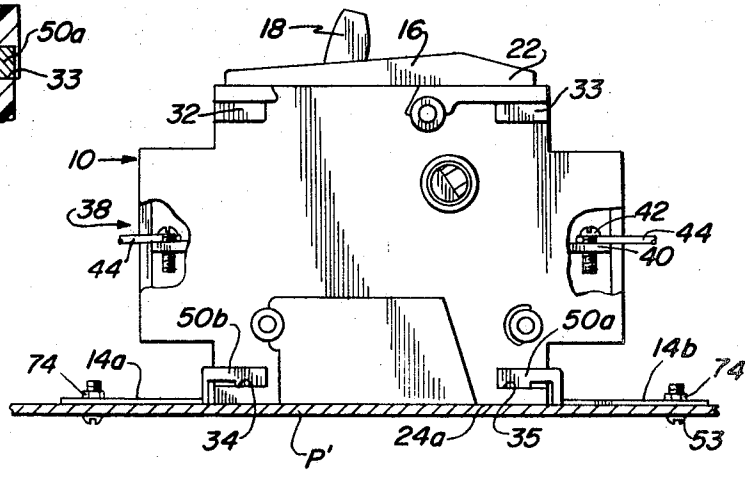


FIG. 4



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MOLDED CASE CIRCUIT BREAKER AND MOUNTING MEANS THEREFOR

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FIG. 5

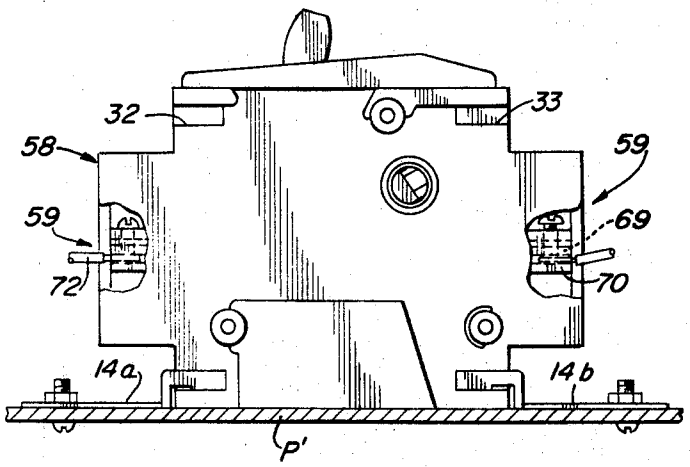


FIG. 6

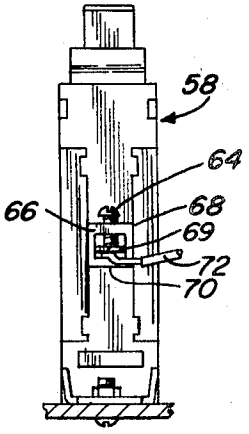


FIG. 7

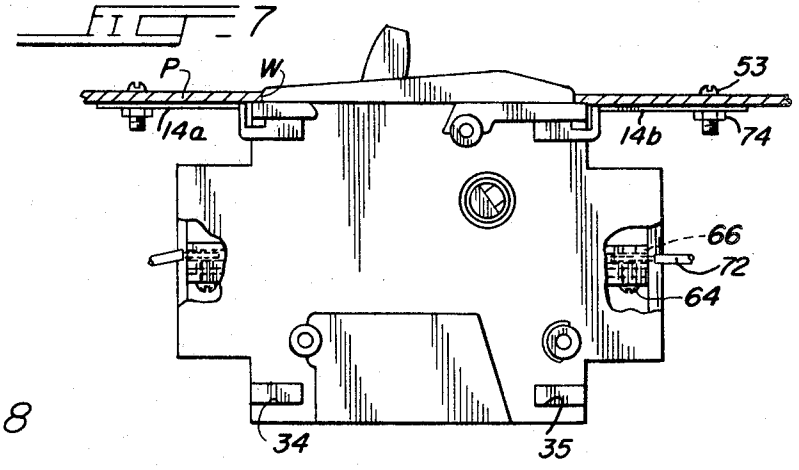
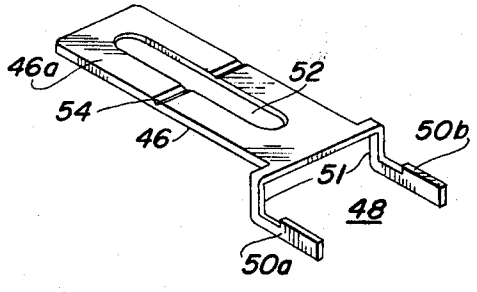


FIG. 8



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3,398,249

MOLDED CASE CIRCUIT BREAKER AND MOUNTING MEANS THEREFOR

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Filed Feb. 13, 1967, Ser. No. 615,435
6 Claims. (Cl. 200—168)

ABSTRACT OF THE DISCLOSURE

A pair of mounting brackets are removably secured selectively at either the top or bottom of a molded case circuit breaker. When the brackets are at the bottom, the circuit breaker may be mounted with its bottom surface against the outer surface of a panel. When the brackets are at the top, the circuit breaker may be mounted against the inner surface of a panel with an upper portion protruding through an opening in the panel. Screw-type wire connectors at opposite ends of the circuit breaker are reversible so that the wire-clamping screws can be made accessible to a conventional screwdriver irrespective of the mounted position of the circuit breaker.

Background of the invention

Field of the invention.—Details of electric circuit makers and breakers, specifically mounting and terminal means for a molded case circuit breaker.

Description of prior art.—Most molded circuit breakers designed specifically for the protection of branch circuits in buildings are arranged to be plugged into panelboards. Modified versions of these standard circuit breakers without the plug-in feature, termed unit breakers, are provided with non-removable mounting means which permit each of the circuit breakers to be individually secured on the front of a panel with the bottom wall of the circuit breaker held against the panel or are provided with different non-removable mounting means which permit each of the circuit breakers to be secured to the back of a panel with a portion of the circuit breaker protruding through an opening in the panel. Heretofore, the terminals of unit breakers had to be different, depending upon which of the two mounting means were provided, because the panel would otherwise prevent a conventional screwdriver from reaching the clamping screws of the wire connectors in one of the two mounted positions.

Summary of the invention

This invention relates to a molded case circuit breaker and mounting means therefor so constructed and arranged that the circuit breaker can be secured to a panel selectively in either of two positions with the wire connectors of the circuit breaker easily accessible by a tool in either position. Thus the invention renders the manufacture and stocking of two different unit breakers unnecessary.

An improved molder case circuit breaker and mounting means therefor in accordance with this invention comprises a circuit breaker case having four pairs of grooves formed in its side walls, the grooves of each pair being in alignment on oposite sides of the circuit breaker, respectively. Two pairs of the grooves are at the upper portion of the case at opposite ends, respectively, and the other two pairs of the grooves are at the lower portion of the case at opposite ends, respectively. A pair of mounting brackets is provided. Each of the mounting brackets has a pair of legs receivable respectively in the grooves of one of the pairs of grooves and a body portion arranged to be secured to a panel. Screw-type wire connectors at respective ends of the circuit breaker case have the axes of their clamping screws at right angles to the top and bottom walls of the circuit breaker case. The connectors are reversible so that the head of the screw can face the top or bottom of the circuit breaker, selectively.

An object of the present invention is to provide an improved molded case circuit breaker and mounting means therefor.

Another object is to provide an improved molded case circuit breaker and mounting means therefor, which mounting means comprises a pair of mounting brackets and cooperating means on the circuit breaker case for detachably securing the mounting brackets to the circuit breaker case selectively in either of two operative positions.

Another object is to provide an improved molded case circuit breaker and mounting means therefor which permits the circuit breaker to be mounted selectively in either of two positions on a panel, the circuit breaker having wire connector means which are reversible to permit access thereto by a suitable tool irrespective of the mounted position of the circuit breaker.

Brief description of the drawings

FIG. 1 is a side view of a molded case circuit breaker and mounting means therefor in accordance with the present invention, the circuit breaker being shown in mounted position beneath a panel and with portions of the case broken away to reveal the wire connectors;

FIG. 2 is an end view taken from the right of FIG. 1;

FIG. 3 is a partial sectional view taken generally along the line 3—3 of FIG. 1;

FIG. 4 is a side view of the circuit breaker of FIG. 1, but showing the circuit breaker in mounted position on top of a panel;

FIGS. 5, 6, and 7 are views similar to FIGS. 4, 2, and 1, respectively, but showing a circuit breaker having modified terminal connectors; and

FIG. 8 is a perspective view of a mounting bracket of the mounting means according to the present invention.

Description of the preferred embodiment

Referring to FIGS. 1, 2, and 3, a molded case circuit breaker **10** having a molded case **12** is mounted beneath a panel P by a mounting means comprising a pair of identical mounting brackets **14***a* and **14***b* and cooperating grooves, to be described, in the case **12**. An upper portion **16** of the case **12** extends upwardly through a window W in the panel P and has an operating handle **18** protruding upward therefrom. The case **12** has a top wall **20** which provides a top mounting surface **22** around the portion **16**, a bottom wall **24**, a pair of side walls **26** and **27**, and a pair of end walls **28** and **29**.

In FIG. 4, the circuit breaker **10** is shown mounted above a panel P′ by the same mounting means with a bottom mounting surface **24***a* of the bottom wall **24** in engagement with the upper surface of the panel P′.

The mounting means comprises, in addition to the brackets **14***a* and **14***b*, four pairs of grooves **32**, **33**, **34**, and **35** which are formed in the side walls **26** and **27** of the case **12** during the molding operation and which constitute securing means for cooperation with securing means of the brackets **14***a* and **14***b*.

Each of the grooves **32**, **33**, **34**, and **35** is rectangular in cross-section, and extends inwardly a short distance from its associated one of the end walls **28** and **29** generally parallel to the top mounting surface **22** and the bottom mounting surface **24***a*. The respective grooves

of each pair are in alignment in the opposite side walls **26** and **27**. The pairs of grooves **32** and **33** are at an upper portion of the case **12** a predetermined distance below the top mounting surface **22** and the pairs of grooves **34** and **35** are at a lower portion of the case **12** the same predetermined distance above the bottom mounting surface **24***a*.

The circuit breaker **10** is provided at opposite ends, between extending portions of the side walls **26** and **27**, with respective identical wire connectors **38**. Each of the connectors **38** comprises a fixed conducting tab **40** leading into the case **12** and having, in its outer end portion, a threaded opening receiving a wire-clamping screw **42**. A wire, such as one of the wires **44**, can be clamped between the tab **40** and the undersurface of the head of the screw **42** of each of the connectors **38**. Each of the tabs **40** has wiregripping grooves (not shown) surrounding the threaded opening on both its upper and lower surfaces. The arrangement of the case **12** and the tabs **40** is such that the screws **42** may be threaded into their respective tabs **40** from either the bottom, as shown in FIGS. 1 and 2, or from the top, as shown in FIG. 4, to perform its wire clamping function and to permit convenient access to the head of the screw **42** by a screwdriver whether the mounting arrangement of FIGS. 1 and 2 or the mounting arrangement of FIG. 4 is used.

As shown best in FIG. 8, each of the brackets **14***a* and **14***b* has a generally flat body portion **46** and a generally U-shaped case-engaging or securing means portion **48**. A pair of legs **50***a* and **50***b* of the case-engaging portion **48** constitute securing means for cooperation with the securing means on the case and are offset from the body portion **46** by respective off-setting portions **51** and extend away from the body portion **46** in a plane parallel thereto. The leg portions **50***a* and **50***b* have a cross-sectional size and shape complementary to the grooves **32, 33, 34**, and **35** of the case **12** so as to fit snugly therein as shown in FIG. 3. The body portion **46** has a fastening means such as an opening **52**, shown as an elongated slot, for receiving a fastener such as one of a pair of bolts **53**. A parting groove **54** having a generally V-shaped cross section is provided, as shown in FIG. 8, to permit severance of an end portion **46***a* from the remainder of the body portion **46** to provide a shortened body portion and an open-ended slot useful in certain installations. The brackets **14***a* and **14***b* are preferably made of metal.

In the modification of FIGS. 5, 6, and 7, a circuit breaker **58** similar to the circuit breaker **10** has, at opposite ends, respectively, a pair of identical wire connectors **59** of greater current-carrying capacity and for accommodating wires of larger size than the wire connectors **38** of the circuit breaker **10**. The connectors **59** are also reversible like the connectors **38**. Each of the connectors **59** comprises a clamping screw **64** threaded selectively into either a threaded opening in an upper wall portion **66** of an open, generally rectangular clamping frame **68** of the connector or a threaded opening of a lower wall portion **70** of the frame **68** thereby to provide access to the head of the clamping screw **64** regardless of whether the mounting arrangement of FIG. 5 or FIG. 7 is used. The frame **68** of each of the connectors **59** surrounds the outer end portion of a conductive tab **69** which extends into the circuit breaker **58** and which has wire-gripping grooves (not shown) on both its upper and lower faces. One of the faces is engaged by the inner end of the screw **64** to exert clamping pressure on a wire, such as one of the wires **72**, held between the opposite face of the tab and one of the wall portions **66** or **70**.

Mounting the circuit breakers **10** and **58** in the manner indicated in FIGS. 1, 4, 5, and 7 is readily accomplished. In FIGS. 1 and 7, the legs **50***a* and **50***b* of the respective mounting brackets **14***a* and **14***b* are received in the respective upper pairs of grooves **32** and **33** and a pair of the bolts **53** extend through respective openings in the panel P and through the openings **52** in the respective mounting brackets **14***a* and **14***b* and are secured with nuts **74**. Because the leg portions **50***a* and **50***b* are offset the same distance from the body portions **46** that the pairs of grooves **32** and **33** are spaced from the upper mounting surface **22** causes the mounting portion **46** to be coplanar with the respective mounting surface **22** and the inner wall of the panel P. The circuit breakers **10** and **58** are thus secured with the front mounting surface **22** held against the marginal area of the panel P surrounding the opening W.

In the mounting arrangement shown in FIGS. 4 and 5, the pair of mounting brackets **14***a* and **14***b* have their leg portions **50***a* and **50***b* respectively received in the lower pairs of grooves **34** and **35**. A pair of the bolts **53** in combination with nuts **74** may be used as in the front mounting arrangement. Because the leg portions **50***a* and **50***b* are offset the same distance that the pairs of grooves **34** and **35** are spaced from the bottom mounting surface **24***a* causes the mounting portions **46** to be coplanar with the surface **24***a* and the top of the panel P'. The circuit breakers **10** and **58** are thus secured with the surface **24***a* held against the panel P'.

A feature of the present invention is that removal of the circuit breakers **10** or **15** may be effected by merely loosening the nuts **74** and sliding the mounting brackets **14** out of engagement with the associated grooves of the case whichever mounting arrangement is used. Mounting may be similarly easily accomplished by the reverse of this method.

I claim:

1. In a molded case circuit breaker and mounting means therefor the combination comprising a circuit breaker having a molded case provided with top and bottom walls and a pair of end walls, and an improved mounting means for mounting the circuit breaker selectively in either of two positions on a panel, an outer surface of the bottom wall of the case being in engagement with the panel in one of said positions and an outer surface of the top wall of the case being in engagement with the panel in the other of said positions, said improved mounting means comprising a pair of elongated mounting brackets each having a fastening means at one end portion for fastening the bracket to the panel and a securing means at the other end portion, upper securing means on the case respectively adjacent the upper two corners of the case defined by the end walls and the top wall, and lower securing means on the case respectively adjacent the lower two corners of the case defined by the end walls and the bottom wall, said securing means on the case and at the other end portions of the brackets being mutually cooperative for detachably securing the pair of brackets to said case at the respective upper two corners or at the respective bottom two corners thereof, selectively.

2. The combination of claim **1** wherein said case has a pair of side walls and said securing means on the case comprises pairs of opposing grooves in said side walls respectively adjacent said upper and lower corners, the securing means of each of said mounting brackets is a pair of parallel spaced leg portions extending outwardly longitudinally from a body portion of the bracket including said one end portion, said leg portions being removably respectively in the grooves of each of said pair of grooves for detachably securing the bracket to the case.

3. The combination of claim **2** wherein the grooves at the top and bottom of the case are spaced equal distances respectively from said outer surfaces of the top and bottom walls, and the leg portions of each of the mounting brackets are offset from the body portion thereof a like distance.

4. The combination of claim **1** wherein the circuit breaker has a pair of screw-type wire connectors extending outwardly from said end walls, respectively, each of said connectors has at least one opening for receiving a wire-clamping screw, the axes of all of the openings being

generally parallel to said end walls and the openings being arranged to permit the screws to be threaded into the openings to perform a wire-clamping function with their heads facing either the top wall or the bottom wall, selectively.

5. The combination of claim 4 wherein each of the screw-type wire connectors comprises a screw, a rectangular frame having upper and lower wall portions with a conductive tab therebetween, said frame and tab being relatively movable so that said wall portions are movable toward and away from said tab, each of said wall portions having a threaded opening for receiving the screw, selectively, the axes of both of the openings being generally parallel to said end walls, and the inner end of the screw, when received in either opening, engaging the tab to effect said relative movement whereby a wire may be clamped between the tab and either of said wall portions.

6. In a molded case circuit breaker and mounting means therefor the combination comprising a circuit breaker having a molded case provided with top and bottom walls, a pair of side walls, a pair of end walls and a pair of screw-type wire connectors extending outwardly from said end walls, respectively, and mounting means for mounting the circuit breaker selectively in either of two positions on a panel, an outer surface of the bottom wall of the case being in engagement with the panel in one of said positions and an outer surface of the top wall of the case being in engagement with the panel in the other of said positions, wherein the improvement comprises said terminals being reversible so that access to the head of the screw can be had from the bottom or the top of the case, selectively, and said mounting means comprises a pair of elongated mounting brackets each having a means at one end for fastening the bracket to the panel and a securing means at the other end, upper securing means on the case respectively adjacent the upper two corners of the case defined by the end walls and the top wall and lower securing means on the case respectively adjacent the lower two corners of the case defined by the end walls and the bottom wall, said securing means on the case and at the other end of the brackets being mutually cooperative for detachably securing the pair of brackets to said case at the upper two corners or at the bottom two corners thereof, selectively.

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R. E. MOORE, *Primary Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,398,249 August 20, 1968

Edward P. Dessert

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 32, after "molded" insert -- case --; line 62, "molder" should read -- molded --. Column 2, line 45, "Embodiment" should read -- Embodiments --; line 53, "upward" should read -- upwardly --. Column 4, line 8, "and" should read -- or --; line 25, "15" should read -- 58 --; line 64, after "removably" insert -- receivable --.

Signed and sealed this 20th day of January 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents